A Cheapskate Corn-Belt Technical Nerd's Cookbook: The hows and whys of addressing the USA's food insecurity issues with its most abundant "Whole Foods"*

(19Aug2023)

(or "Corn &Soybean Cookbook: A Cheapskate Technical Nerd's "whole food" solution to the USA's food insecurity issues")

(or "Corn belt Commodity Cookbook: A Technical Nerd's "whole foods" solution to the USA's food insecurity issues)

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*Warning: this book may become "*Known to the State of Iowa to foment discontent*"

Style Definition: TOC 1

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Glossary/Acronyms

Artisanal = purportedly made in a traditional or non-mechanized manner. antonyms (usually) “efficient”, “cheap”, “quick”.

Ball-park (or ball parking) = semi quantitative estimates performed in order to determine if a proposed/ conceived solution to a problem could possibly work.

Blenderizing = simultaneous mixing/size reduction performed with a blender. synonym “pastifying”.

CAFO = Confined Animal Feeding Operation (aka “animal concentration camp”, “meat farm”, or more accurately, “fat farm”)

CDC = Centers for Disease Control and Prevention

Defartify(v) = doing whatever’s required (mechanically separate, leach, ferment, or germinate) to render your commodity-based foodstuff less apt to generate backdrafts.(n) defartification

DIAAS = digestible indispensable amino acid score

DIY = Do It Yourself - a much suppressed human instinct in the USA’s service and expert dominated economic system

DOE= (US) Department of Energy

FAO = the United Nations’ (UN’s) Food and Agriculture Organization

Fartlich = apt to enhance a male human’s “rich warm gas” production (in Geman, it’s a noun for running two miles at a race pace and two miles at a slower pace, in foodie English it’s a “new” adj).

FDA = Food and Drug Administration

Fisherperson = DIY fish shopper&, hopefully, consumer

Flyfisherperson = a supremely wise, effective, and good-looking fisherperson

FNS = Food and Nutrition Service (THE USDA’s feed-the-poor subagency)

Foodie = person with a particular interest in consuming “special”, cost-is-no-object, foods; a gourmet

Food insecurity = the state of being without reliable access to sufficient affordable, nutritious food, syn “poor”

GMO (genetically modified organism) = plant, animal, or microorganism that has had its genetic material (DNA) changed using technology involving its modification via transfer of specific snippets of DNA from one organism to another. Aka genetic engineering

Good = nutritious, honest, reasonably simple/quick, and not ridiculously or unusually expensive. Antonyms (usually) “special’, “organic”, “natural”

ICPP= Intergovernmental Panel on Climate Change

Natural = consistent with Mother Nature's "laws", not fine-sounding opinions and/or imagined "principles". Antonym (usually) "natural" because no government agency, certification group, or other official entity unambiguously defines that term or ensures that such claims have merit (each corporation's marketing department determines its definition)

NRC = (US) Nuclear Regulatory Commission

Organic = foodstuffs produced in a fashion that promotes ecological sustainability without "toxic" inputs like manmade nitrogenous fertilizers, pesticides, and genetically engineered ingredients (it's also any carbon containing molecule that's neither fully oxidized nor solely bonded to itself; e.g., not carbon dioxide or graphite)

Opportunity for excellence = a new or novel but solvable (not "wicked", political, religious, or otherwise trans-scientific) problem

Pastifying = converting big-sized particulate foodstuffs to a paste with an added liquid -– classically performed with a mortar/pestle but now usually with an electric blender, "special" food processor, or grain grinder.

Perfect (or perfection) = achieving whatever it is you want to achieve as well as it needs to be achieved. Synonym "*good enough for government workers*"

"People food" = stuff that people are "supposed" to eat (it's also a website)

SBM = Soybean meal

SNAP= the USDA's Supplemental Nutrition Assistance Program which provides the debit cards enabling ~41 million economically challenged US citizens to consume the same sorts of highly processed stuff that the rest of us do

RFOs = especially fartlich galacto-oligosaccharide (GOS) carbohydrates ("prebiotics") comprised of three to ten, 5 or 6 carbon "ring" sugar molecules bonded together in a particular way.

Synfood = foodstuff fabricated from isolated & often overly "purified" fractions of whole food commodities along with whatever other components (additives) are apt to render it easier to sell.

Unit operation (Unit Op) = one of a manufacturing process's series of individual steps

USAID =.United States Agency for International Development

USDA = US Department of Agriculture

Veggie = "vegetarians" when referring to flesh-phobic people or to what such people feed themselves with (anything derived from plant, bacterial, or fungal lifeforms - grains, legumes, mushrooms, vegetables, weeds, fruits, etc.)

WFP = The World Food Programme, an international organization within the United Nations that provides food assistance worldwide.

Whole food = a complex foodstuff containing everything that's edible/nutritious within a food commodity; e.g., whole corn/wheat/soybean kernels either with or without their "hulls" or a plucked/mostly gutted whole chicken - meat, bones, skin, fat, and giblets.

WIC = the USDA's SNAP-like "Special Supplemental Nutrition Program for Women, Infants, and Children"

Forward

(to be determined)

Introduction

"It is the duty of every man, as far as his ability extends, to detect and expose delusion and error"

&

"He who dares not offend cannot be honest"

Thomas Paine

I'm a 78-year-old, long-retired (2006) Idaho National Laboratory "Consulting Scientist" who's always considered doing science to be both fun and a "candle in the dark"[1]. I've written lots of technical papers about lots of subjects in lots of different fields including several chapters in Professor Rattan Lal's long running soil science book series and an entire book of my own about a "Nuclear-Powered Green New Deal"[2].

I'm also a newcomer to Iowa who's decided to take up "Bill Nye the Science Guy's challenge to try to "*change the world*" by identifying the root causes of the USA's "food insecurity" issues and pointing out how a straightforward technical fix could and should address them[3].

When I was in my early teens, my heroes were Isaac Asimov and Robert Heinlein. Asimov's autobiography convinced me to become a chemist, then a college professor, and finally after retiring from Idaho's national laboratory, a technical nerd-type writer. I recently learned that Heinlein had characterized us humans as rationalizing, not rational creatures[4] At the time that this book was first conceived, the then dominant US political tribe's willingness to self-identify with cults & ignore both history and readily available facts had triumphed over common sense, science, and even self-preservation (see APPENDIX VII). Having seen how a competently managed/incentivized bureaucracy did things during his tour as a WWII naval officer, Heinlein's writing thereafter "*expressed admiration for competence emphasizing the value of critical thinking which therefore often posed situations challenging conventional social mores*" (aka personal business models). I feel the same way and this book will drive that point home.

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[1] See Carl Sagan and his wife/collaborator Ann Druyan's last book, *"The Demon Haunted World: Science as a Candle in the Dark".*

[2] Siemer D., "Nuclear Power: Policies, Practices and the Future", Wiley/Scriveners, 2019 ISBN 978-1-119-65778-1. I'm also working on a more detailed, updated, textbook-style revision of that book.

[3] See Mr. Nye's book, **"Everything All at Once"**. That's the reason why some of my footnotes and APPENDICEs discuss the causes and cures of global warming, other cost-of-living inflation causes, and our children's *almost* inevitable food & energy issues – those issues share the same root causes.

[4] . Mark Twain hadn't been that kind to us: "... *what a dull-witted slug the average human being is* ...". ("Life On the Mississippi", 1883).

I'm certainly not the first technical nerd to conclude that the USA's mountains[5] of soybeans and corn are perfectly good "people foods". Here (below) is the first paragraph of a 1939 Iowa State College (now ISU) campus newspaper article about one of the then-recent collaborations between its chemical engineering and home economics students.

"SOYBURGER," said the chemical engineers recently, when they were asked what was served as meat at their all-soybean banquet. And so the menu went-soyburger, soybean soup, soybean noodles, soybean butter, and soybean adinfinitum. When chemical engineers pretend to take over the duties of home economics students majoring in dietetics, it's probably only right that the girls should know about it. And that's what these chemical engineers were doing when they put on the novel all-soybean banquet last month. Starting as the first co course was soybean soup. There are many variations in this recipe, but the one selected for the dinner was a cream soup featuring the whole bean as the principal constituent. Served with the soup as a first course or a side dish was soybean green sprout salad. The salad was covered with mayonnaise made from soybean oil. The sprouts were of a 5–7-day growth and were raised by our Horticulture Department here on the campus. Constituting the main course was the meat substitute, soyburger, soybean macaroni, soybean cheese, soybean noodles, and baked soybeans with tomato."

Since then, many articles/essays have been published about how the USA's privatized food system's decision makers and their governmental supporters have taken advantage of peanut producers (farmers) and US taxpayers[6] (see APPENDIX XIV). What's been missing are expressions of outrage about how those misdeeds have also impacted peanut *consumers* – in particular, the USA's ~38 million relatively unimportant food-insecure citizens[7]. That along with lots of suggestions about how to turn two of the USA's cheapest food commodities (corn

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[5]To visualize what a "mountain" means in this context, each year US farmers deliver ~17 (soybeans) and ~55 (corn) "Great Pyramid of Giza's" (volumes) of those crops to local buyers.

[6] In the US, each oligopoly's businesspersons are free to define both what a "unit" of its commodity is (bushel, gram, avoirdupois ounce, troy ounce, fluid ounce, pound, lug, bale, ton (2000 pounds), tonne (1000 kg), clam shell, etc. - see Weights, Measures, and Conversion Factors for Agricultural Commodities and Their Products (usda.gov)) and set its first and often biggest percentage-wise price markup. For instance, here in the USA, the mean "farmgate" price of whole, raw (no "value" added), potatoes is currently about 9 US cents per pound and their average wholesale cost about 35 cents/lb, which figure, in turn, was about one quarter of what DesMoines' only "downtown" supermarket demanded for them the last time I checked. Consequently, I now rarely buy potatoes unless some sort of "special" is being advertised. For example, three weeks before this footnote was written, HYVEE had a one day, one sack per customer, $1.49/five-pound spud special. Such happy situations only occur when the remainder of last year's crop must be cleared out of storage facilities to make room for a new crop. That's possible because potatoes are a "staple" foodstuff which means that they are relatively easy/cheap to store.

and soybeans) into delicious/nutritious "whole food[8] dishes", not just supply components of the US food and fuel business sectors' "value added" products, is what this book is mostly about.

I've become old, world-weary, and tired of hearing mostly bad "news" mostly consisting of alternative facts and self-serving/slanted/fixated opinions, not real and/or helpful information presented in proper perspective. However, as cynical as both that and my career in the USA's "science business sector" has made me, I also realize that most of us are "nice", behave more or less rationally, and some even go out of their way to unselfishly help the rest of us navigate through the mazes erected by the especially important people establishing and supporting extant business models[9] .

That's what's turned much of this book into an explanation of what's wrong with how several of the USA's business sectors are being managed and what could/should be done to address the issues engendered by such misbehavior. This ill render it an uncomfortable read to some especially important people.

Because it is also quite "technical", it's not for folks who don't want to bother with the nitty gritty of rational food selection/shopping/cooking or the even tougher learning how and wanting to think and do "technical stuff" for themselves[10].

No mind is thoroughly well organized that is deficient in a sense of humor.

Samuel Taylor Coleridge

Finally, I've tried to make this book somewhat humorous because it's fun and I'm apparently experiencing the same thing that one of Iowa's famous authora did over fifty years ago.

"Eventually you will go nuts, the cornfields get to you"

(Kurt Vonnegut "Iowa Writers' Workshop" 1967-1969).

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[8] Genuine whole foods are unrefined (or unprocessed) and therefore contain all of the nutrients within the plant(s) and/or animal(s) from which they were derived. Many of your supermarket's "whole foods" aren't whole.

[9]."Good" examples include the thousands of folks who freely share their expertise via YouTube's DIY videos, GOOGLE, QUORA, Engineering Toolbox, WIKIHOW, and WIKIPEDIA.

[10] Oligopolistic capitalism recently (2021) killed TV's then-best educational show outside of NOVA, "*Adam* (Conover) *Ruins Everything*", because in the aftermath of AT&T's 2018 acquisition of Time Warner, a new set of business managers did what happens every time there's another US mega-merger: indiscriminately lay off workers to "cut costs". In each of his show's 65 episodes, an annoying technical nerd (sticks his nose into everyone else's business -Conover) debunks common misconceptions on a topic including most of those discussed in this cookbook. In that takeover/merger, one hundred people were fired from **truTV**, including the head and vice head of that network and its entire programming and marketing departments. The company's new bosses then began to cancel shows, both good and bad to further cut costs. Because many of "*Adam Ruins Everything*" 's episodes had to do with how fostering citizen/voter/consumer fears and ignorance is profitable to the USA's deepest pocketed advertisers, it's surprising that his show lasted as long as it did.

Why “Cheapskate”?

In today’s world, money buys health, education, happiness, independence, and security which means that unless you were either born or have somehow become “rich”, wasting your money is apt to severely impact both you and your dependents. One of this book’s primary purposes is to show individuals how to properly feed both themselves and their loved ones for much less money than they have been led to believe is necessary by adding their own “value“ to the USA’s cheapest whole food commodities.

Learning how to do this will prove to be personally rewarding but will also require substantial effort because it’s not easy to unlearn bad habits or question things that most of our peers, family members, and leaders feel, “must be right because everybody thinks that way”.

“*Where all think alike, no one thinks very much*”

Walter Lippmann

Unlike most animals, we humans live in a world of our “feelings” which are in turn mostly determined by what we already believe, i.e., “faith”. That faith may be in a principle (e.g., “greed is good”), our interpretation of “God’s wishes”, anecdotal experiences, and most importantly, our social/political tribe’s collective beliefs & talking points. That’s why we often seem oblivious to things immediately obvious to “dumber” creatures like dogs, cats, and the weird people who aren’t naturally good team players. The latter is what I always seemed to have been - the “enlightened”[11] but politically autistic little gunboat that habitually sails up between two contesting armadas and then begins to blast away in both directions[12].

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[11] The Enlightenment is a movement of the late 17th and 18th centuries emphasizing reason and individualism rather than tradition.

[12] By my mid-teens, I’d appended “*and do it with numbers*” to my salesman-father’s advice, “*think for yourself*”, and have lived by that philosophy ever since. I apparently also have an artistic temperament which has proven to be a double-edged sword. Most of us “artists” share these qualities. Why Van Gogh Matters: What is the Artistic Temperament? :

1. Pursue creative avenues (I like to sing and have always been able to draw fairly well).
2. Prefer to work alone.
3. Shows or professes a love of nature.
4. Relationships with people have a lower priority than our work.
5. Although intelligent, we often aren't very wise in the practical ways of the world.
6. We’re “manic” - swing between periods of tremendous energy and long periods of rest .
7. Both introverted and extroverted, which basically means that we don't get on well with others.
8. We try to be androgynous or blend characteristics of both genders without necessarily being gay (I get weepy watching movies like “Love Story”, “Titanic”, and ”Beanpole”)
9. We try to be humble but deep down inside are proud of our “art”

The USA is currently in a “cold” Civil War between groups that see themselves as patriots but each other as threats to the country.   It’s become two nations with different worldviews, cultures, values, and ways of understanding reality occupying the same territory. The still barely dominant nation’s beliefs descend from the Enlightenment which had established fact-based reasoning as the ultimate source of authority. The other is descended from the Counter-Enlightenment which has never stopped believing in the primacy of faith, tradition, culture, ties to the land, and ethnic identity – or, in other words, in whatever often-alternative facts professed by their leadership s. Because the Enlightenment worldview has been so dominant during the industrial revolution, the Counter-Enlightenment had been almost forgotten until revived by politicians determined to regain power by taking advantage of the US constitution’s checks and balances.

Almost three years ago Professor Lal   suggested that I write a cookbook to demonstrate how the two commodity-type food crops that I’d recommended[13] that Africa's poor, and more numerous future masses[14] should raise to feed themselves (peanuts & corn) could be converted to foodstuffs that wouldn't gag us here in the first world. Consequently, I bought a 50-pound sack of steamed/rolled feed corn at a local feed store for ~$10 & tried it out in lots of ways. However, since …

- my wife usually won't even taste anything "strange"
- it was impossible to buy "cheap-enough" peanuts where I was then living (Idaho Falls, ID), and…
- I didn’t really like to eat totally vegan,
- I was then busy finishing up my book about the hows & whys of implementing a sustainable nuclear renaissance

…that project petered out until my wife finally succeeded in convincing me to move back to where she’d grown up (Iowa) and I’d finally gotten our 60-year-old ”new” house on the eastern edge of Des Moines mostly fixed up & winterized.

Surprisingly, it wasn’t easier to buy corn, peanuts, or even soybeans here smack dab in the center of the USA’s corn/soybean belt than it had been back in Idaho. Up until the COVID-19 pandemic had apparently given its “food sector’s” businesspersons a fine-sounding, all-purpose, excuse (“safety”) to shut down its bulk food section, Idaho Falls’ no-frills, warehouse-style, supermarket (WINCO) had included US soybeans along with the other commodity-type grains (wheat, flax, beans, lentils, peas, etc.) bulk-sold to anyone willing to scoop their own selections from bins into plastic bags - a self-performed “value addition” that apparently halved

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[13] In one of the soil science book chapters I’d written for Professor Lal, I’d done some ball parking having to do with estimating the amounts of energy, food, land, and water it’d take to feed Africa’s people circa 2100 AD. See The Nuclear Option | 14 | Soil Degradation and Restoration in Africa | (taylorfrancis.com)

[14] Africa’s current population is ~1.4 billion or about the same as India’s or China’s. The UN’s futurists predict that it’ll reach about 4.5 billion by 2100 AD.

the cost of whatever was being scooped relative to its cost elsewhere in that store. WINCO's soybeans had cost me about 65 cents per pound the last time that I'd bought them there which figure I'd considered too high because it was then ~three times higher than what their producer-farmers had likely received and no raw grain or bean kernel has had much "value" added to it.

Here in Des Moines one of its feed stores could/did sell me a five-pound sack of "*peanut pickouts – not for human consumption*" for "only" $8 (at that time, a ~six times farmer-to-consumer markup[15]-- the same sack would now cost me $11.13), but neither it nor any of the other people and/or other-animal feed stores that I contacted could sell me Iowa's soybeans – it's chief most cash crop - at any price because they didn't stock them. As that was going on, the USA's response to the COVID-19 epidemic was throwing millions more of its working people out of work and closing the schools at which many of their children had been receiving the only good meal/meals that they could depend upon. Consequently, additional "food insecurity" joined the other inflation[16]-driven insecurities that have been gradually rendering the lives of the USA's once proud and confident "middle class" more precarious since circa ~1975.

Consequently, another of this book's purposes is to identify the societal business models that have rendered such "wicked" problems so difficult to address.

Overall US retail food cost inflation between June 2017 and 2022 averaged 31% with greater percentage-wise increases for "cheap'' stuff like eggs, apples, peanut butter, potatoes, and wheat flour: (Figure 1 lists the price of a single "value added" foodstuff that's remained popular for over a century). That combined with a rapid run up of housing and energy costs are the main reasons that ~300,000 of Iowa's citizens - four times as many people as it has farms – remain both "troubled" and food insecure.

Since I felt that there had to be *some* way for the citizens of a state producing ~550 million bushels of soybeans each year to readily obtain them, I decided to refocus my little commodity-

[15] . On average US farmers receive under 16 cents of every $1 that its consumers spend on food. The "farm gate **value"** of a cultivated product is its "market value" minus its transport & marketing costs. It's not necessarily what its farmer-producers s get for it, which when grain is auctioned may be well below market price or even its production ("breakeven") cost. This website's http://www.producepriceindex.com/ "Farm Price" represents what the USA's "Western Grower" farmers are paid per standard unit of fruits and vegetables such as a one-pound clamshell (plastic box) of strawberries, bag of grapes, head of lettuce, or single cantaloupe melon. Its retail prices are what an average shopper must pay for them.

[16] Although probably not admitted, the reason that our government's monetary experts (Federal Open Market Committee (FOMC)) consider an annual inflation rate of two rather than zero percent as "ideal", is that it favors both its government and businesses. Big borrowers don't have to pay back as much as it would otherwise seem and the "fixed" pensions and benefits promised to their employees, don't cost them as much. Therefore "big-enough" investors (meaning big-enough election campaign contributors) like inflation while fixed income, penny pinching old retirees like me hate it.

based people-feeding cookbook onto recipes invoking combinations of field corn with soybeans rather than peanuts.

Table 1 US corn and soybean statistics

CORN	2019-2020		2020-2021 (Est.)	2021-2022 Projections August	SOYBEANS	2019-2020	2020-2021 (Est.)	2021-2022 Projections August
	(million bushels)		*(million bushels)*	*(million bushels)*		*(million bushels)*	*(million bushels)*	*(million bushels)*
Beginning stocks	2,221		1,919	1,117	Beginning stocks	909	525	160
Production	13,620		14,182	14,750	Production	3,552	4,135	4,339
Imports	42		25	25	Imports	15	20	35
Supply, total	15,883		16,127	15,892	**Supply, total**	4,476	4,680	4,533
Feed & residual	5,900		5,725	5,625	Crushings	2,165	2,155	2,205
Food, seed & industrial	6,286		6,510	6,625	Exports	1,679	2,260	2,055
Domestic, total	12,186		12,235	12,250	Seed	96	102	104
Exports	1,777		2,775	2,400	Residual	12	4	14
Use, total	13,963		15,010	14,650	**Use, total**	3,952	4,520	4,379
Ending stocks	1,919		1,117	1,242	**Ending stocks**	525	160	155
Avg. Farm price ($/bu)	3.56		4.40	5.75	Avg. Farm price ($/bu)	8.57	10.90	13.70
	[1] Source: USDA OCE World Agricultural Supply and Demand Estimates Report http://www.usda.gov/oce/commodity/wasde/index.htm				[1] Source: USDA OCE World Agricultural Supply and Demand Estimates Report http://www.usda.gov/oce/commodity/wasde/index.htm			

What's happened since then is the reason that so much of this book is devoted to describing the runaround that any "unconnected" soybean consumer wannabe encounters when trying to obtain reasonably priced (not over twice its commodity spot price) soybeans here in Iowa[17].

[17] It's likely that this book's tenor would be the same if I had moved to Georgia & not switched my basis protein-source commodity from peanuts to soybeans – see Appendix XIV.

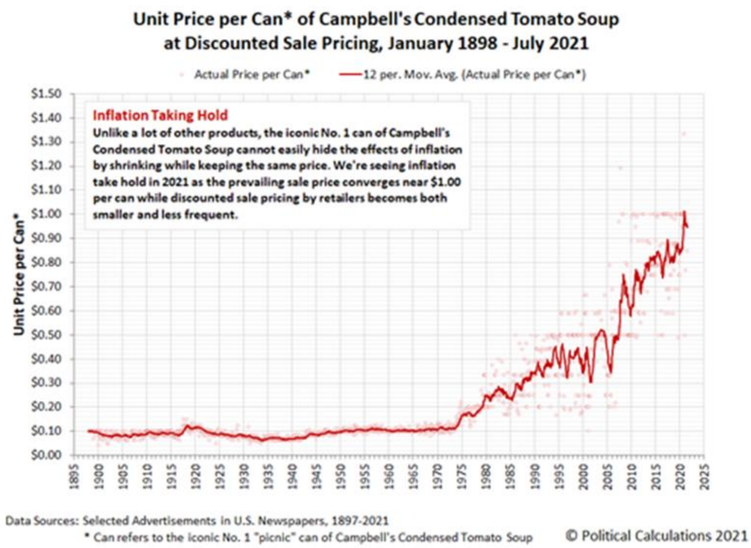

Figure 1 Typical example of highly processed people food cost inflation

The USA's farmer-producers aren't responsible for its food affordability issues. The root cause is its food sector's business policies, not its commodity producers' "greed". During the last forty years, agriculture has become the primary exception to the USA's policy driven deindustrialization[18] that's encouraged/rewarded the consolidation of small family farms into much bigger, more expensive to operate, and intensely competitive commodity production factories[19]. Including its tiny "hobby farms", the average size of a US Corn Belt farm is now about 350 acres and its owner's land is worth about $15,000/acre. Unfortunately, many of the USA's therefore seemingly "rich" surviving family farmers are financially insecure because their incomes often don't exceed their expenditures.

Farmers—especially those growing the corn and soybeans fueling our demand for hamburgers, bacon, motor fuel dilutants, and foreign trade —are in a tight spot. For their seeds, fuels, pesticides, and fertilizers, growers must depend on a small number of big companies that have

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[18] The rationale proffered was that we'd all be better off importing rather than making stuff that our own "dirty" industries would produce. "Clean" service sector-type jobs - advertising, education, health, finance, legal, government, transportation - and sales/trade would replace the USA's grubby old blue-collar factory work which would, of course, let everyone rise to the cleaner-handed, whiter-collared "middle class" (ha ha).

[19] Earl Butz, US Secretary of Agriculture under Presidents Nixon and Ford famously declared that US farmers should "*get big or get out*". That philosophy along with the policies and practices it fostered are the reason that today's family farmers get their food from the same supermarkets that the rest of us do - they no longer raise their own.

enormous leverage to raise prices. When they're ready to market their crops, they're then confronted by another handful of powerful grain-trading firms (buyers), that also have enough market leverage to keep their own costs down.

US corn farmers—the world's leading producers of that crop —have essentially three buyers: *ADM, Cargill, and Ingredion* (formerly *Corn Products International*). According to a 2014 study by University of Missouri rural sociologist Mary Hendrickson, they control 87 percent of the market. For the US soybean crop—also the world's 1st (or 2nd ?) biggest—ADM and Bunge are the top two buyers. Together with *Cargill* and Nebraska-based *Ag Processing*, they process 85 percent of US-grown soybeans[20].

As has happened with peanuts (see APPENDIX XIV), the USA's dominant soybean buyers are steadily merging into even bigger and more powerful entities with similar consequences to its supplier-farmers and consumers. Four years ago, the Department of Justice ok'd a proposed merger between seed/pesticide giants Monsanto and Bayer that further shrank farmers' options for buying necessary inputs and the grain-trading behemoth Archer Daniels Midland tried to take over its chief rival, Bunge.

Farming is a tough, risky, business because its farmers can't get off the USA's agribusiness model's treadmill, can't control the weather, can't control their fertilizer, seed, and fuel costs, and can't control most of the factors determining what their "big" (and often only) buyers will pay for their produce. What keeps them in business are the subsidies (price supports) provided via the United States Department of Agriculture (USDA) because the USA's topmost politicians realize that if too many of their constituents and (especially) their children go hungry, they'll lose their grip on government and therefore control of its economy.

Another cause of food cost inflation is that consumers have been encouraged to believe that unless a food is "organic", it's "unhealthy". According to Mr. GOOGLE, "organic" food is grown without the use of synthetic chemicals, such as human-made pesticides and fertilizers, and does not contain "genetically modified organisms" (GMOs). In most cases the resulting foodstuff is identical to the non-organic foodstuff – their "differences" are due to the origin (history) and associations of the element/compounds that it, plant or animal, had assembled itself from. These "legal" factors, not its quantifiable, characteristics, determine whether a food can be labeled "organic" (i.e., "green" kosher). Consequently, the USDA's "Certified Organic" seal is highly recognizable in the food marketplace, much coveted by both consumers and producers, and therefore inflates food costs because whatever's bearing it is "special"(very few consumers don't want to be "special"). Obtaining that credential raises food production costs because farmer producers can't utilize the most efficient technologies and must pay for additional overhead . While a "small farm" certification fee may initially cost its owners only ~$750 , they and their produces' consumers must pay for annual inspections, assessments, mountains of

[20] Worldwide the biggest grain traders are ADM, Bunge, Cargill Inc. and Louis Dreyfus Co. which together are known as the "ABCDs" dominating the industry.

paperwork, travel costs, and annual renewal fees. Such expenditures increase the cost of food, not add value to it[21].

Federal law requires that organic foods be produced in a way that promotes ecological sustainability without "toxic" inputs and genetically engineered ingredients. It also requires that farmers "*have a plan*" for building soil fertility and submit to annual independent third-party audits (certifications) of what they actually do. The philosophy behind US food laws regulations and interpretations differs from normal US law in that there's a presumption of guilt (it's "adulterated" or "unfit" for human consumption unless producers can prove otherwise), not innocent (good) unless proven to be guilty (not good).This of course means that perfectly good soybeans and corn are deemed "bad" (i.e., "not food grade") unless their producers can provide you with an expensive paper trail's "certifications" proving that their product hasn't been "adulterated". Most such warnings stress what the experts in question don't know about the stuff – not what they do or should know. We have a lawyerly[22], not scientific regulatory system irrespective of what its practitioner's educational qualifications or titles happen to be.

"*The first thing we do, let's kill all the lawyers*"

William Shakespeare

Grossly inflated staple foodstuff costs are the root cause of the USA's "food insecurity" issues. During an average year roughly 25% of the USA's ~330 million people receive some sort of help from one or more of the Federal government's 15 distinct food and nutrition assistance programs. Federal spending on the USDA's programs totaled $182.5 billion in fiscal year (FY) 2021, 49 percent more than the previous high of $122.8 B in FY 2020. *F*our titles accounted for 99% of the USDA's farm bill's mandatory outlays: Nutrition, Crop Insurance, Farm Commodity Support, and Conservation. Nutrition comprised 76% of that bill's mandatory outlays, mostly to support its Supplemental Nutrition Assistance Program (SNAP). The remaining 24% was to cover risk management and commodity support (16%) and conservation (7%). Programs in all other farm bill titles accounted for about 1% of mandatory outlays.

The difficulties that an "outsider" (anyone other than an insider) encounters when trying to bulk-purchase no-value added, raw soybeans for anything like what they should cost in the corn belt (not over twice current market price) has become one of this "cookbook's" primary subjects. Unfortunately, this situation isn't unusual. Another conclusion reached while

[21]The USDA's organic label has never worked for the well-meaning/acting small business-type farmer-producers who can't afford receiving certification.

[22] A society's laws – the ones that its lawyers concern themselves with - are "*acts of (its) general will*" (Jean-Jacques Rousseau, The Social Contract, II, 6), not statements based on replicated experiments or observations ("scientific laws") that describe or predict natural phenomena irrespective of what society's feelings happen to be. Lawyers are trained to and rewarded for winning arguments based upon "precedence", not for seeking/telling "whole" truths.

researching this book is that most (all?) of the other key goods and services that US citizens require have also become "oligopolized" in one way or another[23].

Researching this book has also demonstrated that the COVID-19 pandemic has provided another excuse for many of the people nominally working for both farmers and the rest of us in federal, state, and county governmental institutions to not go to work, answer their phones, return calls, or reply to emailed enquiries[24].

Equally unfortunate is the fact that most of the corn belt's farmers seem unwilling to question the business models that have put them onto the "cheap commodity" production treadmills enriching the USA's food and agricultural sectors' investors and topmost leadership.

Oh well, if you aren't yet hooked up to a breathing machine, the air you breathe is still "free" & the USA's food-for-the-poor providers, dispensers, and (especially) vendors are still doing a land-office business meeting their country's growing demand for their goods & services[25].

As I'd learned a long time ago in my two "real" long-term jobs first in academia[26] (tenure track Professor of Chemistry, Marquette University, 1974-1978) and then at/for Idaho's National Laboratory (INEL/INEEL/INL, 1978-2006), most of the "barriers to science"[27] that have rendered my latest little hobby project both relevant and unnecessarily difficult are political (trans scientific), not technical.

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[23] Oligopolistic capitalism recently (2021) killed TV's then-best educational show other than NOVA, "Adam (Conover) Ruins Everything", because in the aftermath of AT&T's 2018 acquisition of Time Warner, a new set of business managers did what happens every time there's another US mega-merger: indiscriminately lay off workers to "cut costs". In each of his show's 65 episodes, an annoying technical nerd (Conover) sticks his nose into someone else's business debunking common misconceptions on topics including most of those discussed in this cookbook. In that takeover/merger, one hundred people were fired from truTV, including the head and vice head of that network and its entire programming and marketing departments. The company's new bosses then began to cancel shows, both good and bad to further cut costs. Because many of "Adam Ruins Everything" 's episodes had to do with how fostering citizen/voter/consumer fears and ignorance is profitable to the USA's deepest pocketed advertisers, it's surprising that his show lasted as long as it did.

[24] I have had some small successes in contacting USDA personnel (four of ~50 attempts). However, to date no one so far has been willing to discuss either the root causes or possible cures for what's become one of this book's main themes or even agree to fact-check my work. As far as I'm concerned , the USDA has become another of the USA's pretend "public" institutions (i.e., it's chief customer is the "business", not the public)..

[25] The latest such warning I've received was 14Jan2023 when a CNN reporter announced that 25% of the USA's military personnel (mostly low ranking, married, enlisted people) have also become "food insecure.

[26] I quit that job after just four years because 1) it didn't pay enough 2) professors in "big name" US universities are graded more upon their success at bringing in "outside" money-than for either teaching or doing/supervising/publishing worthwhile research, and 3) my brother lived near Idaho's national laboratory. Before leaving, I made sure that both of my PhD-seeking graduate students had successfully defended their theses.

[27] The National Academy of Science's all-time "best seller" https://www.nap.edu/catalog/10229/barriers-to-science-technical-management-of-the-department-of-energy identified the reasons why the USA's nuclear scientists & engineers can't seem to deal with their institutions' radioactive wastes. Check it out – it's a great read.

Since I'm a technical nerd writing a technical cookbook, I've tried to quantitate as much of what I'll be discussing utilizing information, data, and materials that most not-poor US "civilians" can readily access/afford via the world wide web.

For instance, since most of today's supermarkets and big box one stop shopping centers no longer stock "clean" sodium hydroxide[28] and, if they do stock Cal Mexicana" (hydrated lime) it's ridiculously expensive, this book's nixtamalization (corn dehulling) procedures call for either sodium hydroxide (lye), pickling lime (also hydrated lime) or a mixture of 14 cent/pound masons/builders lime with "washing soda" (sodium carbonate). I've also decided to describe how I've arrived at my conclusions with lots of footnotes and APPENDICES.

History - especially the last century's wartime history – should have taught every public-school graduate that when we humans are both motivated and empowered to do so, we can do almost anything, good or bad, dumb or smart, that we set out to do. Unfortunately, several decades ago the USA's topmost decision makers, regulators, & rule-writers apparently decided that people feeding should become just another way for its food businesspersons, both regular and "organic", to make as much money as they can, any way they can.

The also unfortunate fact that the USA's higher education[29] & health [30]service business sectors have embraced the same philosophy is another of the reasons why so many of its younger middle-class citizens can't seem to "get ahead" as readily as could/did their parents & grandparents.

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[28] "Clean" means that the sodium hydroxide isn't accompanied with magic drain cleaning additives, e.g., hypochlorite , chunks of aluminum, dyes, or perfumes.

[29] Over one half of the USA's Medicare beneficiaries now sign up for its privatized "Medicare Advantage Part C" insurance system. Several of that program's biggest business beneficiaries (i.e., given ~12,000 tax dollars /year to provide Medicare's health related services), Kaiser Permanente, Cigna, Humana, Anthem, Elevance Health, and UnitedHealth Group have been accused of fraud. " How Insurers Exploited Medicare Advantage for Billions - The New York Times (nytimes.com) " Most of them refuse to disclose the costs of their services (publish a price list) or cover the cost of any "special" drugs and services that their doctor/nurse "associates" might recommend. That's what made the USA's health industry its biggest, most profitable, and most influential business sector which means that its leadership routinely can and does stomp out competitors like the midwives who've been helping women go through a natural process for as long as we humans have existed Des Moines' only birth center is closing despite demand for midwives (desmoinesregister.com).

[30]Adam Ruins the Hospital | truTV.com Adam Ruins the Hospital | truTV.com demonstrated why the USA's health care system has become ineffective, unaffordable. and unfair. For example, each of its hospitals or chain of them has a secret "chargemaster" featuring unrealistically high prices for its services (e.g., \$38 for a Tylenol tablet or \$33,000 for an Xray). However, actual billing charges depend upon where the money is to come from. Medicare and big insurance companies (their biggest customers) demand/get discounts but uninsured individuals and anyone else who's "out of network" gets charged its "chargemaster's" figures. The absence of effective governmental oversight benefits that business sector's "providers" (physicians, drug/equipment suppliers, hospitals & insurers) – not its consumers. Adam's show also pointed out that the reckless prescription of antibiotics to both people and the inmates of "Confined Animal Feeding Operations" is rendering them worthless.

That realization gradually turned much of my little commodity cookbook into a rant written in "nerd speak" which renders it more controversial and even a bit funny here and there. Therefore, it could and should be deemed "recommended reading" by the USA's genuinely tenured[31] culinary arts, culinary science, human nutrition, civics, and social science educators.

It's been fun to write because unlike my chief-most boyhood hero, Isaac Asimov, I have always liked to design & do experiments, almost everything that I've set out to do/make eventually worked out OK, and it's become a way to exercise my sense of humor.

[31] "Genuinely" because very few US academics tenured or otherwise actually possess "academic freedom". Most of them are paid with a fraction of the research grant money that they must first wheedle from "outsiders" and then share with their employer. In ag world such "soft" money usually comes from producer-paid "check offs" and the food sector's deepest pocketed business interests. Likewise, its government's lab researchers seem more eager to serve their agency's "*industrial partners*" than their fellow citizen-taxpayers. One reason for this is that in the cases that I'm intimately familiar with (e.g., DOE's National laboratories), the government refuses to unambiguously define what its contractors are supposed to accomplish or when whatever they finally agree upon must be done. This has led to repeatedly missed deadlines, grossly inflated project costs, goal line shifting, and in many cases, total "mission" failure. What's worse is that business model soon "burns out" an institution's new employees thereby rendering them both cynical and less capable.

The whys of technical nerd cooking

(warning – some readers might also be troubled by this chapter)

Using heat/fire to cook our food is a uniquely human activity that too many of us have never learned how to do. We homo-type anthropoids may have been cooking ~2 million years ago, though definite archaeological evidence doesn't go back over ~1 million years when we first began to consume more energy than our muscles could generate by lighting fires – another uniquely human capability/characteristic. Most of our world's ~8 billion people would soon starve to death without cooking because we can't efficiently digest most of the raw foodstuffs produced by farmers - especially the grains that provide most of our nutrients (carbohydrates[32], fats, and proteins) which couldn't be produced in sufficient quantity ("at scale") in any other fashion.

"Without farmers we'd all be naked, hungry, and sober"

anon.

The growth rate of children in poorer developing countries often declines with the introduction of "grownup foods" around the age of 6 months and continues to decline up to 18 months of age. Those deficits are accompanied by delayed development and increased morbidity/mortality. The primary cause is nutritionally inadequate and often contaminated diets generally consisting of a starchy cereal-based porridge, with little or no additional "special" vegetable or animal products to provide sufficient "indispensable" amino acids (aka "complete" protein). Such diets are overly bulky/fibrous/indigestible (possess low nutrient densities) and contain high antinutrient factor (ANF) levels.

Plants feed us, clean our air by sequestering the atmosphere's excess carbon dioxide, offer us shade, and provide both food and habitat for us and the rest of our world's creatures. However, because we humans don't possess a goose, brontosaur, or cow's more roughage-adapted digestion system, we can't efficiently digest most of the raw plant-type foodstuffs produced by farmers - both people food type veggies/grains[33] and plant-based livestock feeds like corn,

[32] Carbohydrate molecules are called saccharides or, if relatively small, sugars. They all consist of 5 or 6 carbon ring molecules bonded together in different ways. The chemical formulas of many of them can be written as hydrated carbon, $[CH_2O]_n$, hence their collective name. They are a major source of metabolic energy for plants and the animals that eat them. Aside from the sugars and starches serving that purpose, some carbohydrates also serve as structural materials (cellulose & hemicellulose), a component of our chief energy transport compound (ATP), and one of the three essential components of both DNA and RNA.

[33] The FDA's "Produce Safety Rules" recommend that the following people foods should be thoroughly cooked before being eaten: asparagus, black, Great Northern, kidney, lima , navy, pinto, & soy beans, chickpeas and lentils; the roots and tops of both garden and sugar-type beets; cashews; sour (pie type) cherries; cocoa beans; coffee beans; collards; sweet corn; cranberries; dates; dill (both seeds and "weed"); eggplant; figs; ginger;

sorghum, barley, soybean meal, corn "gluten", rapeseed meal, mustard oil cake, "dried distillers grains with solubles" (DGGS), pea seed meal, lupin seed meal, sunflower oil cake, cottonseed meal, etc.) many of which contain ANFs interfering with their utilization. ANFs include protease inhibitors[34], lectins[35], phytic acid[36], saponins, phytoestrogens, and antivitamins, Fortunately, most ANFs are "discombobulated" by boiling, toasting, roasting, or pressure cooking. For instance, normal moist-heat-based cooking significantly decreases the trypsin inhibitor activity of raw eggs, beans, cabbage, and potatoes. Normalized to their protein contents, the trypsin inhibitor activity of "raw" and cooked tofu is about 20 and 10%, respectively that of the raw soybeans from which they were made. Heat treatment produces toasted soy flours, soy meals, soy protein concentrates, and soy protein isolates containing well under 10% of the trypsin inhibitor activity of raw soy flour. The treatments, spray drying, and/or canning and sterilization employed to produce soy based infant formulas destroy 97% of the raw soy flour's trypsin inhibitor. Such levels are of no nutritional concern for lab rats and unlikely to be significant for humans.

Over the last century, deficiencies of essential nutrients have dramatically decreased, many infectious diseases have been conquered, and most of the USA's citizens still can anticipate a long and productive life. However, during the last half century, several chronic disease rates—many of which are related to poor quality diets, overeating, and physical inactivity—have increased. Roughly one half of all American adults now have one or more preventable, diet-related chronic diseases, including cardiovascular problems, elevated blood pressure, type 2

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hazelnuts; horseradish; okra; peanuts; pecans; peppermint potatoes; pumpkins; most squashes, sweet potatoes; and water chestnuts, (FDA Fact Sheet Produce Safety Rule (21 CFR 112) - Rarely Consumed Raw Produce).

[34] Protease (e.g., trypsin) inhibitors interfere with the actions of the enzymes that break food proteins down to the individual amino acids required by your body. They also overwork your pancreas as it tries to compensate for it.

[35] Lectins are the proteins in most plant-based foods that bind to carbohydrate molecules. In their natural (not cooked state) lectins play a role in protecting plants against external pathogens, such as fungi, viruses, and other microorganisms. There are many kinds of them most of which are harmless. However, certain lectins are considered toxic or anti-nutritional, because they mess with the regeneration of the cells protecting gut linings which allows bacteria and toxins to slip through and thereby cause cramping, bloating, & leaky gut syndrome. They may also trigger an immune response leading to the inflammation at the root of many maladies. Furthermore, some lectins prevent the body from absorbing essential minerals, including iron, calcium, phosphorus, and zinc. That's why some trendy eating plans (e.g., Followers of the "Paleo Diet" and Steven Gundry MD, creator of the "Gundry Diet"), claim that avoiding foods with lectin can lead to weight loss, overall wellness, and the prevention of chronic diseases. However, little to no research that backs up their theories. A review of the evidence published in the journal Nature stated, "*In their whole and cooked form, there is currently no strong evidence from human trials to support the claim that lectin-rich foods consistently cause inflammation, intestinal permeability, or nutrient absorption issues in the general population*."

[36] Phytic acid exists in many plants. Like other strong chelating agents, it tends to bind with ("complex") essential multivalent cationic species such as calcium, iron, and zinc which reduces their bioavailability.

diabetes, and severe overweight/obesity all of which renders them particularly vulnerable to what our President Trump characterized as the "*Chyna Flu epidemic*".

"Synfoods" compounded of overly purified fractions of whole foods (grains, legumes, leaves, tubers, etc. and animals (i.e., their meat, bones, skin, & giblets) are often trace-element(s) and/or vitamin deficient. Like the rest of the Earth's "higher" lifeforms , human metabolisms are powered by enzymes and hormones many of which require/contain a special "trace" element not encountered or required elsewhere within our bodies. Long-known essential trace elements include iron (Fe), zinc (Zn), copper (Cu), selenium (Se), chromium (Cr), cobalt (Co), iodine (I), manganese (Mn), and molybdenum (Mo). "New" ones that have only recently been deemed essential include boron (B), chromium (Cr), manganese(Mn), nickel(Ni), tin (Sn), vanadium (V), molybdenum (Mo), arsenic (As), lithium (Li), aluminum (Al), strontium (Sr), cesium (Cs) and silicon (Si) [Trace elements in human nutrition (fao.org)]. Some or all of them along with equally essential purely biologics (vitamins, etc.) are separated/discarded during the preparation of many of the food sector's most important "purified" ingredients (e.g., sugars, oils, proteins, etc.) recovered from whole food commodities.

What should we be eating? All meat (Atkins diet)? Plant-based foods (vegan)? The Mediterranean Diet? With all the competing claims out there, it's hard to know what to feed ourselves with but almost every nutrition expert agrees that everyone, big, small, young, or old, needs plenty of "complete" protein.

Derek Headey, senior research fellow at the CGIAR's International Food Policy Research Institute, recently published an opinion piece about using milk, meat, and eggs to fight malnutrition and stunting in the "developing world". He pointed out that such 'animal-sourced foods', particularly milk and eggs, are prohibitively expensive for most of the world's poorer households. There's nothing new about this – ever since we invented agriculture ~12,000 years ago, poor people have fed their children almost exclusively with whatever mono-cropped, high starch/low protein grain or tuber they were raising which caused a reduction in their average skeletal size relative to their hunter/gatherer forbears. In the natural world, humans, cows, and sheep eat enough of a variety of foodstuffs to balance their diets - poorer "domesticated people" (not hunter-gatherers) often don't and can't.

The proteins within the milk, eggs, birds, fish, and other mammals we eat possess about the same proportions of the nine essential amino acids required by humans. Most veggie proteins do not - they're generally overly rich in some of them and deficient in others. That's why we human-type beasties should be eating both corn and soybeans[37].

[37] John Steinbeck's solution to single-parent, Senora Teresina Cortez's food insecurity issues in his depression era literary classic, *Tortilla Flats* (1935) is instructive. When Danny and his Mexican paisano friends provided her with "better" stolen foods than she had ever been able to afford before, her kids couldn't/didn't remain healthy until they had then decided to steal enough beans for her/them to resume their customary ~100% tortillas & beans diet.

When poorly nourished children in any country, whether it's developing, stagnating, dysfunctional, or totally collapsed[38], fall behind in their physical growth and therefore stunted relative to their peers, they usually fall behind in other things including health, cognitive development, schooling, and eventually both productivity and income as adults[39].

Those social and economic costs mean that there are high societal returns to the prevention of stunting, provided that the necessary actions happen early enough[40].

A recent University of Eastern Finland and Finnish Institute for Health and Welfare[41] metanalysis[42] concluded that switching that country's traditional high meat/fat/sugar & low fiber[43] diet to one consisting primarily of whole grains, legumes, and other vegetables would reduce Finland's health care costs by "*almost one billion euros*". Considering that Finland's population is ~1.5% that of the USA's and that its people only have to devote one half as much of their GDP to provide themselves with "health services" (9.1 vs 18%), if the USA's people were to make that paradigm shift, it would translate to a ~$148 billion cost savings for them. If that savings were to be spent providing all ~330 million of us/them with corn and soybeans at current commodity prices, we'd each be getting about 54 bushels of corn and 13.5 bushels of soybeans per year. That averages out to ~18,000 kcal of food energy and 710 grams of "complete" protein per day/person - roughly ten times what we'd need meaning that no one would be "food insecure" & some of us could even raise a few goats, chickens, rabbits, or ducks just for the fun of watching them gambol about generating/scattering fertilizer on our own little "organic" food garden plots (ha ha).

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[38] Jared Diamond's iconic book, "Collapse" should be required reading for anyone attending a US public high school because it reminds us of what happens to societies that adopt unsustainable, faith-based, and selfish business models for its more important activities.

[39] Marasmus is protein/energy malnutrition caused by deficiency of all energy-producing nutrients including carbohydrates, proteins, and fats. Its victims exhibit generalized wasting, loss of subcutaneous fat, and muscle bulk. Another type of malnutrition is kwashiorkor, which occurs in children consuming a diet that may be rich in energy provided by a starchy carbohydrate deficient in protein. However, the importance of eating only complete proteins is a myth for people with reasonable access to food. Because most of us have ample access to enough protein from multiple sources to supply all the amino acids we need, it's not something that most of us need to worry about.

[40] Superior childhood nutrition is the main reason that today's average Japanese is almost a head taller than his/her great grandparents were – "*man does not live by rice alone"* (me).

[41] Janne Martikainen, Kari Jalkanen, Jari Heiskanen, Piia Lavikainen, Markku Peltonen, Tiina Laatikainen, Jaana Lindström. **Type 2 Diabetes-Related Health Economic Impact Associated with Increased Whole Grains Consumption among Adults in Finland**. *Nutrients*, 2021; 13 (10): 3583 DOI: 10.3390/nu13103583

[42] Meta-analyses combine data from multiple studies.

[43] Dietary fiber refers to veggie stuff not digested by gastrointestinal enzymes including several not-starch polysaccharides (cellulose, hemicellulose, oligosaccharides) and associated substances including, lignin, pectin, mucilage, and gum. The labels of some food products list total fiber content which figure includes both soluble and insoluble (aka "crude") fiber.

According to another study published 8Feb2022 in *PLOS Medicine* by Lars Fadnes of the University of Bergen, Norway, and colleagues, a young adult in the U.S. could add over a decade to his/her life expectancy by changing their diet from a typical Western dietary to one including more legumes (e.g., soybeans), whole grains (e.g., corn), and nuts, and less red and processed meat[44]. That's why Canada's government recommends that adults have two (female) or three (male) servings of them each day (3/4 cup of cooked beans ='s one serving).

There are lots of other compelling reasons to change how we go about feeding ourselves. Considering many society's tacit acceptance of various forms of slavery (e.g., Louisiana's "prison farms"), the subjugation of "foreigners" including many of our "essential workers", judicial torture, murder of heretics, election of fascist leaders, and apparent eagerness to get into both hot and cold wars, future generations are apt ask themselves how we could have failed to see what we're doing. One such collective blindness is the mass incarceration of animals within "concentration camps" (Confined Animal Feeding Operations - CAFOs) to enable rich-enough folks to eat lots of their flesh, eggs, and milk. While many of us consider ourselves to be animal lovers, collectively our behavior inflicts brutal deprivations upon billions of our fellow animals.

One of the ways that we are causing "anthropogenic" climate change is that our domesticated cattle, goats, sheep etc. belch an especially impactful greenhouse gas (GHG), methane (CH_4) when they consume the cellulose that serves the same purpose for plants that bones and gristle do for us animals. That's a part of the Earth's biogenic "carbon cycle" based upon its plant life's ability to incorporate its atmosphere's CO_2-type "carbon" into the cellulose within leaves, roots, fruits, and stems while releasing its oxygen back into the atmosphere – the same photosynthetic mechanism that rendered the Earth potentially habitable to animal-type life about 600 million years ago.

Cellulose is a polymeric carbohydrate consisting of hundreds of glucose sugar "ring" molecules so tightly bonded together that most "advanced" animals including us humans cannot digest it. It is present in all grasses, trees, shrubs, food, and fiber-type crops and particularly plentiful in the grasses and shrubs able to thrive upon marginal lands. Two-thirds of the world's agricultural land is "marginal" and thereby naturally hosts the cellulose and lignin-dense grasses and shrubs that we can't consume ourselves. However, ruminants (cattle, deer, buffalo, sheep, goats, giraffes etc.) can digest cellulose and are therefore able to thrive/survive in regions possessing soils too "poor" to support substantial populations of other herbivores, domesticated or otherwise.

[44] Lars T. Fadnes, Jan-Magnus Økland, Øystein A. Haaland, Kjell Arne Johansson. **Estimating impact of food choices on life expectancy: A modeling study**. *PLOS Medicine*, 2022; 19 (2): e1003889
DOI: 10.1371/journal.pmed.1003889I another recent (10 April 2022) study concluded that the consumption of plant-based foods, including fruits, vegetables, nuts, coffee, and legumes, is associated with a lower risk of developing type 2 diabetes (T2D) in generally healthy people .
<www.sciencedaily.com/releases/2022/04/220410110753.htm> .

Like all other ruminants, cattle return a substantial fraction of the atmospheric carbon absorbed/sequestered by the plants they've consumed back to the atmosphere in a form (methane) that's initially ~150 times more impactful GHG-wise than is CO_2 itself. About one half of atmospheric cow-burp methane is oxidized back to CO_2 by the atmosphere's hydroxyl radicals[45] within about one decade, half of what's left is then oxidized during the next decade, etc., etc. (in other words the "half-life" of methane within the Earth's atmosphere is about ten years). However, most of the cellulosic and the other forms of "organic carbon" eaten by cows is returned to the atmosphere as CO_2 sooner than that because manure rots and we rarely allow domesticated animals to live that long[46]. Once that's happened, plants reabsorb it and thereby close a biogenic carbon cycle which, for those animals lasts roughly ten years.

Once carbon dioxide enters the atmosphere, it hangs around both therein and within near-surface ocean water for ~1,000 years. Because natural (not artificially enhanced) carbon exchange between the atmosphere and geological reserves including deep soils, deep ocean, subsoils, and rocks) takes on the order of a thousand years, mankind's relatively recent burning of a significant fraction of Mother Nature's geologically sequestered bioenergy reserves (fossil fuels) has had a much greater impact upon the Earth's recent climate/weather than did her own fully equilibrated, natural biogenic carbon cycle (see APPENDIX XIII).

To put this into better perspective, the CO_2 released from driving your car is likely to remain in the atmosphere thereby continuously contributing to global warming longer than you, your children, or even your grandchildren are apt to exist. Thus, the burning of fossil fuels has a longstanding impact upon our climate that's much more significant than is cattle burps (see APPENDIX XIII).

Many environmentally concerned celebrity chefs and writers opine that the obvious solution to such issues is for farmers to keep their livestock outdoors and therefore we'd be eating only "free-range" beef, mutton, lamb, chicken, eggs, etc. .

Doing that would be swapping mass cruelty for even greater environmental destruction. The reason for this is that grazing is inefficient. Roughly twice as much of the world's surface is currently devoted to grazing as for growing crops, yet animals fed entirely on pasture produce under 2 percent of the ~80 grams of protein that sufficiently-rich-humans consume per person per day, meaning that the future's farmers would have to convert what little remains of the Earth's potentially useful unspoiled lands to pasturelands to even begin to affect such a fine-sounding suggestion.

Unfortunately, a cow consuming its natural diet of grasses, hay, and other cellulosic forages produces ~three times more methane per pound of weight gain as does one fed with corn and

[45] The hydroxyl (OH) radical is the atmosphere's most important oxidant after oxygen itself. Its main sources are the photolysis of ozone and the photolysis of nitrous acid (HONO). It's likely that nitrogen fertilizers have become a major source of nitrous acid.

[46] For instance, North American dairy cows are typically slaughtered at ~67 months because they no longer produce milk as efficiently as they did when younger. "Pet" cows typically live for about ~20 years.

other “rich foods” containing relatively little cellulose or, in other words – a typical “factory farm’s” dietary [Grazing / Grass-Fed - A Well-Fed World (awellfedworld.org)](). This means that continuing to produce the same amount of beef via grass-feeding is apt to be more environmentally impactful (more wildlife habitat loss from even greater land use changes, freshwater eutrophication, soil erosion, and the suppression of native vegetation from overgrazing) than are today’s CAFOs.

Humanity’s cow, goat, and sheep grazing changed the face of Mother Earth long before we began to burn significant amounts of her fossilized[47] “biocarbon”.

Consequently, “*Given the environmental tradeoffs associated with raising more cattle in exclusively grass-fed systems, only reductions in beef consumption can guarantee reductions in the environmental impact of US food systems*.” (see Figure 2) [Nationwide shift to grass-fed beef requires larger cattle population - IOPscience]()

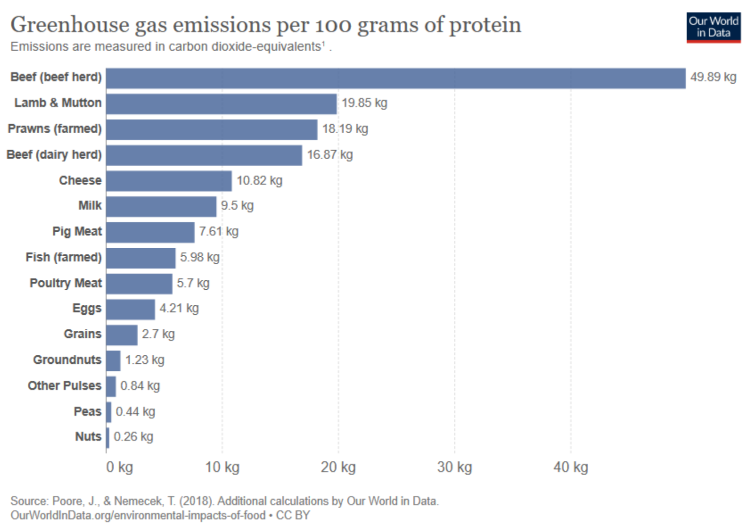

Figure 2 An environmental reason for us to "embrace change"

If you don’t want to accept the uncomfortable truths that some scientists, doctors, foreigners, technical nerds, and securely tenured US educators are willing to talk about, the all-American businesspersons paying for TV’s **Colace**™ commercials have come up with a catchy little jingle ([Colace Song - Poop Should Never Feel Painful (30 seconds) - YouTube]()) to remind us of several economic reasons why a whole veggie-food-based diet makes good sense, i.e., its substantial

[47] Fuel type carbon means not fully oxidized carbon (not CO_2, HCO_3^-, or $CO_3^=$)

“prebiotics” content means that you won’t have to waste your money buying goods like Colace™ or services like colon resections.

Learning how to properly feed yourself with your own country’s raw food commodities can also become a pleasant hobby because there are far more ways of doing it “right” than I’m going to describe that you could invent for yourself. It’s also something that you can do at home unconstrained by anyone else’s rules, regulations, or opinions – it will empower you.

It would also save you and yours lots of money that could pay for our world’s other necessities. For example, here in the USA (29May2022) the average cost of McDonald’s “Big Mac Meal” comprising a cheeseburger, a medium-sized packet of fries, and a soft drink is $8.64. It contains 30 grams of protein and 1080 kcals worth of food energy - about one half of one average adult’s daily requirement of both. $8.64 represents that day’s commodity cost/value of ~44 pounds of corn and ~11 pounds of soybeans containing ~4050 grams of protein and 105,000 kcals of food energy. That’s enough to feed a family of four for almost two weeks if/when its decision makers were both enabled and willing to do so (see APPENDIX IX).

The money that parents quit wasting on synfoods & the plastic they come in[48] could pay for their children’s laptop computers, cell phones, and internet access. In today’s highly competitive world, children must have ready access to all such gadgetry to succeed in life[49].

Finally , your new hobby could become your own “small business” because other people are apt to like your cheap/simple-to-make/tasty concoctions enough to pay you “restaurant prices” for them.

In today’s “information age” - open internet, free social networking, and 24-hour news/entertainment TV shows - we are constantly assaulted with messages intended to scare, frighten, or advise us to quit using helpful products (e.g., baby powder) or eating perfectly “safe” stuff like non-value-added field corn/soybeans, wheat, or for that matter, additives like BHA[50] (butylate hydroxyanisole) or artificial sweeteners. The goal of most such “information”

[48] Here’s another California-type regulation joke: “*So let me get this straight. I go to the store and buy a pound of sliced ham wrapped in plastic, a loaf of bread in a plastic bag along with similarly packaged, napkins, Greek salad, milk, mustard, and ketchup but they can’t give you a bag to carry them home in because “plastic is bad for the environment*”.

[49] In today’s world, access to the internet is a near necessity for economic survival. However, a recent survey concluded that ~160 million Americans – about half of us -are limping along without broadband (≥ 25 Mbps) access and those possessing it are paying more than they should, which in turn, is due an absence of competition between providers How Do U.S. Internet Costs Compare To The Rest Of The World? - BroadbandSearch. Be that as it may, the money saved by feeding your family yourself instead of with Big Mac Meals two or three times per month could provide such access. Who knows – your kids could help you set up a spreadsheet to you optimize their diets with whatever commodity-type ingredients are available - see APPENDIX I.

[50] Since 1947, BHA (butylated hydroxy anisole) has been added to edible fats and fat-containing foods to prevent rancidification. Like its cousin butylated hydroxytoluene (BHT) or “natural” (unfiltered) olive or soybean oil, BHA is an antioxidant that sequesters the oxygenated free radicals which would otherwise “spoil” foods. That characteristic/mechanism renders both of those additives more likely to benefit than poison you.

is to keep your attention by fostering controversy and raising "concerns", not put the real issues into proper perspective and help and/or educate listeners. As a sapient, responsible-for-yourself, customer/consumer living during a mostly privatized information age, you should learn to gather information, evaluate it, and then draw rational conclusions based upon facts, not just other people's opinions, or special-interest-driven advertising. To make sense of the often-contradictory reports about foodstuffs & cooking, "Google" the subject (WIKIPEDIA is especially useful), read several, not just one of its hits and any scientific studies mentioned. The "Conflict of Interest" or "Competing Interests" section at the end of any "real" study will tell you who funded the research and their relationship with the report's authors. For instance, in the case of artificial sweeteners, there is no reputable evidence that any of them (Aspertame, cyclamate, saccharin, or sucralose) are either "poisonous" or pose a realistic cancer risk.

Special interest driven legislation is another something that's been making it tougher for the USA's middle class. For instance, myopia (near sightedness) is the world's most common "medical condition", currently affecting 22% of the world's population and tending upwards wherever children spend most of their time in school and/or staring at cell phones. Idaho has a law forbidding the sale of the negative focal length lensed (concave) eyeglasses required by myopic people unless they first pay for a permission slip (prescription) issued by a state-licensed "health service provider". In today's world obtaining such prescriptions costs far more than do the glasses themselves. If you chose to order them yourself, a prescription's lens "strength" in diopters = - 1/(distance in meters) that the relaxed eye it is to be for sees most clearly; e.g., if that distance is twelve inches, you should mail-order a lens strength of -3.28 "diopters" (-1/(12 inches*0.0254 m/inch) for that eye.

Little-known facts like these suggest that we should become more attentive to what our governmental representatives have done[51].

Finally, as a probably somewhat disgruntled consumer/citizen/voter/taxpayer you should realize that the best way to "beat the system" is to not purchase outlandishly expensive things and/or unnecessary "services" - take shopping seriously & learn how to do and think for yourself.

A key part of winning your little tussle with the "system" is to not let yourself become a slave to your or anyone else's recipes, opinions, or schedules. Modify recipes and change your schedule as occasions like $1.59/pound potato prices or one-day 49 cents/pound chicken sales materialize.

The internet has made both learning and doing such things a lot easier than it was when I was young.

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[51] Iowa's Code section 147.109, "***Ophthalmic spectacle lens prescribing and dispensing***," was apparently written to be as vague as possible but doesn't <u>seem</u> to draw the key distinction in Idaho's legislation. I suspect that if given world enough and time, Iowa's supreme court could definitively tell us what's legal here.

The USA's poor people feeding system

(warning – skip this section if you want to remain "untroubled")

Over 60,000 food pantries and 344,894 churches offer feeding programs to the chronically food insecure 10-12% of US households (American Religious Data, 1952–2010). Thousands of other organizations serve over 10 million school children, many of which offer food to supplement meals served at home. The dual burden of malnutrition (obesity or a non-communicable disease coupled with malnutrition) is prevalent in more than half of all malnourished US households – over 50% of those households with an underweight person also house an overweight or obese person, see The dual burden of malnutrition in the United States and the role of non-profit organizations - PMC (nih.gov) .

The USDA comprises 29 agencies with ~100,000 employees at over 4,500 locations across this country and abroad. 16 of its agencies comprise its Food and Nutrition Service (FNS) which spends about $190 billion dollars per year trying to keep 40-50 million food insecure US citizens and undocumented "essential workers" from falling through the USA's nutritional cracks in a fashion consistent with the USA's political and business models 2022 Budget Summary (usda.gov).

Here's an excerpt from a report *Web Based Supply Chain Management | USDA* outlining how our "food-for-the-poor" system works.

> *"The Web Based Supply Chain Management (WBSCM) system is an integrated, internet-based commodity acquisition, distribution, and tracking system built on Systems, Applications and Products (SAP). WBSCM supports domestic and international food and nutrition programs administered by three United States Department of Agriculture (USDA) agencies, including Food and Nutrition Service (FNS), Agricultural Marketing Service (AMS), and Foreign Agricultural Service (FAS), and the United States Agency for International Development (USAID). Multiple programs, including the National School Lunch Program (NSLP), the Emergency Food Assistance Program (TEFAP), and Food Distribution Program on Indian Reservations (FDPIR), serve over 30 million Americans and are administered through 98 State Distributing Agencies (SDAs), supporting over 100,000 Recipient Agency (RA) school districts, food banks, and feeding centers, and 110 Indian Tribal Organizations (ITOs), supporting over 75,000 program participants.*
>
> *Household-level programs, such as Commodity Supplemental Food Program (CSFP), TEFAP, and FDPIR, serve food to insecure groups such as senior citizen, Native Americans, and low-income citizens. International programs, which include Food for Peace, Food for Progress, and Food for Education, serve over 280 million people in over 65 countries with aid provided through the United Nations World Food Program and over 30 foreign governments, and approximately 70 private voluntary organizations (PVOs).*
>
> *USDA Foods account for nearly 20 percent of the value of school districts food purchases menus. On a yearly basis, WBSCM directly supports the order, procurement, and delivery of over 6.5 billion pounds of American farm food commodities with a value in excess of $4 billion.*"

p 59 of another report, USDA FY 2023 Budget Summary teaches us that its Food and Nutrition Service (FNS) spent $174 billion in 2022 of which ~$140 .billion went to fund its Supplemental Nutrition Assistance Program (SNAP) – an updated version of the USA's old fashioned food stamp program).

According to its national level annual summary SNAP's overhead costs represented only about 6% of the benefits directly "redeemed" by needy US families[52]. Money-wise its primary beneficiaries are the owners of the factories and retailers making/selling the same valued-added food products, at the same prices, at the same supermarkets that the rest of us buy foods with our own money.

Due to the USA's relevant business models, the USDA's people feeding programs are mostly concerned with enabling its poorer people to acquire/consume small lots of the US food sector's value-added products[53], not with providing them with large lots (e.g., 50 pound bags/boxes/cartons etc.) of either the USA's raw whole food commodities (corn, wheat, soybeans, peanuts, wheat flour, etc.) or the twenty-five items similarly tax-dollar purchased for USAID/World Food Program (WFP) -managed distribution to the outside world's neediest people (see FoodAidProduct_InfoGuide_2020.pdf (usaid.gov)) . Reversing that policy would save well over a hundred billion tax dollars and enable/incentivize its own food insecure citizens to provide for themselves[54].

During my research for this book, I've learned that anyone trying to do anything along those lines experiences resistance from the government's policy setters and corporate lobbyists like the Iowa Soybean Association and its membership's sufficiently important customers and dependents[55].

[52] The term "overhead" depends upon its definition in that context. Having spent 28 years working for one of our federal government's perpetually boondoggling agencies myself (DOE), I'm sure that everyone working in/for the USDA's food-for-the -poor system at every level has convinced both him/herself & his/her bosses that whatever they're doing is "necessary" and therefore not overhead . My point is that most of those programs along with their bureaucracies, excessive paperwork, and ridiculous costs would be unnecessary if the USA's cheap commodities and simple services were to be 1) unburdened by such overhead, and 2) provided gratis to the people needing them.

[53] USDA Foods Available List for CSFP | Food and Nutrition Service lists the foodstuffs its agencies purchase for distribution to sufficiently deserving US citizens. The **USDA** uses its "buying power" to purchase specific nutrient-rich foods at wholesale prices from US suppliers to distribute to program participants.

[54] Despite rampant inflation, a "Trumped"-up baby formula shortage and cost-driven food insecurity, many eligible Americans including ~one fourth of its military personnel refuse to sign up for either SNAP or WIC because of *'a lot of judgment, stigma, guilt, and shame.'*

[55] Each of Iowa's 40,000 corn/soybean farmers must pay his state's "corn council's" program managers a one cent per bushel corn "check off". He must also pay both his state's and the USDA's Soybean Councils' managers one quarter of one percent of whatever he gets for his soybeans. Those "*not taxes*" typically add about $44 million dollars per year to Iowa's coffers and are to be spent "supporting the industry" by developing markets, educating consumers, advertising, and scientific research but not/never for "lobbying"(ha ha). The research part of that money supports its universities' agricultural programs.

That same scarcity-based business framework is responsible for the dysfunctions of the USA's health care, housing, reliable[56] electricity, and worthwhile job/employment systems. The root cause of all of them is that societal scarcity is more profitable to the providers of a privatized service or good than is societal abundance – if there's not enough of something to go around, a society's customers will pay more for whatever is available. With respect to health services, of First World nations the USA has the longest-lasting and most expensive medical/dental-educational system and therefore also the fewest native-born physicians per capita. Its medical education system typically charges its students ~$400,000 to obtain permission to "practice" medicine which has of course led to a shortage of relatively low-paid primary-care physicians, pediatricians, GPs, and Medical Microbiology/Infectious Disease experts. Additionally, many US physicians, physician assistants (PAs), and nurses must work for/within a maximally "efficient" hospital framework providing insufficient support/backup resources; e.g., not nearly enough hospital beds to deal with our world's all-too-likely pandemics. It's "good business" both because it saves its decision makers' money and watching a substantial number of unimportant people suffer/die toothless, hungry, miserable, and homeless incentivizes the rest of us to pay whatever our "service" providers' market will bear[57].

The USA should and could adopt an abundance agenda for everything and everyone.

About two years ago Mr. GOOGLE[58] informed me that ~38.3 million of the USA's people were "food insecure" and that about three fourths of the US federal government's then ~$85 billion/year "agricultural support" subsidies went to support its sundry human nutrition (poorer people feeding) programs, not US farmers[59]. By Christmas day 2020, the number of food

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[56] For instance, today's electricity marketing model encourages individual utility owners to replace reliable, already-paid-for and well-functioning Nuclear Power Plants (e.g., Iowa's Duane Arnold NPP) with unreliable windmills, solar panels, and promises that don't have to be kept because when Mother Nature gets up on the wrong side of the bed (no wind or sunlight over an extended region) it's an act of GOD, not energy providers.

[57] Similarly, in a fully privatized energy market like ERCOT ("Electric Reliability (ha ha) Council of Texas") which allows its electrical energy system's businesspersons to charge their customers thirty times more per kWh during emergencies, power providers tend to operate in ways that generate lots of emergencies (for proof, GOOGLE "ERCOT Uri report").

[58] GOOGLE is still the best all-purpose search engine because its "big" competitors are even more ad focused than it's become. However, it's up to you to determine whether what you are being offered is a parroted baseless opinion, advertisement, or information based upon quantifiable facts & scientific consensus. Because the "cloud" is replete with people seeking to sell, impress or convert too-impressionable other people with bogus arguments and "alternative" facts, read several, not just one of its "hits" looking for inconsistencies and faith-based biases.

[59] Since I first composed that paragraph, the USDA's food-for-the-poor expenditures have ballooned. In Fiscal Year 2022, Congress provided **$140 billion** to fund just one of that departments food giveaway programs, SNAP . The US food sector's suppliers & vendors vigorously lobby for all such programs because it's "good for business". That's where other USDA programs come in. Billions of taxpayer-funded bailouts, subsidies, and crop insurance are paid out each year to farmers raising commodity crops. The result is a market that's often flooded with cheap corn and soybeans, with big conglomerate meatpackers standing by to snatch up feed at below-production cost to pad their profit margins. The pressure that those companies place on elected officials to keep

insecure Americans had reached approximately 50 million evidenced by the thousands of people then stacked up in multi-mile-long, food bank giveaway queues within many US cities. Another manifestation of that pandemic-exacerbated (not created) issue was

People Feeding Cost/2500 kcal (January 2023 prices)

Food Mix/2500 kcal	total grams	g protein	$ cost
1:3.9:8.2 by weight oil/soy/wheat flour*	607	118	0.50
1:3.9:3.9:3.9 by weight oil/soy/corn/wheat flour**	589	108	0.40
1:3 by weight soy:corn**	650	105	0.18
8 veg FDA cornucopia***	6920	57	61.25
*$14.90/bu soybeans,WALMART's all-purpose flour & veg. oil			
** $7/bu corn			
***HYVEE peas, carrots, broccoli, spinach, cauliflower, tomatoes, asparagus...			

Table 2 Relative DIY "healthy whole food"-type dietary costs (APPENDIX I's first example explains how to go about deriving conclusions like these)

an uptick in food and hygiene product shoplifting which translates to an uptick in the petty crimes that eventually ruin many of our fellow Americans' entire lives. See https://www.washingtonpost.com/business/2020/12/10/pandemic-shoplifting-hunger/.

Another issue was/is that millions of the USA's poorer children don't get enough "good stuff" to eat when their schools aren't in session.

The USDA's Dietary Guidelines[60] were developed by its policymakers' nutrition experts to direct US health policies/programs and guide the frontline dietary professionals charged with trying to convince its citizens to consume healthier diets. Its information is used in developing Federal food, nutrition, and materials designed for both the public-at-large and the nutritional education components of HHS and USDA food programs. Ultra-processed foods are made using sequences of energy-consuming processes (unit ops) that isolate certain substances from cheap raw commodities (mostly corn, wheat, and soybeans), purify and/or alter them with other chemicals, and then recombine them with other substances and additives to formulate final products. Those products are characteristically relatively (not absolutely) cheap, palatable, and convenient; examples include soft drinks and candy, packaged snacks and pastries, ready-to-heat/eat products, reconstituted meat products, and the currently considerably more expensive, synthetic "meats".

High precision mass spectrometric determination of its ^{13}C to ^{12}C isotopic ratios enables researchers to determine the origin of the carbon making up any living creature's body– that's

the rules, laws, subsidies, insurance, and bailouts that ensure that the USA's food production system churns out livestock feed much more cheaply and efficiently than it does people food .

[60] https://health.gov/our-work/food-nutrition/2015-2020-dietary-guidelines/guidelines/executive-summary/

the reason why nutritionists doing such analyses have characterized us Americans as "*like walking corn chips*"[61]. Other researchers have concluded that another 10% of the "organic" stuff that we're made of originated in soybeans[62].

The "synfoods" fabricated from isolated components of those and other whole food commodities usually also contain lots of additional salt, sugars[63] (mostly high fructose corn syrup), and fat which explains why other studies have linked their consumption with weight gain and greater risk of chronic diseases, even after adjusting for that salt, sugar, and fat in their study subjects' diets. While the mechanisms behind these associations are not yet fully understood, many of our government's nutrition authorities argue that the existing evidence is sufficient to justify discouraging consumption of the US "food sector's" ultra-processed foods in their recommendations and policies.

That's the reason that the FDA's guidelines emphasize consumption of the unprocessed whole foods depicted in its website's iconic veggie basket.

Figure 3 The FDA's cornucopia

Unfortunately, many of the FDA and USDA's well-meaning foodstuff recommendations are unrealistic because many of their suggestions are either unavailable (e.g., raw grains & soybeans) or artificially unaffordable to those US citizens most needful of improved diets. Table 1's figures reveal the reason for this probably "controversial" assertion. Its uppermost

[61] Most of our bodies' "corn carbon" originates in the corn-fed animals, starches, maltodextrins, and high fructose corn syrup within the USA's most popular meats, syn/snack foods, beers, and soft drinks.

[62] If we are what we eat, Americans are corn and soy - CNN.com (Sanjay Gupta 2007).Dr. Gupta continues to counsel CNN's listeners about the consequences of consuming "processed" rather that home-cooked whole foods.

[63] Carbohydrate is a synonym for saccharide which term includes sugars, starches, hemicellulose, and cellulose. Monosaccharides, disaccharides, oligosaccharides, and polysaccharides constitute the four chemical forms of saccharides. The smallest (lowest molecular weight) carbohydrates, mono , di, tri, and quad ring saccharides, are generally referred to as sugars.

rows list typical real-world 2020 AD retail veggie costs and those items' composition (FDA figures) . Its last few rows, translate those figures into retail cost/nutrient (protein and calories) figures & ***should*** reveal that only the richest Americans could afford to feed themselves with only the especially "healthy" stuff depicted in its cornucopia basket. The technical reason for this is that the primary purpose served by veggie foodstuffs other than grains, beans, peanuts, peas, potatoes, yams, and cassava is to provide us with some additional trace minerals, vitamins, and antioxidants - not the protein required to grow/maintain our bodies, or the energy required to heat & power them[64].

An afternoon's worth of store-to-store or GOOGLE-based US food shopping will soon convince anyone willing to do the sorts of simple spreadsheet-type calculations tabulated above that a genuinely hungry, low income, person is unlikely to either buy or eat much of what's in the USDA's veggie basket.

Its colorful leafy veggies and fruits are certainly tasty and do *contribute* to an interesting/nutritious diet but in today's world cost far more per unit of calories, protein, vitamins, minerals, etc. than do the intrinsically cheap "whole food" staple grain/legume commodity based combos that this book will describe. The technical reason for this is that most of the stuff in that cornucopia is "bound"[65]. Many of our fellow citizens simply can't afford to spend limited incomes on foodstuffs that don't "fill them up" (provide lots of calories and sufficient protein). They instead either go hungry or, far more often here in the "first" world, beg, buy , borrow, or steal the relatively (not *absolutely*) cheap, readily available, relatively tasty, high calorie/low-other-nutrient "junk" foods responsible for many of their health issues. Many of them also live in "food deserts" – areas where there is limited access to healthy, affordable food of any sort. For instance, my new hometown's (Des Moines, Iowa)

[64] Although I'm an unabashed "liberal", I consider RFD-TV to be DISH'S best (most intelligent, realistic, & honest) source of information about the USA's economic, agricultural, and energy systems. In particular check out "Johns' World" (John Phipp's technical essays),"Ag PhD" (the Hefty brothers' farm chemical show), and "The Cow Guy's"(Scott Shelladay's) "marketing" show. RFD-TV is a 24-hour television network focusing upon agribusiness, AG SCIENCE, and the rural lifestyle along with lots of wholesome country music, entertainment, and & patriotic stuff. Another reason I like it is that I've always suffered(?) from "classic tractor fever".

[65] Since 2016, the number of people facing extreme hunger world-wide has trebled to today's figure of ~900 million. The United States "independent" in-kind food aid agency (USAID, Title II) responds to emergencies where: 1. local markets are not functioning; 2. there isn't enough food in them to meet the need; or, 3.people do not have physical access to markets. In 2021, the U.S. contributed nearly $4 billion dollars to the U.N. World Food Programme (WFP) through direct financial support and in-kind commodity assistance (i.e., grains including crops like corn, wheat, and soybeans). For instance, on November 26,2022, the 1 millionth ton of wheat purchased by the United States government for global hunger relief efforts left Vancouver, Washington destined for the WFP's operations in Yemen where 19 million people were (and still are) severely hungry. A typical USAID food basket includes a grain, a pulse, and veggie oil. The following links describe one such product – a quick cooking gruel (20% solids upon prep) comprised of degerminated cornmeal (a byproduct of corn oil manufacture), defatted soy flour (or, in other words, soymeal - a byproduct of soybean oil manufacture), and soybean oil, fortified with various minerals, antioxidants & vitamins. Instant Corn-Soy Blend for Use in Export Programs (usda.gov) & Instant Corn Soy Blend (ICSB) (abilityone.gov)

relatively low population density downtown core region's inability to attract chain grocers has rendered much of it officially designated a food desert[66].

Whole grain cereals (corn, wheat, barley, rye, oats, millet, etc.) and pulses (dried beans, soybeans, lentils, peas, etc.) are staple commodity crops collectively containing virtually everything we humans need. While those veggie food types differ in terms of the relative amounts of each required characteristic (proteins, "prebiotics"(fiber), digestible sugars, starches, vitamins, minerals, antioxidants, etc.) they complement each other; i.e., in combination, what one is deficient in, the other supplies. Since good nutrition has long been known to be key to the prevention and management of disease, about 15 years ago, the US Department of Agriculture nearly doubled its "Food Pyramid's" guideline recommendations for whole foods specifically including both of them at its base. However, in the United States, consumption of both whole pulses (beans) and whole grains continue to be dismally short of its nutrition experts' hopes and recommendations.

Contrary to popular opinion, the heart of the USA's especially productive "corn belt" does not "grow our food" thereby rendering it more readily available (cheaper) to everyone living here . Instead ~80% of Iowa's land is devoted to producing two cash-crops[67] - mostly soybeans rotated with corn which are mostly raised to feed livestock and make biofuels and synfoods' building block components. We consume some of the meat, fat, milk, eggs, cheese etc. produced by those animals and export the rest[68]. In 2010, the USA's cattle consumed ~three times as many calories (food energy) and over seven times as much protein as did its people. Overall, its livestock consumes ~five times as much protein and over eleven times as much food-type energy as do its people.

According to U.S. Department of Agriculture , under 2% of the corn produced on American farms is directly consumed in whole or nearly whole human food forms. During the past decade, ~7% of its corn has been broken down to make components (starches, maltodextrins, high fructose corn syrup, glucose, dextrose, gums, etc.) of the "processed" foods occupying

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[66] For instance, a recent (April 2022) visit to downtown Des Moines' only full-fledged supermarket revealed that its average-looking, ~80% water, potatoes were priced from $1.29 to $1.59 per pound - that's almost certainly over an order of magnitude more than what the farmers that grew them had been paid.

[67] By definition, a "staple" foodstuff is easily/cheaply stored and therefore can be consumed throughout the year. Common whole food staples include wheat, rice, maize (corn), potatoes, yams, some varieties of apples and onions, carrots, peanuts, and any/all dry beans. Breads, meats, and most fruits & vegetables are too perishable (require freezing or canning) to be considered staples.

[68] In terms of dollars, the USA's agricultural exports are generally very close to its imports and both currently represent roughly 150 billion dollars/annum or about six tenths of one percent of its GDP [USDA ERS - Agricultural Trade](). However, in terms of "food value" (calories, protein, etc.), the US exports far more than it imports because the latter - coffee, tea, lettuce, avocados, spices, etc. – are typically more costly per pound of nutrient than are the USA's exported corn, soybeans, soybean meal, wheat, beef, pork, etc.

most of your supermarket's shelf, cooler, counter, and freezer spaces. Most of both corn and soybeans end up becoming animal feeds.

The third-largest destination for American corn, exports, has slowly been increasing and currently accounts for about 18% of it.

Soybeans have become the USA's most profitable/valuable export crop – about 50% of the ~120 million metric tons (tonnes) of them raised each year is shipped off to foreign buyers, the biggest of which is China[69].

One of my goals in writing this little book is to point out again (I'm certainly not the first to do so) that there is no good excuse for anyone to either go hungry or be malnourished in the USA. It's nevertheless happening because   1) in one way or another, its food sector's businesspersons control the marketing of the USA's basic food commodities in ways that limit availability and balloon retail costs[70] , 2) most of its citizens have neither the desire, knowledge[71], nor equipment required to convert their nation's primary whole foods to people food, and 3) neither their public servants (e.g., elected representatives or employed by the USDA and the USA's "cow colleges") nor the leadership of the other non-profit food-bank/pantry programs can afford to challenge institutional paradigms or facilitate easy access to the USA's cheap commodities[72].

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[69] grain.pdf (usda.gov) & oilseeds.pdf (usda.gov) Are current (July 2023) nation-by-nation compilations of the entire world's grain (wheat, corn, barley, etc.) and oilseed (soybeans, canola, peanuts, etc.) production, prices, consumption, imports, and exports.

[70] The reason for this is that US business incentives/policies are established by politicians primarily concerned with "representing" their party's leaders and real, not pretend, voter base. In this context, the latter comprise its food and agricultural sectors' leadership along with everyone helping them implement their business models.

[71] There should be much more emphasis upon teaching practical "life skills" in public schools (i.e., "shop" &"lab" classes including home maintenance and cooking). Most of our kids learn rapidly, like to work with their hands, and should become able to do, think, and fix things for themselves by the time they've graduated from any publicly funded school system.

[72] Telling the truth, the whole truth, and nothing but the truth has become almost impossible for US scientists because, in one way or another, most of us nerds work for businesses possessing comfortably profitable, government condoned, business models, paradigms, & ground rules. We all have lives to live, bills to pay, & dependents to support which means that we must somehow get/keep a reasonably good-paying job in the real world. That renders the "whole" part of this footnote's list the toughest to achieve because it would mean drawing/revealing conclusions based upon your observations that may not put the system that you are working for in the best of light. My own experiences at Idaho's national laboratory suggest that anyone persisting in pointing out his workplace's imperfections is apt to be   "disfellowshipped" by his colleagues and eventually either reorganized out of his job or outright fired. My bosses at INL – a government organization run by and mostly for its contractors - couldn't fire me because they'd earlier made the mistake of formally teaching us worker bees about "ethics" which fact I reminded them of every time I questioned what was going on. My bosses tried to downsize me anyway but ended up being forced by DOE's finally-alarmed IG to give me a cash reward, a two-step promotion, and a promise to "lay off" which worked for me until a different contractor's bid won the lab's Management and Operations contract.

Assuming $6/bushel corn and $12/bushel soybeans, our federal government's $1676 2021 annual human nutrition expenditures per each of its then ~38 million food-insecure citizens would supply anyone consuming Table 1's 4:1 corn/soybean mix with about 69,000 kcal of food energy and 2500 grams of protein per day – more than enough of such "whole foods" to feed thirty people or a hard-working bull elephant. Providing this country's less-fortunates with 5000 kcal's worth of that combo per day (twice what they'd need) would require about 3% of the USA's corn and soybean crops.

As far as Iowa itself is concerned, that's why in spite of its citizenry becoming "like walking corn chips", it'd take only about 0.1% of its corn and soybean crops to so feed its ~300,000 increasingly food insecure citizens which would let the remaining 99.9% continue to be exported, sold to the owners of cow/pig/chicken feedlots[73] (which mostly converts them to crap &piss) or to the owners of the factories that convert them to people foodstuff components, chemical feedstocks, and petroleum substitutes.

Because US farmers produce enough grains to feed its human population many times over[74], none of their fellow citizens would be going hungry if its/our topmost decision makers *really* considered hunger prevention to be their primary mission. However, in capitalistic countries, big money buys big influence and their food sector's goals comprise 1) purchasing maximum amounts of raw food commodities from their farmers as cheaply as possible, 2) selling maximally marked-up commodities to anyone able to buy them including, of course, "rich" foreigners unable[75] or unwilling to produce 100% of their own foodstuffs (e.g. China), and, 3) encouraging their supporters in government, education, "the fourth estate"[76], and social networks to help them convince their fellow citizens to want/demand relatively expensive "organic" and/or value-added[77] synfoods compounded from purified components of "not

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[73] China's citizens eat a far greater proportion of its food sector's soybeans than do the USA's. In 2000 those ratios were 58% China and 1% US (see footnote 102).

[74] According to the USDA US farmers produced 4.4 billion bushels of soybeans and 15.1 billion bushels of corn in 2021. Those figures add up to a total of ~0.504 billion tonnes of food. Assuming 4 kilocalories per gram and 330 million people, that corresponds to ~17,000 kilocalories/person/day - over six times more of just that pair of staple foods (not counting wheat, rye, oats, barley, millet, sorghum, peanuts, potatoes, carrots, apples, etc.) than its citizens would need.

[75] During the last four decades, China's increasingly high-tech "mining" of its soils and their underlying aquifers has rendered a good deal of its farmland barren. That and the fact that many of its people have become rich enough to also want to consume lots of meat are the reasons that it's become the world's biggest grain importer.

[76] Today's news media are businesses largely supported by selling advertising to other businesses & politicians. Its employees have been subjected to several decades worth of consolidation-driven corporate downsizing which has reduced their readership and hollowed out "independent" journalism. APPENDIX XI contains one of my "controversial" opinion pieces sent to the editors of the San Francisco Chronicle and APPENDIX XVI is another written 23Feb2023 that hasn't been sent anywhere yet.

[77] "Value added" refers to a feature added to a basic line, mode, or staple for which buyers must pay extra. Unfortunately, in the food business, "adding value" (e.g., bleaching flour, degerming & extracting a corn kernel's oil, or polishing rice) often reduces a foodstuff's nutritive value.

organic" food commodities rather than those commodities themselves (e.g., soybean oil and SPI without their source's concomitant proteins/vitamins/minerals/antioxidants etc.).

The USA's farmers are in a tight spot —especially those producing the corn and soybeans providing components of their country's "value added" synfoods and satisfying its citizen's demand for hamburgers and government subsidized motor fuel diluents.

One problem is that the rest of the world's farmers (in particular Argentina's, Brazil's, and Russia's) have adopted the same "green revolution" technologies that had given them a big head start in production cost efficiency.

Another is that for their machinery, seed, pesticide, and fertilizer inputs, US growers depend upon a small number of big companies possessing enormous leverage to control their products' prices.

Then, when they're ready to market their crops, farmers are confronted by another handful of powerful grain-trading firms possessing enough leverage to keep their own costs down. According to a 2014 study by University of Missouri rural sociologist Mary Hendrickson, US corn farmers—the world's leading producers of CAFO livestock feed—have essentially three buyers: ADM, Cargill, and Ingredion (formerly Corn Products International) controlling 87 percent of that market. For the USA's soybean crop—also the world's biggest(?)—ADM (*Archer Daniels Midland*) and *Bunge* are the top two buyers. Together with *Cargill* and Nebraska-based *Ag Processing*, they process 85 percent of US-grown soybeans. These corporations continue to merge into bigger and more powerful entities. The Department of Justice recently OK'd a merger between seed/pesticide giants *Monsanto* and *Bayer* which further shrank farmers' buying options. The Wall Street Journal recently reported that grain-trading behemoth ADM is pushing to take over rival *Bunge*. Neither company immediately commented on that story, but their investors take such things seriously: ADM's share price jumped about 10 percent and Bunge shares rose 15 percent after that report.

For example, here's a recent QUORA answer to " **Why in America are they growing more corn than wheat, and since when did this happen?"** written by a fourth-generation US farmer/landowner:

> "(*It's) because there is more profit with corn. We stopped growing wheat in the 1990's because we were losing money on it every year. We were having poor yields and the state was being so tough on inspections (they still are) that we would get huge discounts for our product. It got so bad that one neighbor actually owed the elevator 32 cents a bushel for his wheat. There were some unusual circumstances, but it shows how tough the standards are.*
>
> *This is a common question as to why farmers aren't more diversified with their crops. When I was growing up, we grew flax, barley, rye, oats, wheat, soybeans, corn, and sugar beets. Now, I grow corn and soybeans. With the exception of wheat, I don't even know where I can sell the other commodities. Sugar beets are grown under contract and contracts aren't easy to get. The whole reason we're more monoculture now is the ability/hope to make a profit with your crop.*

About twenty years ago I read an article which quoted an executive from Quaker Oats bemoaning the fact they had to import oats because American farmers weren't growing it anymore. I did some checking, and they were offering us the same price for oats they had offered in 1968, thirty years before."

For several decades independent US researchers have been warning us about the decay of their/our county's institutional competence. Organizations like its DOE, NIST, CDC, NRC, FDA, and even its USDA have gotten caught up in the negative feedback loops within today's increasingly mistrustful world and have thereby become increasingly defensive, obstructive, and ineffective[78]. Because those organizations have lost a good deal of their legitimacy, US citizens and their representatives have lost a good deal of faith in them and whatever service or good they are supposed to provide. Worse, super talented people no longer want to work for them which renders them less competent[79] and even more defensive[80].

To rich-enough old nerds like me the most annoying manifestation of this situation are the firewalls (see SP 800-41 Rev. 1, Guidelines on Firewalls and Firewall Policy | CSRC (nist.gov)[81]) erected by the managers of the public institutions nominally "working for us" to protect its/their employees from nosy outsiders like I have been/still am to the DOE's nuclear program managers and recently become to the USDA's human nutrition and commodity marketing

[78] The CDC acted too slowly during the COVID 19 outbreak and did not make its data available to the public quickly enough. When they *did* issue guidance, it was confusing and overly conservative (it's impossible to maintain 6 foot spacing between the ~30 kids packed into a typical US classroom), which caused many people to lose trust in that agency. Like many of our government's other "technical" institutions, the USDA and FDA are research-focused and headed by political appointees and therefore geared toward a hyper conservative, slow-moving, step-by-step "academic" form of science that doesn't work during crises. During emergencies when lives are on the line & we need to know what to do as quickly as possible, it's much less successful. Another issue is that their advice is too individually minded. *You monitor your own risk; you worry about your own health, you fix your own problems, and you make yourself more resilient by buying more insurance*. That doesn't work in the contexts of poverty, infectious diseases , or the real impacts caused by an overly politicized approach to addressing our world's environmental, energy, education, and food insecurity issues.

[79] It's also the reason that most of those institutions' best & brightest employees retire as soon as they can. A happy worker doesn't want to retire.

[80] This behavior is an example of what we nerds call a "negative feedback loop" which by definition resists changes to whatever "business as usual" happens to be, good or bad or whether change is necessary or not. Some of this world's most important feedback loops are due to water's properties - here on the Earth, depending upon local temperatures it can exist in three totally different states with totally different properties which fact is responsible for the weather/climate changes becoming too obvious for some of us to continue ignoring.

[81] The following boilerplate is part & parcel of the USDA's emailed communications with "outsiders" like me.

" [External Email] If this message comes from an **unexpected sender** or references a **vague/unexpected topic;**
Use caution before clicking links or opening attachments.
Please send any concerns or suspicious messages to: Spam.Abuse@usda.gov "

experts. The reason for this is that those institutions possess similar "symptoms" and therefore insist upon wasting billions of tax dollars trying to address nominally technical issues in ways that obviously don't work[82].

There's nothing terribly new about this situation. In 1969, Daniel Patrick Moynihan advised then President-elect Richard Nixon that "*In one form or another, all of the major domestic problems facing you derive from the erosion of the authority of the institutions of American society*".

Of course, here in the USA it's perfectly legal for a private organization to do anything it wishes with respect to erecting a nominally "Spam Abuse" firewall around its employees. My latest attempts at trying to contact anyone at the ***Iowa Soybean Association*** (five - one by phone four via email) apparently resulted in some higher-up telling his/its IT guys to reject anything from d.siemer@hotmail.com to anyone at ***iasoybeans.org*** & also of course, his employees & experts to not pick up their phones either.

Unfortunately, that's also been happening at publicly funded institutions. We apparently have lots of "Big Brothers" monitoring but never directly responding to anything that any easy-to-ignore "troublemaker" says, writes, watches, or asks.

Another of Iowa's "technical" issues is that its people produce a surprisingly small fraction of their own "healthy" people-type foods. A 2012 survey of Des Moines County's farmers reported a total of 59 acres devoted to raising vegetables, fruits, or tree nuts - that's 1.5 acres per 1,000 residents compared to a 31.8 acres/1000 person US average. Another manifestation of this issue is that attempts to relieve such problems are usually met with objections from important citizens that don't want their neighborhoods "messed up" (property value reduced) by the veggie gardens and grubby-looking "strangers", work sheds, public-accessible "free" refrigerators[83], distribution points, etc., required to serve people who can't afford to drive to the nearest "Wholefoodsmarket"[84] or even a WALMART[85]. Feeding Iowa's less important people is apparently less important to its decision makers than is supporting its businesspersons' business models.

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[82] Because these institutions are driven by political considerations, they are good at doing research and tabulating statistics but terrible at communicating with "outsiders" or addressing any sort of controversial issue. For a list of their symptoms see Barriers to Science: Technical Management of the Department of Energy Environmental Remediation Program |The National Academies Press)

[83] For example, see Des Moines says community fridge that provides food to needy must move - Axios Des Moines and https://www.desmoinesregister.com/videos/news/2021/

[84] City-lot sized urban farms like the one upon which used to host footnote #83's public refrigerator produce some almost affordable fresh vegetables ("almost" because such things are mostly marketed via DesMoines pricy Farmers Market and therefore don't/can't address its citizens food insecurity issues).

[85] Walmart is to US supermarket chains as China's wind turbine manufacturers are to ours in that its prices establish standards for thrifty-minded shoppers spending their own money.

My second goal is to prod our new and refreshing sane-seeming, topmost political leadership to do whatever's necessary to provide the USA's own poor & huddled masses with access to enough wholesome, non-value-added, whole food commodities to feed themselves (see Tables 1 - 5), not continue to cater to its most prosperous farmers/landowners/ food business sector executives, and technically clueless, overly concerned, & overly coddled citizen-consumers[86]. Because extant business models and the governmental policies responsible for them squander time, money, and human resources that should be addressing our genuinely "existential" problems, our government's rule-writers and administrators must establish policies that cause those business models to become unprofitable and therefore be *voluntarily* changed by those business sectors' managers.

One of the things that our people feeding dollars should be doing is supporting the people & institutions that could render its local "farmers markets "all that they could be"; i.e., produce and then store those intrinsically cheap veggie-type staple foods that aren't currently available to its not yet -rich-enough citizens. One acre of normally (not "vertically") farmed Iowa land could produce from 10 to 25 tons of apples, tomatoes, carrots, onions, cabbage, beets, cantaloupe, or potatoes. The US corn belt's sunlight and rainwater [87]are free and locally storing/distributing such produce in bulk is neither terribly difficult nor terribly expensive because our great grandparents managed to do that over a hundred years ago. Bulk transport of such commodities to regions that aren't so naturally blessed isn't a genuine issue either because Statista.com reports that ," *in 2020, the U.S. average freight revenue per ton-mile in Class I rail traffic stood at 4.4 U.S. cents*[88]**.**

This report (2022-nebraska-crop-budgets-010322.pdf (unl.edu)) presents detailed production cost breakdowns (labor, seed ,cultivation, pesticides etc.) for several of next-door-to-Iowa Nebraska's major crops (dry & irrigated peas, sorghum, corn, alfalfa, soy & "dry" people food type beans). Its figures for 240 bushel (bu)/acre pivot irrigated corn (p 52) translate to total production costs of 3.05 cents/lb for field corn or 4.15 cents/lb if/when ownership-related "overhead & opportunity" costs are added in too. For 48 bu/ac dry land soybeans (no irrigation) those costs add up to 10.6 or 15.8 cents/lb respectively. For pivot irrigated, 75 bu/acre soybeans, production costs are 9.4 and 14.6 cents/pound. For irrigated, 2700 pounds/acre, people-food type beans its figures (p 56) translate to 18 and 24 cents/pound

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[86] In today's www-empowered world, "technically clueless" means intellectually lazy and/or too poor to access the internet.

[87] Iowa's rainwater is free but often insufficient and/or too unreliable for veggie gardening. Anyone planning to raise his/her own should assume that additional water will be needed. Since most of Iowa's homes have bigger roofs than they have garden spaces, catching/saving rainwater from your home's downspouts represents a good way for individuals to accomplish that.

[88] Iowa has traditionally had sufficient rainfall to reliably produce huge soybean and corn crops. Global warming's climate changes may end that happy situation – In 2022, California, Arizona, Iowa, and Nebraska experienced yet another exceptionally dry growing season, Argentina, Cuba, and Uruguay are suffering for the same reason now and droughts have caused more civilization collapses than has any other cause.

which again demonstrates that soybeans are more productive as well as more nutritious than are people-food-type beans.

This report Microsoft Word - EBB2-Po3-13 (uidaho.edu) gives the same cost breakdown for Idaho's potato production almost all of which is irrigated. The bottom line is that spuds now cost 8-9 US pennies per pound to produce which figure is often close to what Idaho's farmers receive from their immediate buyers[89].

Because Iowa naturally has more rainfall, its people-food farmers would likely incur lower irrigation costs than would either Nebraska's or Idaho's[90].

To get some idea of what could be done veg-wise, let's ballpark how much of its most populous county's land (Polk County) would be required to provide its ~492,000 people with 125% of the fresh veggies that the average American citizen is currently consuming[91]. Assuming an average of 15 tons of veggies/acre/year, doing so would require that about one half of one percent of that county's land surface be devoted to that purpose. State-wide, it'd take about 0.04 of one percent of Iowa's 33.6 million acres of farmland to so-feed-up its entire population.

What should we do?

Making appropriate policy changes is what a genuinely effective 21st century US government's officials should do rather than continuing to try to compensate for the effects of too deeply entrenched dumb policies. I recently (18Feb2023) watched a CGTN interview of Professor JØrgen Rander, co-author of the infamously controversial 1972 Club of Rome report, "The Limits to Growth"[92]. According to Dr. Rander, the reason that we humans haven't addressed

[89] Idaho's potato farmers currently get 15 to 18% of US average retail potato price: i.e., currently about 11 of 78 cents/pound USDA ERS - Chart Detail .The biggest markup occurs before its potatoes leave Idaho - its "packing " facilities are currently (early Summer 2022) selling them for about 40 cents per pound ($20/50 pound box). Their best/lowest price here in DesMoines then was about 80 cents/pound.

[90] Homework questions:1) if an Iowan farmer really wanted to "save" the world's hungry people, should he devote his efforts to raising 200 bu/acre corn or 20 US-type ("short") tons/acre spuds? 2) If a bushel of corn weighs 56 pounds and averages 9.4 wt% protein and 3.65 kcal/g and potatoes average 1.6 % protein and 0.69 kcal/ g, how much more nutritious calorie-wise is the better choice than the other crop? Ditto, for protein? (Ans: (see APPENDIX I) Corn provides about 48% more food energy and 65% more protein/acre. It's also easier to store and cheaper to ship which is the reason that Iowa-born President Herbert Hoover, then serving simultaneously as U.S. Secretary of Commerce and head of the American Relief Administration, "saved" Russia's starving poor circa 1919 by sending them corn rather than potatoes, pork chops, microgreens, or kumquats.

[91] According to the USDA's latest Economic Research Service (ERS) - Food Availability and Consumption report veg.xls (live.com),an average American consumes about 4.1 oz and 50.5 kcal's worth for fresh veggies per day or s about 2% of his/her energy requirement.

[92] see Degrowth: One on One with Jørgen Randers – The Agenda full episode - CGTN His book turned into a genuine best seller- some 30 million copies printed in 30 different languages have been purchased. Incidentally, although his thesis is now being characterized as "degrowth", he says that that's inaccurate, misleading, and apt to be self-defeating.

the now much nearer future's "existential" energy, food , and environmental issues in a sustainable fashion, is that our governments' policies "*don't offer good investment opportunities*."[93]

During 2022, the USDA's SNAP program alone spent $140 billion to assist the USA's then officially 43.6 million "food insecure" citizens. - that's $3211/person/year or month or $9.55/day. Since today's (1/6/2023) "'market" costs of corn & soybeans are $6.53 & $14.67/bu respectively, the annual cost of providing anyone who wanted to provide themselves with 2400 kcal & 92 g protein each day would be about 18 cents or ~2% of what SNAP alone currently is costing US taxpayers.

The maximum monthly snap benefit is currently about $234/person to which as of 1Apr2021 the USDA'S FOOD AND NUTRITION SERVICE (FNS) added a $95/household "SNAP COVID-19 Emergency Allotment" regardless of family size. A year later, despite especially rapid "post-covid" food cost inflation, the FNS dropped that extra $95 which totally ended that adjustment in Iowa and eleven other Republican-led states leaving many individuals /families unable to feed themselves in the manner that many of us consider to be a birthright. Consequently, food pantries everywhere are struggling to meet increased demand[94].

My mostly internet-based research for this book suggests that most of the tax dollars currently devoted to people-feeding here in the USA serves instead to benefit/support a horde of "government workers", politicians, and vendors[95]. I've also concluded that most of our much-heralded "farmers markets" don't accomplish what they're supposed to because of government sanctioned yuppie-driven pricing & unreliable availability.

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[93] Governmental policies are the reason that the USA's currently green-leaning decision makers are still attempting to replace its most reliable electrical energy sources (nuclear reactors) with ineluctably unreliable windmills and solar panels:

"*We get a tax credit if we build a lot of wind farms. That's the only reason to build them*". Warren Buffett

[94] Imagine spending hours preparing delicious vegan meals for people who are both unhoused and hungry, only to have your local government punish you for doing so. That's what's been happening to the membership of *Food Not Bombs* in Houston, Texas (see Food Not Bombs - Wikipedia) . Over the course of several weeks, police have cited that group twenty-nine times for the crime of "*feed(ing) homeless*." Each ticket cost that group $2,000 adding up to its volunteers & contributors paying Houston's government $58,000 for the privilege of feeding its hungriest folks. That city's ban on feeding unhoused people is over a decade old and hasn't meaningfully addressed the number of them living there: in fact, it simply makes everything worse because its poorest people not only do not have a place to live but are forced to be hungry as well. Such behavior reminds me of the "Do not feed the animals!" signs at parks and zoos. Hungry people are deemed to be a nuisance and therefore should not be encouraged to stay (or breed) with free food. We've become so hung up on behavioral and political issues (e.g., abortion, school prayer, gay rights, and whatever Trump happens to be doing) that we're refusing to provide for those of us at risk from issues that different policies providing different incentives could address now including food insecurity, poor sanitation, deficient medical care, poor jobs, labor shortages, insufficient housing, poor education, etc. We need to make those changes NOW, not by 2050.

[95] My research was largely internet based because almost all of the people implementing, supporting, and supplying the current system, refused to answer questions regardless of how I've tried to ask them.

The USA's approach to feeding its poorest people isn't failing because there isn't enough money or individual effort being spent, it's failing because it's being implemented the same way that the rest of our government is - a hodgepodge of organizations at Federal, state, county, city, and neighborhood levels, each of which interprets/implements their part of that "mission" in whatever way best fits its own policies, "*exclusive agreements with vendors*", schedules, and manpower availability. At the Federal level that mission boils down to funding both its own nutritional organizations and individual states to do whatever they wish to ensure that their citizens don't go hungry. At every level there's a presumption that the only way that people could/should feed themselves is the way that best fits the USA's food sector's current paradigms and therefore benefits its suppliers, managers, technical experts, and investors. The people heading each level of that pyramid don't consider themselves individually responsible for its success, failures, or excessive costs – it's always "*those other guys*".

Consequently Mr. Biden has inherited a "feed-the-poor" system that maintains ~40 million of his constituents' dependence upon a self-serving system that benefits its own employees, "experts", and business vendors far more than it does its recipients or farmers. His US Secretary of Agriculture[96] could quickly solve most of his constituents' food insecurity problems by…

1. Declaring that any institution receiving any of the roughly $174 billion federal dollars/year[97] currently devoted to poor people-feeding also freely distribute <u>big</u> bags/sacks/boxes of US commodities (e.g., corn , soybeans, flour, soybean oil, etc.) along with information (books, pamphlets, lectures, videos, etc.) describing the whys and hows to go about preparing/consuming them.

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[96] Mr. Biden's Secretary of Agriculture, Tom Vilsack, is that business sector's ultimate "insider" because he had previously held that same position during the Obama administration. A Democrat, Mr. Vilsack was first elected to become the mayor of Mt Pleasant Iowa in 1987, then elected to the Iowa Senate in 1992 ,and finally elected and began serving the first of two terms as its Governor in 1999. At the end of 2006 he announced intention to run for the presidency in the 2008 election but soon dropped out when it became apparent that that was a race that he wouldn't win. In 2008 Mr. Obama picked him to serve as his Secretary of Agriculture for the next eight years. Along the way Mr. Vilsack served as member of the National Governors Association Executive Committee, chair of the Democratic Governors Association, chair of the Governors Biotechnology Partnership, the Governors Ethanol Coalition, and the Midwest Governors Conference, and both chair and vice-chair of the National Governors Association's committee on Natural Resources where he worked to develop the NGA's farm and energy policies. One of the many things that I totally agree with Secretary of Agriculture Vilsack about is "public service". During the 2008 Presidential race he joined then fellow candidates Hillary Clinton and Joe Biden in supporting the establishment of a U.S. Public Service Academy as a civilian counterpart to its military academies. In my opinion, <u>everyone</u> should be 'drafted' to learn/perform a year's worth of some sort of useful public service after completing high school.

[97] See USDA ERS - Food Security and Nutrition Assistance . $174 billion/40 million food insecure people = $4400/year/person - or according to Lending Tree's December 2021 cost figures, our government is spending about 1.7 times as much per person-year as do average, not-poor, taxpaying US citizens for their groceries (see Average Household Budget: How Much Does the Typical American Spend? - ValuePenguin)

2. Because the modest proposal that I'll be suggesting next would provide the only incentives that seem to really matter in today's "Material World", his and Mr. Biden's USDA should amend the "quality" criteria in their agency's "Federal Grain Inspection Service handbook" (Book II Grain Grading Procedures (usda.gov)) to respecify what constitutes a premium-worthy "1st grade" US soybean.

Because the low raffinose-type soybean seed varieties best suited for both people and animal feeding (more protein, less fiber, & superior digestibility) have repeatedly been shown to be equally productive and contain ~same amount of oil, Mr. Vilsack could and should assure the USA's farmers and livestock feeders that switching over to them wouldn't hurt their business's bottom lines[98].

My proposal[99]

Because I feel that the purpose of government should be to empower its citizens to do things for themselves, I propose that its current "feeding the poor" system be replaced with one that's simultaneously more effective, less demeaning, and much less expensive. Here are my assumptions/basis:

1. An average of 43.6 million US citizens are food insecure throughout the year.
2. Their average family size is two persons (i.e., 21.8 million families)
3. Each person is primarily being fed with Table **2**'s 2500 kcal/day's cooking oil/soybeans/corn/wheat flour combo to which they will be adding their own value.
4. Everything is bulk shipped an average 1500 miles from where it's produced via Class I rail traffic at a cost of 4.4 U.S. cents per ton-mile.
5. At the ultimate rail stop the program's recipients either pick up their sacks & jugs of food commodities themselves or good Samaritans help them do it.
6. Our government's purchasers will competitively shop for commodities and shipping – not purchase from politically favored suppliers.
7. Our government will give each of its 43.6 million recipients people three times what it should cost to feed themselves with those commodities purchased back from their government for what its buyers paid for them and plus shipping.
8. To begin with, the government will also give each "deserving" family a one-time grant of $300 (more?) to buy their own pots, pans, blender, grain grinder, slow cooker, etc.

Here's this scheme's cost breakdown:

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[98] Kathryn Marie Baker, MS thesis "NUTRITIONAL VALUE OF HIGH-PROTEIN AND LOW OLIGOSACCHARIDE VARIETIES OF SOYBEANS FED TO PIGS AND POULTRY", master's thesis, University of Illinois, 2007 Microsoft Word - Thesis 8-23-09.doc (illinois.edu).

[99] My foodstuff-related proposal's suggestion isn't nearly as controversial as was that proffered to Great Britain's decision makers by Dr. Jonathan Swift ~300 years ago (GOOGLE it). APPENDIX XV outlines another of my outrageous "save the world" proposals.

A one-time $300 grant to 21.8 million families would cost US taxpayers 21.8E+6*200/1E+9 or $4.36 billion[100].

At 50 cents/day/person providing enough flour, cooking, oil, and soybeans for 43.6 million people with to feed themselves for one year would cost taxpayers $6.29 billion [$0.40*43.6 million/1E+3 million/billion].

At 589 grams/person day for that combo and an average source-to-customer shipping distance of 1500 miles, food commodity shipping cost would be about $0.3 billion/year.

Consequently, since that program's recipients would be purchasing their staple foodstuffs from the government with one third of what they'd be receiving for learning/doing their own value additions, this scheme's first year total cost to taxpayers would be about $16.5 billion [2*6.29+0.3)+3.36] – about 10% of what today's privatized vendor-based "feeding-the-poor" system costs them.

It would also encourage and empower its recipients to first learn and then do what's best for themselves and would therefore be consistent with humankind's most fundamental behavior driver.

Closer to home, Iowa's business & governmental decision makers could/should recognize that even its poor people represent a large, yet-unserved, customer base that its commodity businesspersons could profitably serve - after all, charging walk-in customers let's say $25, for something that its farmers were paid under $13 (i.e., 50 pounds of today's closing price soybeans), sounds like a good enough incentive for its businessmen (or farmers) to want that/their business too. Who knows – the President of Iowa's Soybean Association might even volunteer to no-strings attached, donate a few percent of its memberships bounty to the UN's "World Food Programme" to help alleviate the misery of the rest of the world's ~900 million more-genuinely "food insecure" (starving) people.

Again, for a genuinely middle-class person like me, it would have been perfectly OK if I could have simply gone to a feed (?) store and purchased a 50-pound sack of whole soybeans for under twice what the USA's "market forces" force its farmers to sell them for.

Other information sources

Here are some other good sources of information.

Harold McGee's monumental book, "*On Food and Cooking: The Science and Lore of the Kitchen*" is the best-written and most comprehensive all-purpose technical "cookbook" I've

[100] Throughout this book I'll be expressing very large or very small numbers via decimal (base ten) exponential notation; e.g., three million six hundred thousand =$3.6\text{x}10^6$ = 3.6x10^6 = 3.6E+6 (get used to this number because it's the number of the metric systems' energy units (Joules) within one kilowatt hours' worth of the electricity that you cook with and are billed for. power (Watts) = energy (in Joules) per second)

seen so far (it's free at https://www.pdfdrive.com/on-food-and-cooking-the-science-and-lore-of-the-kitchen-e145171545.html).

Michael Pollan's also brilliantly written, *The Omnivore's Dilemma: A Natural History of Four Meals"*, explains how both of the USA's "food business sectors" ("organic" & otherwise) actually work. https://archive.org/stream/Michael_Pollan-The_Omnivores_Dilemma/Michael_Pollan-The_Omnivores_Dilemma_djvu.txt .

Mark Bittman, opinion columnist and food writer for the New York Times, author of 30 books, and "Fellow" of the Union of Concerned Scientists(UCS), recently published another best-seller, *Animal, Vegetable, Junk: A History of Food, from Sustainable to Suicidal* which explains how today's big-business-dominated food system came to be and why there must be some changes[101].

The book that best addresses the root causes of our "Food Sector's" institutional pathologies, is Dr. Robert Paarlberg's, "*Resetting the Table: Straight Talk About the Food We Grow and Eat*". It skewers some of the fallacious myths and criticisms of that system including several proffered by Messrs. Bittmann and Pollan. Most important, it suggests realistic steps towards addressing systemic root causes based upon his thesis that food policy, not farm policy, should serve as the action focal point. He also advises farmers to embrace innovation and entrepreneurship, not simply continue to go along with whatever their immediate customers and their country's food sector decision makers are saying.

Mary Shrader's YouTube video series, "Mary's Nest" offers excellent, common-sense advice about virtually every aspect of food storage and preparation (see https://marysnest.com/).

The best-written technical article I've seen about the reasons why we here in the Western World should be consuming more soybeans is "*Expanding Soybean Food Utilization*" written by then-Monsanto's Dr. Keshun Liu twenty-two years ago[102].

Finally, a few months ago, my wife discovered a moth-eaten paperback in the attic of her mother's abandoned farmhouse that apparently was one of the mid-20th century's natural-food "Bibles" - the third printing (1971) of Dorothea Van Gundy Jones', "*The Soybean*

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[101] Iowa's agricultural business models, practices, and regulations apparently served to inspire Mr. Bittman's latest book's title. While it's very well written and a great read, I don't agree with 100% of his opinions: for example, if you didn't get a good tasting/nutritious sandwich at ***Subway***, it's because you didn't choose its best bread or ask your server to '*pile on the veggies*'.

[102] See Expanding Soybean Food Utilization (researchgate.net) Dr. Liu is now busy doing "Small Grains and Potato Germplasm Research" at one of the USDA's experimental (ARS) stations in Aberdeen, Idaho.

Cookbook: Adventures in Zestful Eating". It's a treasure trove of miscellaneous information about soybeans including ~350 recipes. In any case, anyone interested in this/my book's subjects should get a copy of hers – the last time I checked, AMAZON would sell you one for six dollars[103].

[103] Unfortunately, many of the things that Dorothea Van Gundy Jones apparently assumed would be readily available/affordable fifty years ago (e.g., raw soybeans, soy grits, soy pasta, etc.) are no longer available at the local retail level. The link, T. A. Van Gundy and La Sierra Industries (soyinfocenter.com), describes how she came to be that book's author.

Raw Materials

For simplicity's sake I've limited this section's subjects to just a few of the food-type commodities mass-produced within the United States emphasizing those most common to its "corn belt". If I were to add others, the first two would probably be wheat and peanuts.

I had considered including raw wheat but decided to go with already-made, enriched, all-purpose wheat flour instead because 1) reasonably priced versions of that staple foodstuff are still readily available at the retail level[104], 2) a combination of soybeans & corn fills the nutritional gaps generated by discarding a wheat kernel's germ & bran, and 3) home-grinding raw wheat kernels sufficiently to produce a flour that behaves like we have come to expect would be both difficult and exensive.

Some other attractive (to me anyway) possibilities include steamed/rolled oats and 60% protein corn "gluten"[105] both of which currently cost about 60 cents per pound at "***Eastern Iowa's largest supplier of agricultural products***" (*Eldon C. Stutsman, Inc*.) – the same wholesaler that had supplied my sack of 46% protein, 40 cents/pound, soybean meal. Again, it's too darn bad that Iowa's feed dealers neither stock nor sell its farmers' whole soybeans.

If I still were living in Idaho, I'd probably also include lots of potato-based recipes because it was especially easy for me to raise them there and whole (not peeled) spuds contain some good quality protein and could therefore partially complement that within the other veggie foodstuffs that should be providing most of our energy (in particular, whole potatoes are an excellent source of vitamin C). Unfortunately, like most of the stuff within the USDA's cornucopia, potatoes are mostly water (typically ~80%), usually peeled, and cost far more than they should (see Table 2). Nutrient-wise, they are no longer a "cheap food" in either the USA's corn belt or Idaho - a situation that a genuinely caring and "follow the science"- type government's leadership would be trying harder to address.

Peanuts – Medium Runners (Raw) If I were to become convinced that it may become possible to purchase whole raw peanuts for not more than three times their farmgate price, I'd be delighted to see what could be done with them too. During this project, I've learned that

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[104] Walmart's "house brand" all-purpose flour is (March 2022) ~50% more costly than it was just a few months ago. That price is still "reasonable" because it wasn't much over-priced to begin with and flour mostly consists of wheat the cost of which has also become that much higher. That rationale/excuse for food cost inflation doesn't apply to things like "sea salt", twinkies, "special" breads, or tempeh in which raw material cost represents a trivial fraction of its retail price.

[105] Corn "gluten" refers to the corn protein fraction separated during "wet milling" (i.e., ethanol production). Unfortunately, it's not "stretchy" like wheat's gluten & therefore can't be substituted for it in yeast/sourdough-leavened breads.

soybeans are “great” people food but suspect that peanuts might prove to be equally good or even better.

Quinoa is another possibility because its yield per acre is similar to that of wheat (55 bu/acre [New Small Grain Offers Good Profit Potential - ProAg](#)), it’s somewhat higher in both protein and fat (both are ~15%) than most varieties of wheat, and its protein like that of soybeans is relatively high in lysine. It’s also gluten-free (and therefore makes lousy bread) and widely considered to be especially “healthy” - which is true because it is generally consumed in forms that haven’t been processed as much as wheat is. The rub of course, is that it currently costs about ten times more than does sapiently-purchased wheat or wheat flour - over $3/pound in bulk.

Sorgo (aka sorghum or milo) is another possibility because it’s cheaper than wheat, almost as nutritious, easy to raise[106], drought-tolerant, especially efficient in the utilization of both solar energy and fertilizer and doesn’t require special equipment to grow. The reason for this is that its origins can be traced back to 8000 B.C. near the Egyptian-Sundanese border where it had adopted itself to climates ranging from the Afro-Alpine summits of Ethiopia to the Sahel’s semi-arid climate. While a good deal of it is grown in the US -- in 2021, 454 million bushels, and $1.3 billion in sales - -- it's not a popular people food and likely won’t become one unless climate change renders corn growing impossible.

Finally, one of last-year’s XMAS presents, the 2022 edition of “T*he Best American Science and Nature Writing”* includes an essay written by the Washington Post ‘s Sarah Kaplan about another “miracle” grain, Kernza, that could “save the world” if its farmers were to be sufficiently incentivized to raise it. If I can get enough of it to play around with, my next cookbook may include recipes for it[107].

I will not be saying much about “organically” produced/labeled foods other than that there’s absolutely no question that so-labeled foodstuffs cost more to both produce and purchase, much of which cost inflation has to do with obtaining “certifications” (paperwork), and that numerous metastudies have concluded that there is no evidence supporting the contention that such things possess superior nutritional quality.

I also won’t be saying much about store-bought meats other than chicken because: 1) chickens are much more efficient at converting the same commodity veggie-type foodstuffs (mostly corn and soybeans) that we ourselves could/should be eating to meat-type food than are either pigs

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[106] In 2021 the USDA estimated that it would cost $324, on average, to grow an acre of sorghum compared to $775, $697, and $466 to grow an acre of cotton, corn and soybeans, respectively.

[107] The reasons for this include 1) kernza is a perennial which means that it wouldn’t have to be replanted every year 2) it is deep rooted which makes it a better at sequestering atmospheric CO_2 in the form of ”soil organic carbon”(SOC) than are wheat, corn, etc., and 3) it’s especially “healthy” in that it has 18 grams of fiber and 19 grams of protein per 100 grams vs wheat’s 10.8% fiber/~13% protein. Its downsides include too much fiber, little/no gluten & therefore not good for <u>good</u> bread-making, and <u>much</u> lower food yield/acre (currently ~30% that typically achieved by the first world’s wheat farmers).

or (especially) cattle; 2) (therefore) chicken is intrinsically cheaper than other meats, and, finally, 3) I feel more kinship with my fellow mammals than I do with either Iowa's birds or fishy "commodities"[108].

Beef is especially special. One way to define a "luxury food" is that it's something that you shouldn't eat often or much of – the USA's favorite factory-farmed/fed "red" meat (beef) is a prime example. Although still considered a "necessary" part of regular meals by many people, meats - especially beef - already constitute a prohibitively expensive luxury item for many others of us[109]. Because each step up the biological food chain wastes 80 to 90% of its last step's energy (see APPENDIX II), we humans should adopt plant-based diets to reduce our own "carbon footprints" along with the other environmental/social impacts we cause by deliberately feeding ourselves inefficiently (see Figure 2), i.e., by both eating meat rather than what we feed our "meat animals" with and <u>not</u> locally raising/storing/distributing most of the grains, pulses, other vegetables, and fruits that we should be consuming instead. Those effects include the huge land areas – often wrested from natural forests & grasslands – currently devoted to meat production which paradigm eventually may become impossible as human population increases and more of the planet's agricultural land is desertified via anthropogenic global warming and the Green Revolution's, still- dominant, "dirt mining" approach to agriculture[110].

Collectively, we should and will eventually be forced to cut down on meat-eating. Changing behaviors and tastes will also impact the status of such foodstuffs. It's likely that meat eating will eventually become viewed the same way as spitting in public, screaming at children, or kicking dogs is now. It's not just their excessive costs, climatic impacts, and scarcity that's apt to transform some of today's everyday foods (e.g., beef, coffee, some spices, and certainly, anything flown in "fresh" from another country or hemisphere) into luxury items.

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[108] However, if I had to raise/kill my own chickens, it's likely that that I'd be eating far less and far tougher chicken - only those that had died of old age or chicken-to-chicken conflict.

[109] Per capita US beef consumption is currently under 60% of what it was during the mid-1970s primarily because it's become too costly – burgers used to sell for 25 cents apiece when I was a college student..

[110] For instance, even though it's been known for several decades that the USA's dominant agricultural practices degrade its soils, kill its wildlife including the insects pollinating many crops (i.e. "reduce biodiversity"), and pollute both ground and surface waterways, to date only ~3% of its farmers have adopted the "regenerative organic agricultural" principles/practices, see [Marsden Long-Term Rotation Study | Iowa Nutrient Research Center (iastate.edu)](), that could/would address those issues. In today's highly competitive "privatized" business world, unless adoption of such changes is sufficiently rewarded, it won't happen (see APPENDIX IV and https://rodaleinstitute.org/wp-content/uploads/fst-30-year-report.pdf (Rodale 2019, "The Farming Systems Trial – Celebrating 30 years").

#2 yellow field corn[111]

Corn is the world's primary cereal grain in terms of production but ranks third as a staple human food, after wheat and rice. The reasons for this vary but are related to cultural/social preferences and because corn is cultivated/considered as livestock feed in many countries. It's currently the world's most important livestock feed and biggest source of ethanol-type "biofuel"[112]. Every year ~400,000 of the USA's ~2 million farmers, raise ~15 billion, 56-pound bushels of corn on about 90 million acres of land. Its starch is almost 100% human digestible and it possesses more protein than do starchy root-type food energy crops like yams, cassava, sorghum, and white or sweet potatoes but less than that of most other feed grains. It's nevertheless an important protein source for livestock due to the sheer amount fed. Whole corn kernels also contain important minerals and vitamins required by all animals including us humans. Coproducts from both the wet and dry corn milling industry have also become important sources of energy, protein, digestible fiber, minerals, and vitamins for the animal feeding industry. Specifically, corn "gluten meal", "corn gluten feed"[113], distillers grains (DG), and "dried distillers grains with solubles" (DGGS) are popular feed commodities due to their and low cost and substantial protein, energy, mineral, vitamin, etc. levels, and ready availability. Corn used for fuel produces about 53% ethanol, 42.5% animal Feed, and 4.5% Corn Oil.

Before I go any further, I'm going to discuss one of most overblown issues faced by anyone seeking to feed themselves efficiently – the nonsense we are told about Genetically Modified Organisms (GMOs), aka "Frankenfoods".

Even though US shoppers are now unlikely to find lots of GMO "contaminated" fruits and vegetables in the produce section of their grocery stores, GMO crops are a major part of the USA's food supply because most of them feed the animals we eat - including cows, pigs, turkeys, and chickens, both themselves and their eggs. Relatively few GMO crops are grown in the United States, but several of them account for most of that crop (e.g., soybeans, corn, sugar beets, canola, and cotton). In 2020, 94% of all soybeans planted and 92% of the corn planted were GMO. Here in the USA, most of whatever of them not directly fed to animals is

[111] According to a recently retired US corn belt "insider" (a PhD-educated agronomist), the USA's corn and soybean commodities are all considered to be grade 2, not 1, unless they're "special" which means grown at the behest of a special buyer (for example super clean, super high protein, soybeans for Japan's TOFU makers.)

[112] The USA currently makes about twice as much corn ethanol (15 billion gallons) as the world's next biofuel runner- up, Brazil, does sugar cane ethanol (30 billion liters). However, sugar cane is a more efficient alcohol crop than is corn (more gallons per acre).

[113] Corn's "gluten" isn't the same thing as real (wheat) gluten. That's good for gluten challenged people because they could eat it even though it's low on lysine, but terrible for "breadophiles" (the nice ones anyway).

disassembled/fractionated to make biofuels and the fractions reassembled by food factories to make their ultraprocessed goodies like "Ruffles" and "chicken" nuggets[114]. .

From a nutritional point of view, a more relevant issue is that modern corn hybrids were bred for higher "energy" (fermentable starch) yields, meaning that corn now contains less protein than it did back when grandpa was a pup and a good yield/acre was one fourth of what's expected now (Scott et al. 2006). Moreover, since corn's protein was already deficient in certain nutritionally essential amino acids - most notably lysine- such yield "optimization" has further reduced its nutritional quality.

That's why we should be consuming both corn and soybeans.

Table 3 Relative energy-type foodstuff costs

FOOD	cost/calorie	$kcal/corn	Supplier
rolled oats	0.000348	2.3	Tractor Supply
sweet potato	0.002698	18.1	Walmart
white potato	0.001896	12.7	Walmart
g wheat	0.000316	2.1	DesMoines Feed
g corn**	0.000149	1.0	Tractor Supply
enriched rice	0.000348	2.3	Walmart
All-purpose flour	0.000318	2.1	Walmart

* DesMoines retail costs March 2023

**This table's "best" local retail cost = 2.1x that day's official corn market value

Though rarely consumed as a whole food, "GMO corn" represents the USA's single biggest food crop by far in terms of either volume or energy (calories). Iowa alone raises about 2.7 billion, 56-pound bushels of corn kernels each year. It is generally unavailable in the USA's food stores at any price but typically costs $8-12 per 50-pound sack at animal feed/hunting supply stores like "Tractor Supply". That's twice its bulk commodity price which markup represents the upper limit of OK/reasonable as far as I'm concerned for such stuff[115].

One cup of dry feed corn kernels weighs about 180 grams (~6.4 ounces). One cup of my DIY "fine ground" (ha ha) corn flour made from them weighed about 140 grams.

[114] If you would like to learn more about how US field corn is processed into some of its peoples' foods, I recommend watching "*How America Works*"' Mike Rowe (a good narrator, better philosopher, & best baritone singer) explain how a typical US dry corn mill (one of its 40 such factories) converts ~50 tons of corn/day to "germ", masa, various sized meals/grits, & flour along with lots of waste-type dusts & sludges LifeLine Foods featured in national show on Fox Business Channel - YouTube .

[115] Table two's cheapest people food energy source by far is feedstore-purchased, no-GMO, field corn which though cheap likely costs twice what farmers were paid for it. There is no good reason to pay more for white rather than yellow corn - to the contrary, it *should* be (but isn't) a bit cheaper because it is somewhat less nutritious (less carotene).

Consuming any such US field corn or soybean-derived things won't turn you or your loved ones into Frankenpersons because the cooking/processing required to render them edible, discombobulates any GMOs within their proteins and/or DNA[116].

#2 grade US Commodity-type soybeans

The reasons behind my decision to switch one of my cookbook's two primary-most-ingredients from peanuts to soybeans were that while both are among the very few plant (veggie)-based protein sources containing all the amino acids essential to human nutrition, US farmers raise far more soybeans than they do peanuts, and their protein better-complements (more lysine) that of energy-type foods like corn, wheat, sorghum, barley, yams or any sort of potato see APPENDIX XIII and Table 4.

Table 4 Key soybean & peanut constituents

g/100 g of →	peanuts*	soybeans**
lysine	0.9	2.3
methonine	0.3	0.4
total protein	26	37
fat	49	20

* https://vegfaqs.com/peanuts-amino-acids/
** https://www.mdpi.com/1420-3049/26/16/5071

The soybean [Glycine max (L.) Merrill], a native of China, is one of mankind's oldest crops. The Chinese and other Oriental people, including the Japanese, Korean, and Southeast Asians, have used it in various forms as one of their most important dietary protein and oil sources for about three millennia. For that reason and because the amount of protein so produced per acre is higher than that of any other food crop, it's been called "*yellow jewel," "great treasure," "nature's miracle protein," and "meat of the field*" and is therefore often considered to be a primary weapon against world hunger. It's also been touted as a possible weapon against chronic diseases.

Since its introduction to the Western world at the beginning of the twentieth century, the cultivation and use of soybeans have undergone a dramatic revolution: from the orient's traditional soy foods to the Western World's protein supplements, animal feeds, industrial paints, biofuels, and culinary oils and spreads. It's changed from an old oriental field crop to

[116] On the other hand, consuming raw, CAFO-fattened, beefburger ("steak tartare") will almost certainly cause you to grow a third eye, scales, tentacles, or whatever else especially frightens you (ha ha) or your life coaches. I suspect that a third eye began to grow in the back of my head soon after I'd quit working at Idaho's national laboratory but thankfully it still hasn't broken through yet. My lawyer says that because INL's cafeteria offerings surely contained GMOs and that *symptom* along with thinning hair, wrinkling skin, & short-term forgetfulness, might therefore be Mr. Biden's government's fault, I should join along with other victims he's already signed up for his class action suit to get us some reparations.

host of worldwide-produced new crops with greater adoptability, herbicide tolerance, pest resistance, and/or altered chemical compositions.

The top producers today are the United States, Brazil, Argentina, China, and India. In the USA , soybeans are grown primarily for their oil content, the meal residue (soybean meal or SBM) being used as livestock feed and only 3% to 5% used for direct human nutrition. Together, protein and soybean oil content account for ~56% of dry soybeans by weight (typically 37% protein and 20% fat). The remainder consists of ~30% carbohydrates both digestible and otherwise ("fiber"), ~9% water, and ~5% ash. Soybeans comprise approximately 4% seed coat or hull, 90% cotyledons and 2% germ (hypocotyl axis).

About 85 percent of the world's soybean crop is processed (aka "crushed" or "milled") to produce soybean meal (SBM) and soybean oil. Approximately 98 percent of that soybean meal ends up as animal feed with the balance used to make soy flour and various sorts of "proteins". 95 percent of the oil fraction is consumed after purification as edible oil; the rest is used for industrial products such as fatty acids, soaps, and biodiesel. The largest domestic market for direct human consumption has been for milk substitutes for infants judged to be allergic or hypersensitive to bovine(cow) milk. Soy products, not whole soybeans, are also used in a variety of applications including virtually anything primarily consisting of veggie oil (e.g., mayonnaise), protein fortification, and enhancement of functional properties in baked products, candy bars, breakfast cereals and beverages and texturized "fake meats".

The macronutrient composition of the soybean differs markedly from other legumes as it is much higher in fat, considerably higher in protein, and much lower in carbohydrates, especially starch. Worldwide, soybeans are the number one protein source for animal feeds accounting for 69% of total protein consumption of both poultry and swine (both of which are monogastric animals like we are) being the major consumers. Of the USA's ~4.4 billion, 60-pound bushel soybean production from 2010 through 2012, ~44 percent was exported with most of the rest ending up as soybean oil and the soybean meal mostly fed to US livestock. Roughly two percent of the soybean meal is further processed into soy flours and proteins for people foods. A

Only about six percent of the world's soybeans are directly used as human food, mostly in Asia[117].

Soybean oil is still primarily used for human consumption, but the fraction converted to biodiesel-type fuel is steadily growing, especially here in the USA.

The presence of the indigestible Raffinose Family of Oligosaccharides (i.e., RFOs including raffinose, stachyose, and verbascose) in most, but not all US grown soybeans constitute a

[117] The leadership of the USA's food business sector exhibits a good deal of antisoy bias see SANA-Comments.pdf (soygrowers.com)

major drawback. RFOs are poly sugars[118] derived from the easily digested/metabolically useful disaccharide sucrose but due to their α-1,6-glycosidic-type bonding, monogastric animals like us humans, chickens, and pigs can't digest them. Consequently, they pass undigested through our upper guts and are then partially fermented by anaerobic microbes in our lower guts which generates a "rich warm gas"(fart gas) mostly consisting of carbon dioxide, methane, and

	% fat	**% protein**	**% fiber**	**kcal/100 g**
	(FDA Food Data Central data)			
Navy bean	1.5	25.3	17.2	382
soybean	21.7	39.9	9.9	487
kidney	1.2	22.6	17.6	382

Table 5 dry basis bean compositions

hydrogen accompanied with organosulfide "perfuming agents".

Soybeans - especially dehulled soybeans - aren't as gaseous as some popular people-food-type beans because they don't contain as much poorly digestible fiber (see Table 5)[119].

While all soy is one species (Glycine max), there are dozens of varieties among which are several first developed over thirty years ago to address the "bean gas" issue. Although those varieties were/are clearly superior to typical US commodity-type soybeans from a nutritional standpoint (more protein), they haven't been very successful in its soybean seed marketplace because that characteristic isn't important to its biggest buyers and agricultural policy setters ("*our soybeans aren't meant for people, we're in the oil and animal feed business, & who cares how much a pig farts*?").

There are about 100 U.S. tofu processors, and their product represents $130-$150 million in retail value. According to Mr. GOOGLE, "*All the tofu consumed in this country is made from American-grown soybeans, but under 1 percent of its soybean crop is used for tofu.*"

Due to limited demand (they're both too "gassy" and too expensive at the retail level) , very few US farmers bother to harvest or sell immature soybeans (edamame -young, tender, and

118 RFOs are galacto-oligosaccharide (GOS) carbohydrates ("prebiotics) consisting of from three to ten, 5 or 6 carbon monomeric sugar "ring" molecules bonded together in various ways. They're found in dairy products, legumes (peas ,beans,& lentils) and many root vegetables, the "worst" of which is the Jerusalem artichoke (aka "fartichoke").Raffinose is a trisaccharide (3-ringed molecule) composed of glucose, fructose, and galactose. Most soybeans contain more sucrose (table sugar - a disaccharide) than they do RFOs.

119 The cowboys featured in the funniest scene in Mel Brook's second funniest movie (Blazing saddles) were probably "empowered" with pinto, not soy, beans. Their exuberance was fueled with "fiber" and oligosaccharide "prebiotics".

still-green soybeans) because they are too busy competing with each other trying to keep mature US soybeans competitive in international commodity markets[120].

Consequently, almost all US soybeans are allowed to grow to their adult stage and then "field dry"[121] at which point their pods become brittle and the kernels (beans) shrunken/dry/hard which renders them easier to harvest, shell, transport, store, and convert to veggie oil, soy protein isolate (SPI), and soymeal[122]-based animal feeds.

The most often encountered fractions in the USA's value-added soy-containing people foods are soybean oil and soy protein isolate (SPI). "SPI" is what's left after most of a bean kernel's' oil, digestible carbohydrates, fiber, vitamins, and minerals have been stripped out[123], leaving only most of its protein. That remainder is then dehydrated to produce a powder that looks like but doesn't behave like wheat flour.

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[120] Brazil now produces about the same soybean megatonnage as the USA for the same reasons – export sales of animal feeds, CAFO-raised meats, and oil mostly to China.

[121] "Wet" beans and grains don't keep well because nasty molds and/or bacteria will inevitably begin to grow in them. Consequently, if a farmer's soybeans contain over 13% residual water, he'll lose money because his product's buyer won't pay as much for them. However, because buyers don't but should pay a premium for drier soybeans, some farmers purchase equipment to deliberately rehydrate their beans back up to just barely under 13%.

[122] Throughout this book I'll be using "soymeal" interchangeably with "soybean meal" and "SBM" to refer to the feedstuff prepared from what's left when most of their seeds' oil has been removed.

[123] What happens to a US soybean is determined by economics. As of 6/29/2022's the markets' commodity costs for raw soybeans, soymeal, and soybean oil were \$0.62, \$0.46, and \$1.54 per kilogram (2.2 pounds), respectively. There doesn't appear to be a commodity market in the USA for SPI and AMAZON'S cheapest "bulk" SPI will cost you about \$19/kg. A 60-pound bushel of soybeans typically yields ~25 pounds (11 kg) of 90% protein SPI and 11 pounds of oil. Commodities - Live Quote Price Trading Data (tradingeconomics.com) is an excellent source for all sorts of economic information including prices.

Figure 4 Dry mature (yellow) and immature (green) common soybeans ("edamame"

SPI contains very little carbohydrates or fat and no cholesterol It is often used to fortify things like soy-based infant formulas, "protein bars", flours, cereals, and meat/dairy alternatives to boost their protein content.

Some of the parts of Henry Ford's cars were made of soybean protein.

Unfortunately, while its manufacture strips out the zinc and iron in the raw soybeans from which it was made, SPI still contains the phytate anti-nutrients[124] which reduce your body's ability to absorb the iron, zinc, etc., in your other foods.

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[124] An oft-parroted rationale for not considering common soybeans to be "peoplefood" is that they contain "phytate antinutrients". This is indeed true but there's nothing unique about soybeansin that respect. Their phytic acid concentrations are similar to those of wheat, corn, people-food-type beans, etc., and lower than those of such especially "healthy" things as sesame seeds, wheat germ, Brazil nuts, walnuts, and either rice or wheat bran. Phytic acid (aka inositol hexaphosphate or IP6) is present in many plant-based foods because it's the chemical form that many plants including all beans, seeds, and nuts store the phosphorus required by all of the Earth's living creatures' metabolic processes. Consumed raw phytic acid binds to (complexes) polyvalent cations like iron, zinc, and calcium thereby creating phytates which reaction impairs their absorption thereby rendering them indigestible. Cooking, germination, fermentation, sprouting, and (maybe) soaking all tend to hydrolyze (destroy) phytate to harmless inositol and inorganic phosphates thereby eliminating its inhibitory effects. Under *very* special circumstances (e.g., eating nothing but undercooked soybeans), this could lead to mineral deficiencies but would never be a problem to anyone consuming a reasonably well-prepared diet. Phytic Acid 101: Everything You Need to Know (healthline.com)

Whole soybeans represent a better foodstuff than is any of the individual fractions isolated from them with the possible exception of that combination extracted when soymilk is made from them (most of their protein, fat, minerals, vitamins, etc.). The reason for this is that the water-insoluble residue (okara) left when making it (~20-30 % of the whole beans' weight) contains almost all of their poorly digestible fiber along with some of their other "gassy" too-complex carbohydrates [125]- most of the easily digested, nutritious, stuff ends up in the milk.

Unfortunately, reasonably priced whole soybeans are almost impossible for US food shoppers to purchase because they must somehow ferret-out a way around that commodity's marketing system. Although Iowa's farmers typically raise about 550 million bushels (~20 million US-type tons) of them every year, I couldn't find them in any of Des Moines' grocery stores (ALDI, FAREWAY,HYVEE, & WALMART) or West DesMoines' Whole Food Market.

Likewise, none of DesMoines stock/pet food retail outlets stocked raw soybeans nor did any of its host (>20) of food-for-the-poor organizations (see *Greater Des Moines Food Assistance Resources A Short Guide For Congregational Leaders*, [FoodAssistanceResources20121024.pdf (lutheranchurchofhope.org)]). All of them distribute the sometimes discounted, sometimes surplus, sometimes free, and always "value added" products made/produced by the US food sector's businesses from food crop commodities, not those commodities themselves.

GOOGLE-shopping revealed another outfit willing to send me a 20-pound box of organic soybeans for "just" $39.75. Food-cost wise, that represented a 1000 percent cost mark-up relative to their nominal commodity value at that time, ~$11 per 60-pound bushel[126]. Amazon's markup on its "*Premium Grade Non-GMO Soybeans Bulk Great Price (5 Pounds for $12.99)*" soybeans was ~1200 %.

Another local enterprise sporting an especially wholesome-sounding name and mission statement, the "*Iowa food Cooperative*" turned out to be an organic/natural foodie website

[125] In foodie speak such things are called "prebiotics". Prebiotics is a wholesome-sounding label for the too-complex carbohydrates ("fiber") that your upper gut/intestinal system can't digest but your lower gut's(colon's) bacteria can to some degree. Prebiotics beneficially affect people by selectively stimulating the growth and/or activity of their colonic microflora in such a way that potentially health-promoting bacteria, especially lactobacilli and bifidobacteria, become predominant. The reason that eating "more fiber" and "probiotics" (i.e., such microflora) is recommended is that in combination they perform important nutritional functions not all of which have yet been identified. One of the many ways to measure a foodstuff's "fiber" content would be to determine the percentages of water, fat, ash, protein and human upper gut enzyme digestible carbohydrates (D-glucose , D-galactose, D-fructose, sucrose, lactose, maltodextrins and non-upper-gut-enzymatic-resistant starch) in the sample and subtract that total from 100%. "Crude fiber" is that fraction of a vegetative foodstuff – mostly cellulose, pentosans, and lignans - not solubilized by first stirring it up with dilute sulfuric acid (0.13 M) and then with 0.3 M sodium hydroxide.

[126] Soybeans for which the market value was about 21 cents per pound when I started writing this thing (December 2020), are now (Jan 2023)worth about 25 cents per pound mostly because the value of the dollar has dropped. The cost of most of the things that US citizens cannot do without (food, housing, fertilizer, energy, & health/education related services) are rising much faster at the retail level than our leaders are willing to admit or do anything about.

none of whose "*150 producers*" apparently either raise or sell Iowa's predominant food crops (field corn & soybeans). However, if you are willing to shell out $50 for a buying club membership, you can then pay its managers $4.75 for a pound of potatoes, $3 for a tiny bunch of green onions, $5.75 for a half-pound of "freshly cut, young, and tender beet greens", etc.

There is no good reason that anyone living within the USA's Corn Belt should have to pay from three to twenty as much for raw soybeans as he/she must for the "best" (to me anyway) parts (leg plus thigh) of an already- plucked/gutted/cleaned-up chicken that had been fed with stuff processed/isolated from soybeans (mostly soymeal and soybean hulls) & field corn. I'm hoping that that it will soon become possible for anyone to buy raw US soybeans at a reasonable price[127].

I got my first little batch of commodity-type soybeans by telling a huge grain elevator's two lonely-looking operators about how wonderful it'd be if someone could dream up a way to convince Iowans, not just foreign and domestic livestock growers, motor fuel additive (biodiesel) manufacturers, and synfood manufacturers, to buy them too upon which they gave me about ten pounds or 2 dollars' worth but couldn't/wouldn't sell them to me. I promised them a copy of this cookbook[128]. Finally, after the guy who's been sharecropping my wife's family's farm had finally finished growing & harvesting his/our 2021 soybean crop, I got about 8 gallons of them from him, again for nothing 'cause I'm "special".

Possessing a special relationship like that seems to be about the only way that a typical US citizen can obtain affordable soybeans.

Like field corn or wheat kernels, one cup of dry, mature, soybeans weighs about 180 grams (~6.4 oz).

Soybeans are special in several ways:

1. They are essentially tasteless.
2. They are richer than is any other plant-based foodstuff in those nutrients – unsaturated fats, amino acids (especially lysine), and several vitamins – required to properly complement ("complete") the starchy foodstuffs (e.g., rice, corn, wheat, potatoes,

[127] Since the people working in Iowa's granaries apparently aren't allowed to sell whole soybeans to outsiders and its supermarkets and feed stores don't them, I looked into purchasing leftover "seed" soybeans. Unfortunately, because 1) they cost about five times as much per pound (typically about $1.60/lb) as farmers will get for their beans, 2) most such seeds are treated with pesticides and/or herbicides and 3) they're unavailable after local planting seasons because excesses are returned to the outfits currently owning their patent-protected genomes. US soybeans and field corn kernels aren't "heritage" seeds and most of its farmers can't use a fraction of their own crop to seed their next year's crop. That's likely another reason why elevator-minders weren't permitted to sell soybeans to me (I might use them as seed and thereby cheat those businesspersons too.)

[128] Which promise I've kept. I have since managed to persuade two more grain elevator operators to give me a few pounds more of them (usually floor sweepings and/or samples) but none would/could sell any to me.

sorghum, cassava, etc.) which should be providing most of our food energy (kilocalories).

3. Whole soybeans still contain the intact emulsifying agents and non-denatured proteins that enable a smart cook to do things otherwise difficult to accomplish; e.g., make anything made of/with soymilk including any/all varieties of tofus (soycheeses), "Miraculous Wipp", and "Whipped Soy Cream".
4. Like its cousin, the peanut, soybean kernels store a great deal of their energy in the form of fat rather than carbohydrate – typically over ten times as much as do the bean varieties (*Phaseolus vulgaris)* on supermarket shelves (navy, field, pinto, turtle, kidney, white, black, pink, etc.). Fat is what makes most meats and cheeses good tasting to most of us.
5. Unlike most people food beans , a typical soybean's carbohydrate moiety contains very little starch which carbohydrate almost all humans can digest – under 1 percent. The rest of its approximately 30 weight percent total carbohydrate includes soluble sugars (~5-7 percent sucrose , ~5 percent stachyose (indigestible) , and 1% raffinose(indigestible)) and insoluble fiber (~20 percent). Their insoluble fiber - mostly cellulose and pectins - is not digested by your GI tract's enzymes but do absorb water and swell considerably.
6. Two characteristics of all plant-based relative to animal-based foodstuffs and your own body are much higher ratios of phosphorus (P)-to-calcium (Ca) and much lower ratios of sodium-to-potassium. That's the reason that a) we humans instinctively like/seek "salt" (sodium chloride) and b), the vegetarians among us should add a bit of powdered "lime" or some other calcium salt or mineral to whatever they decide to feed themselves with[129]. It's also the reason that I'll be recommending utilizing "whole rock" gypsum & lime in many of my recipes. For soybean-based foodstuffs, adjusting their P/Ca ratios to that approximating cowmilk's boils down to adding about 18 milligrams of builder/mason's lime to each gram of soybeans (½ tsp per cup of dry soybeans) going into your cookpot. For corn, that ratio should be ~1:150 by weight or about 1/8 tsp lime per cup of dry corn kernels (if your corn is dehulled/nixtamalized with lime, you needn't add more later).

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[129] The addition of slaked lime in these proportions to any corn and/or bean combination that's being boiled or steamed won't render that foodstuff poisonous or "caustic". During the course of this project, I've performed many pH measurements (pH = $-\mathrm{Log}_{10}$(hydronium ion (H_3O^+)- concentration) - those of so-prepared foodstuff combos were invariably well under that of Des Moines' tap water (pH ~9.5). -That city's water plant operators maintain it at that level to prevent corrosion because there are lots of century-old water pipes, thousands of which may be made of lead in some of its homes. Another reason for adding lime -especially mason's/builder's lime - to veggie-based foodstuffs is that its calcium and magnesium is likely to prevent any phytic acid that's survived cooking from glomming onto iron, zinc, copper, etc..)

Sprouted soybeans

Figure 5: Two-day sprouted soybeans

Self-germination (sprouting) along with fermentation by "friendly yeast" or bacteria are easily implemented ways to increase the digestibility[130] (nutrient value) of many grain/legume-type staple foodstuffs. They both[131] increase the seed kernel's vitamin concentrations and bioavailability of its minerals and energy, hydrolyse some or all of its antinutrients and reduce the amounts of the poorly digestible complex carbohydrates feeding/fostering flatulence/diarrhea. I highly recommend including sprouts and/or tempeh (fungi fermented soybeans) in many of this book's "main dishes. They are especially useful during the winters, pandemics, recessions, and stagflations when fresh vegetables become more difficult or too expensive to purchase.

Soybean sprouts stir fried (woked) with onion, garlic, ginger, potatoes, and spices are a

[130] Digestibility is the fraction of an ingested nutrient (e.g., protein or carbohydrate) that ends up serving its intended purpose. The digestibility of the usual animal-based peoplefood proteins (milk, meat, & eggs – not hair, claws, feathers, beaks, & tendons) approximates 100%, that of corn & wheat ~90%, whole soybeans ~91%, and people-food-type beans ~80% ref. Torun B (1985) Proteins: Chemistry, metabolism, and nutritional requirements. It's a chapter within: Brunser O, Carraza F, Gracey M, Nichols B, and Senterre J (eds.) Clinical Nutrition of the Young Child, pp. 99–119. New York: Raven Press. .

[131] While most of us have heard about yeasts both good and bad, many are unaware of the importance of fungi in other areas. For instance, a mycorrhiza is a symbiotic association between a fungus and a plant and the term mycorrhizae (the plural of mycorrhiza)/refers to their role in plant root systems (a plant's "rhizosphere"). Fungi play important roles in soil biology, soil chemistry, and plant nutrition by dissolving otherwise inert rocks). Another of their ecological roles is recycling/decomposing tough organics such as wood's lignocellulose thereby releasing vital nutrients back into the environment. As such, it can be said that all life relies on the presence of fungi to recycle the basic building blocks needed for growth and survival. Although a variety of cultivation techniques are employed, the general process uses a pure culture (spawn) to inoculate a suitable substrate including – but not limited to – coffee pulp, sawdust, weed plants, scrap cotton cloth from the textile industry, cottonseed hulls, wheat straw, molasses from the sugar industry, peanut and coconut shells and cassava peels. The substrate is generally milled, pasteurized, spawned and then used to fill polyethylene bags.

basic constituent of Japanese, Chinese, Korean & Nepalese cuisine. Such combos are often eaten with rice but would also be a good match to/with hominy, homemade pasta, masa-type tortillas, corn muffins, etc. as well. Soy sprouts taste OK by themselves as a salad green, but I generally add them to hot dishes that I'm preparing - a few minutes' worth of subsequent cooking removes their naturally slightly "beany" taste and likely also improves digestibility. Although they are grown from the same soybean kernels featured in many of this book's recipes, sprouts are both different and somewhat better in that the seeds[132] have become fresh "veggies" containing considerably more of the vitamins featured in figure 1's beautiful[133] basket[134]) and less of the oligosaccharides and antinutrients serving to feed that transformation.

Depending upon conditions and what you want, soybean sprouting takes from two days to a week.

For instance In this video ,., [How to grow Soybean Sprouts (Kongnamul: 콩나물) - YouTube](https://www.youtube.com)) a Korean lady (Maangchi) describes how she grows them: fully immerse the kernels in water and soak for 24 hours, pick out any broken or split kernels because they won't sprout but will rot, put them into a shallow pan with small holes punched into its bottom, put that container into a larger one, cover it with a dark cloth, put it into a dark place, and then rinse the seeds with fresh water every three or four hours during the next four or five days. The resulting sprouts were 2-3 inches long.

I usually sprout them for only two or three days after a 6 hr (or overnight) warm (not hot!) water soak in a container comprised of two of the disposable shallow plastic "clamshells" that most supermarket salad and "micro" greens currently come in. It's made by cutting lots of ~ one-inch-long slots into both the top (lid) and bottom of one of those containers with a cutoff wheel-equipped Dremel-type "mototool". The kernels are put into the one you've slotted, its lid closed, that container put into the bottom half of the other container

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[132] Soaking starchy grains (wheat, barley, millet, etc.) just long enough to begin germination and then hot drying them, produces a partially cooked product," groats", that's more nutritious than the raw grain itself. If carried further until the grain begins to sprout, soaking produces a malt which is readily yeast fermentable and therefore can be used to make porridge, naturally leavened flatbreads, or beer & whisky (yeah!).

[133] The reasons for this are: 1) many of the things in the USDA's veggie basket are typically grown over a thousand miles from where they're consumed and therefore pass through the hands of many middlepersons each of whom must be paid for his/her "value" contribution, and 2) home-sprouted soybeans are dirt cheap (5-10 cents/pound) *if* you can get the raw beans for a reasonable price.

[134] *"Sprouts provide a good supply of Vitamins A, E & C plus B complex. Like enzymes, vitamins serve as bioactive catalysts to assist in the digestion and metabolism of feeds and release of their energy. They are also essential for the healing and repair of cells. However, vitamins are perishable, and in general, the fresher the food, the higher the vitamin content (if sprouts are going to be cooked, add them just a few minutes before you take the pot off the stove). The vitamin contents of some seeds increase by up to 30-fold within several days of sprouting and soaking them even overnight often significantly increases the amounts of B vitamins and Vitamin C*." https://en.wikipedia.org/wiki/Sprouting#Nutrition

(its lid is discarded), sufficient water is run over/through the slotted lid to fully immerse the kernels, and the assembly put aside for a few hours (or overnight) for the seeds to fully soak. That sandwiched-together assembly is then tipped on its side over a sink to dump out the water and set aside to wherever you choose to do your sprouting. Ever since I've cobbled together Figure 100 DIY light-bulb-heated proofing/fermenting/sprouting oven, I've been sprouting most of my soybeans that aren't going to be turned into tofu for from 28 to 50 hours after they've been soaked. By that time most of the sprouts are from one half to one inch long, weigh from 2.5 to 2.8 times as much as did the dry kernels, and contain a lot more vitamins and water and much less indigestible oligosaccharides than did the original kernels.

Key points include: 1) sprouting should be done in the dark because light will turn sprouts green-colored and make them taste too 'beany'; 2) oxygen (fresh air) must be able to get to them - anaerobic bacteria could otherwise make 'em nasty (that's one of the reasons for slotting the sprouting container's lid); 3) during sprouting, seeds must be rinsed with

Table 6 gives some of the reasons for sprouting soybeans.

NUTRIENT	sprouted*	raw seeds	sprouted/raw
folate mcg	628.79	375	168%
vitamin C mg	55.93	6	932%
niacin mg	4.20	1.62	260%
B6 mg	0.66	0.38	173%
pantothenic acid mg	3.40	0.79	430%
Raffinose +stachyose[135]	~3	24	0.13
*www.nutritionvalue.org's values normalized to dry seeds			

Table 6 dry vs sprouted soybeans.

fresh water at least once per day to retard "evil bug " growth ; 4) they must remain moist – that's the reason why I kept one of my Do-it-yourself (DIY) sprouting containers' lids; and, 5) the rate at which everything "good" happens increases with temperature up to about 85°F .

1. Here's how I make them:
2. • Pick out any ugly seeds and rinse off any chaff, stems, etc., cover them with several inches of water, and soak for at least 6 hours or overnight
3. • put them into a loosely lidded, vented, plastic container like that depicted in Figure 5.

[135] Table 6's ~1-inch-long soy sprouts were grown for 48 hours at 30°C (86°F). At 75 hours, they were over two inches long and 100% of the original oligosaccharides had disappeared.

4. • At least once per day, rinse them by flowing fresh cool water down through the container's perforated lid, tip to dump that water out, and then it put it back into your dark, sprouting place. Repeat until they've become as long as you wish.

Soybean meal (SBM)

Soybean meal (SBM) is a dry[136], yellow-colored mix of cornmeal-like granules and powder made from soybeans that have generally had their oil/fat extracted with hexane after they'd been mechanically dehulled, crushed, extruded, "toasted", and dried. Nutritionally it is virtually identical to the "defatted soy flour" sold by health food outlets and some supermarkets, but most of it (~98%) is used as an animal feed or, occasionally, as a fertilizer due to its high "nitrogen" and potassium contents[137].

The first step in the processing (aka "crushing") of soybeans is to dehull (aka decorticate) them to facilitate (>90%)oil extraction efficiency and increase the protein content of the soybean meal (SBM) byproduct[138]. Doing so typically starts by optimizing their water content (to ~10%) followed by passing them under magnets and through screens to remove removing metal, sticks, stones, leaves, weed seeds, etc. Next, their hulls are removed by 1) sending them through a roller mill which frees the hulls while cracking the kernels into ideally four to six "clean", dust free, chunks, 2) conveying those chunks to an aspirator which features a series of steps upon which they are bounced while a fan/cyclone system vacuums off the hulls remaining dust while the big "meat" bits fall through a screen onto a conveyor belt. 3) The hulls, miscellaneous dusts, and too-small meat bits picked up by the cyclone are deposited on the first of a series of shaking sifter/screeners that separate the hulls from those bits. Finally, the dehulled soybean fractions are combined and then mechanically rolled/crushed into thin flakes to facilitate oil extraction. Subsequent countercurrent extraction with a mixture of hexane isomers[139] dissolves/washes the oil from those flakes. When that oil has been extracted, hexane must be separated from both it and the process's soybean meal by product. Hot (~300°F) steam blown through the flaked meal cooks and strips out/recovers its residual

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[136] According to US rule setters, SBM can have up to 13% evaporable water – that which I bought contained ~10% 240°F evaporable water.

[137] I recently watched a "CGTN Africa" report having to do with substituting "natural" soybean sourced nitrogen for manmade ammonia-based soil fertilizers. About 16 weight % (one part in six) of an average protein is nitrogen - the rest of it is oxygen, carbon, hydrogen, and sulfur. A foodstuff's "total protein" is determined by converting its nitrogen to the ammonium ion via a Kjeldahl (boiling sulfuric acid) digestion, measuring the amount of ammonia so- made, and then multiplying its nitrogen equivalent (= 14/(14+3)*NH_3) by about 6. That's why a 48% protein SBM is also an 8% N fertilizer.

[138] The crush spread is the difference between the value of whole soybeans and what's made of them (primarily oil & SBM) and therefore a measure of a soybean buyer/processor's ("crusher's") potential profit margin.

[139] Isomers are compounds with the same chemical formula (contain the same atoms) but arranged differently: e.g. CH_3-CH_2-CH_2-CH_3 (n (normal) butane) and CH-$(CH_3)_3$ (isobutane).

solvent while distillation is recovering it from the oil fraction. Desolventized bean flakes (SBM) are the highest protein component of most US chicken, hog, cattle, pet, & fish feeds. A few (one?) old technical nerds like me eat it too but there's not enough of us to influence food sector marketing decisions.

The extracted/desolvated soybean oil meant for human food applications is then further processed to remove phosphatides, gums, free fatty acids, and pro-oxidants, neutralize, bleach, and deodorize it. If that weren't done, lots of your supermarket's processed foodstuffs and this book's soybutter, whipped soycream, & ersatz ice creams would taste "beany".

SBM is typically ~46% protein which translates to over 50% if "bone dry" rather than containing the 12.5% max water specified by the feed industry's regulators. World-wide, only about 2 percent of SBM is converted to "defatted soy flour" or anything else meant for direct human consumption. It's relatively cheap – 10 months ago (15Jun2022) I paid $20 for a 50# sack of "ECS soybean meal" at a local livestock/pet feed store. That was only ~7 % of what AMAZON'S cheapest raw soybeans would have cost me then but ~40% more per pound than farmers were likely paid for the soybeans that had gone into it.

That and my second sack SBM comprises a mix of yellowish powder, granules, and smallish oatmeal/flaxseed-like flakes guaranteed to have at least 46.5% protein and 0.5% fat but no more than 5% fiber and 13% water. Though not rigorously specified[140], it likely does not contain soybean hulls because its "fiber" content is quite low. A call to Eldon C. Stutsman's (ECS's) subject matter expert revealed that his company's SBM doesn't contain hulls[141] so I had chalked that characteristic up on the plus side of my soy-source comparison ledger.

Unfortunately, compared to properly cooked "whole" soybeans, soybean meal is a poorer source of several important nutrients, especially unsaturated fats & fat-soluble vitamins - see Nutritional Value of Soybean Meal | IntechOpen). Additionally, because the processing required to facilitate oil extraction and render the remainder a better-digested animal feed denatures its proteins, we/you cannot readily make many of the soybean's especially tasty people-food possibilities - soymilk and therefore yogurt, ice cream, "creamy" soups/stews, or tofu with it. Another downside is that that SBM manufacture also tends to overcook its proteins and thereby render them somewhat less digestible than if they were processed more "optimally". A final downside is that SBM can't be sprouted and thereby nutritionally beneficiated by that means either[142] (see Table 6).

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[140] There are many ways to make soymeal and its manufacturers don't have to reveal details.

[141] He also opined that ECS's buyers had probably purchased it from Cargill or ADM.

[142] However, it is possible to purchase already-fermented SBM (e.g., Fermex 200) in which a proprietary "bug" (probably some sort of yeast) has consumed most of its low molecular weight carbohydrates (sucrose, raffinose, and stachyose which because the total remains 100% thereby increases the concentrations of its remaining constituents (Stein, H. et al, ,. 2007. J. Anim. Sci. 85:172–180. doi:10.2527/jas.2005-742. [PDF] Invited review: Amino acid bioavailability and digestibility in pig feed ingredients: terminology and application. | Semantic Scholar)

I've nevertheless included SBM in this book because it still represents a cheap, readily available, easy to use, easy to store, and are very good - but not quite as good - as whole soybeans at complementing energy-type (starchy) veggie foodstuffs like bread, rice, corn, cassava, wheat, barley, rye, potatoes, etc.

ESBG

Because I like its taste & as far as I am concerned[143] it's "free" because my wife buys the bacon, I use bacon grease in most of my endeavors calling for a non-trans, no-GMO, gluten-free[144], genuinely "organic" fat, shortening, or lubricant[145]. Preparation (my case): pour the hot grease nuked-off your wife's breakfast bacon into a big container kept next to the stove where it'll always be handy. After a week or two's worth of mellowing (or "festering"- my wife's appellation), it will become "extra slutty", hence "ESBG".

In a pinch you can substitute another soft-but-solid fat; chicken fat, margarine, or even (horrors!) a "transfatted" (hydrogenated) vegetable oil such as "Crisco™". Substitutes other than butter or ham grease won't taste as good.

Soybean oil

Nearly 2 billion bushels of soybeans are crushed every year during which they are cracked to remove the hull, then rolled into flakes which are then soaked in a solvent (mixture of hexane isomers) to dissolve the oil which is then distilled to produce pure crude soybean oil.

After the oil has been extracted, the soybean flakes are dried, toasted and ground into soybean meal. If your EVBG stash is getting too low or you want to make something like this book's "whipped soy (or peanut) cream" or "rich" ice cream clones and therefore don't want a salty/meaty-tasting fat, WALMART's house brand "vegetable" (soybean) oil is a good substitute. It's the same stuff in name brand vegetable oils (e.g., Wesson™, Crisco™, or Mazola™) for about one half the price (currently $8.17 gallon/128 fluid ounces). It's also great

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143 In my digs ESBG includes any and all recoverable edible fat that happens to come my way. For instance, I "nuke" any big chunks of fat adhering to any chicken or pork that I'm dealing with as if they were bacon & add the resulting, super tasty, transfat, GMO & gluten-free grease to my ESBG stash.

144 The health/organic food industry's champions have managed to convince many of us to do anything and pay any price to avoid "gluten". The frequency of the difficulties (genuine celiac disease) that doing so avoids is under 1%.

145 If for any reason (wifely sabotage?) your ESBG somehow goes "off", it can be revived by putting the can onto one of your stove's "burners", adding an equal volume of GMO/gluten-free, filtered, tap water, & heating to near boiling with vigorous stirring. Remove from the stove, set aside to cool & then put it into your freezer or outside if it's cold enough. When the water freezes, scrape any offensive-looking floaties off the top, scoop your now-rejuvenated ESBG into a cleaner container & then discard the stuff at the bottom of the can along with its "dirty" ice (hint: dump it where other folks' dogs can find it – they'll happily eat most of it & roll in the rest to take home with them).

for deep fat frying because it's been purified[146] to the point that it's got a relatively high smoke point.

Gently Baked Soybean flour

An hours' worth of cookie sheet ~240°F roasting as-purchased soybeans drives off their remaining ~10-13% water which renders them easier to grind and imparts a pleasant roasted-nut smell/taste to the resulting flour.

It's great stuff for baking-type applications but as is also the case with soymeal, you cannot make soymilk with it because any sort of cooking denatures soy proteins which renders them insoluble under kitchen-implementable conditions.

Unbleached all-purpose enriched white flour

All-purpose white enriched flour is made from wheat kernels that have been stripped of their bran and endosperm which leaves it nutritionally depleted but "*lighter and more forgiving*" in bread/biscuit/pastry making. Because genuinely whole grain wheat flour retains those components, it is a better source of protein, vitamins, minerals, and (especially) fiber and *should* be cheaper because less processing is required and less waste is generated to dispose of[147]. Consequently, I'd be recommending whole wheat flour instead if it were readily available in lots providing nearly as much nutrition value per dollar. However, most supermarkets don't stock either "cheap" whole wheat flour or cheap "bread" flour[148]– Walmart's whole wheat flour

[146] Crude (freshly "crushed", extruded, pressed, or extracted) soybean salad oil (SBO) is composed of triglycerides (esters formed between three fatty acids and glycerol) along with oil-soluble and suspended non-glyceride materials (free fatty acids, phosphatides, sterols, tocopherols, metals, hydrocarbons, pigments, and protein fragments) all of which are deemed undesirable because they will develop offensive flavors and smells over time especially if the oil is exposed to oxygen and/or heat. The object of subsequent purification processes (degumming, refining, bleaching, and deodorization) is to produce a stable, colorless, and tasteless product. The resulting Refined, Bleached, Deodorized (RBD) SBO is either sold neat (as is) as bottled oil or as an ingredient of food products calling for a tasteless edible liquid oil (salad dressings, mayonnaise, sauces, etc.) Hydrogenation converts it to an even more shelf-stable trans-fat such as Crisco™.

[147] ADM recently shut down its Keokuk IA flour mill because its managers didn't realize how expensive its system's starch "biodigester's" issues could become until it became too late to cheaply fix them. ADM's HR policies had encouraged its only genuinely knowledgeable & therefore relatively well paid biodigester operator to retire early which resulted in that mill's starchy effluents repeatedly overwhelming Keokuk's sewage treatment system which in turn resulted in big fines. Since flour milling remains a fairly competitive business (the biggest companies must sell their flour for under 20 cents/pound), if keeping one of its mills running will cost too much, a big-enough company will abandon rather than fix it.

[148] According to USDA regulations, all-purpose flour may possess as little as 9% protein (no upper limit) and may therefore be made of whatever wheat happens to be cheapest to its miller-producer. By law "bread flour" must be made of a "hard" wheat and must have at least 11.3% protein. Whole wheat flour must have at least 12% protein. In any case, since ~60% of the USA's ~50 million tons/year total wheat production is "hard', bread flour shouldn't be considered "special" enough to justify its costing several times as much as all-purpose flour be (for example, as of 26Jan2023 AllPurposeFlour – Simco Foods can still profitably sell 50 pound sacks of all-

costs three times as much as its all-purpose white flour and isn't enough better from a nutritional point of view to be worth the difference.

Though imperfect, all-purpose, enriched, white wheat flour is nevertheless a reasonably good source of protein (9-12%) and good source of selenium, riboflavin, niacin, and thiamine plus trace amounts of copper, iron, phosphorus, and zinc. It's very versatile and can be used to make anything from French bread to angel food cake. It lacks whole wheat flour's healthy germ and fiber but more than makes up for it with greater versatility. Anyone consuming lots of this book's "whole"corn and soybean concoctions will be getting plenty of fiber anyway. https://www.busbysbakery.com is the best[149] place to find info about the different types of wheat flours available to anyone willing/able to pay for something "special" (I'm able but not willing).

The cost of US wheat flours[150] varies by two orders of magnitude with the most outlandishly expensive examples being sold by natural/organic/health food emporiums. Food-cost-wise, Walmart's "Great Value" house-brand offerings are generally about as cheap as retail customer can find in US food supermarkets[151], though here in Des Moines at least, Aldi's stores are competitive & consistently beat every other supermarket with respect to milk & egg costs[152]. In any case, look for "specials" & stock up whenever something worthwhile becomes relatively cheap (e.g., $0.99/pound peanut butter, chickens, turkey, ham, or any other pig-part).

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purpose flour for $8.50 and "bread flour" for $9.00). The good news is that I've discovered that if nicely asked, some supermarket bread bakers will sell you a 50-pound sack of the same "strong" bread flour that they order/use at a sort of reasonable (~2.2 x) markup from Simco's figure. The bad news is that the price of flour to everyone is higher now than it should be and still rapidly rising because at the retail level, that market seems to be controlled in the same way that the USA's peanut and soybean markets seem to be.

[149] For instance, that website explains the whys of adding sugars to bread dough & notes that as-purchased flours contain 1.4 to 2.1% fermentable sugars. That's an important datum because it explains why adding sugar (or molasses, corn syrup, etc.) to a normal DIY bread dough is unnecessary– the stoichiometry of the reaction generating enough carbon dioxide required to more than double dough volume during yeast-driven rising/proofing (rxn = $(CH_2O)_n$ (carbohydrate) plus water → CO_2 + C_2H_5OH (ethanol)) requires under one percent of the flour that's in it. However, sugar also lets the surfaces of your bread/biscuits brown (or "burn") more rapidly/sooner during baking - I've tested/verified both of those assertions.

[150] Regardless of its color or cost, unless clearly labeled "100% whole wheat bread", every loaf of "wheat" bread on a US supermarket shelf is made of white flour colored with something, e.g., blackstrap molasses.

[151] In general, any supermarket's "house brand" items (e.g., Walmart's "Great Value" product line) are equivalent both nutrition and taste wise to its more expensive brand-name (e.g., Kellogg's, Kraft, General Mills, etc.) offerings. To this cynical old nerd, "brand loyalty" is a lot like stupidity.

[152] As of 2/26/2020, my local WALMART sold 25-pound sacks of its "Great Value" house brand, all-purpose, enriched white flour for $5.18 which rendered it one of the USA's genuine people-food bargains. Unfortunately, it has since become (7mar22) over 50% more costly ($7.98/25 pounds) largely because raw wheat has also become far more expensive. The US dollar is rapidly becoming less "almighty" & Putin's war is severely constraining the world's wheat exports spiking worldwide food prices and thereby apt to kill lots of the poorest folks in poorer countries.

Fermented commodity-type soybeans

Upscale US food supermarkets' most popular soyfoods have been fermented: soy sauce, tofu, miso, tempe,and natto. A reason for this is that fermentation by some sort of bug breaks down/destroys "phytate antinutrients[153]" and the poorly digested and therefore "gassy" polysaccharides present in any/all beans (see Table 5) and lots of other veggie foodstuffs https://sfamjournals.onlinelibrary.wiley.com/doi/pdfdirect/10.1111/j.1365-2672.1990.tb01555.x)

In short, as does sprouting, fermentation increases a soybean's vitamin concentrations while reducing its antinutrient and indigestible component levels.

Another reason for the popularity of fermented soy products is that much has been written about how tasty, nutritious, "organic", and "natural" they are. Unfortunately, here in the USA such hype usually translates to whatever so-characterized being unreasonably & too often prohibitively expensive; e.g., for example in early 2021, West Des Moines Whole Foods Market sold 8-ounce packages of 21.4 wt% protein tempeh for $2.79[154] . That's $0.12 per gram of soy protein or ~100 times what farmers were likely getting at that time for producing it . Such protein is also far more costly than is sapiently-purchased[155] chicken-type protein and, unfortunately, doesn't "taste like chicken"[156].

Fortunately, it's not difficult to ferment your own soybeans. It's very much like making your own cultured buttermilk, yogurt, "blue" cheese, or sourdough bread – beg, buy, borrow, or scrounge some of the unpasteurized commercial stuff & use a bit of it to "seed" your own soybeans, milk(s), or doughs[157]. For example, tempeh-making involves boil/simmering soybeans for about 3/4th hour, dehulling them, draining off the water, sprinkling them first with a bit of vinegar (1 tbsp/cup of the original beans) and then with a powdered starter consisting of the spores of a white fungus-type "bug" called *Rhizopus Oligosporus* dispersed in flour (any kind , not just rice flour), and letting them ferment (the mushroom-like fungus begins to grow) in a moist, warm (85–105°F) place for 2 or 3 days[158]. I do it by packing my bean/starter

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[154] By 23May2022, that same little package of tempeh would have cost me $3.59.

[155] "Sapiently purchased" means ~50 cent/pound "quarters" or 95 cent/pound whole chickens(2021 prices) , not the "organic, gluten-free, deboned, skinless", & tasteless $3.99/pound juvenile chicken breasts which most folks then attempt to render tasteful by slathering them with sauces containing olive oil.

[156] In foodie speak, "*tastes like chicken*" means that an unfamiliar meat-like foodstuff purportedly tastes good. While it's almost always nice, the taste of "chicken" varies – old chickens taste better than young ones but are tougher – chickens that can feed themselves 'naturally' usually taste better than do a CAFO's inmates.

[157] This didn't work out with my local Whole Food Market's tempeh because its bugs had been killed (sterilized/pasteurized) and therefore no longer a "whole" food. Because I couldn't find any fresh tempeh in Des Moines, I've GOOGLE shopped for spores that could make it twice. The first batch worked fine but the second arrived as a dead as doornail.

[158] During my second winter in Iowa my tempeh incubators consisted of loosely covered plastic salad greens containers perched onto my gas furnace's outlet duct. Figure 100's light bulb heated proofing oven will serve that purpose the next time I decide to make myself a batch of it. -

+

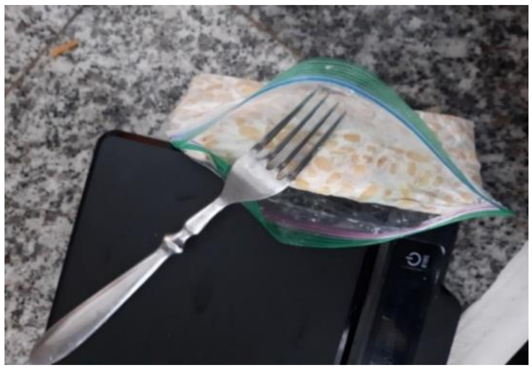

Figure 6 DIY Tempeh

mix into cheap, snack-sized (~8 ounce) ziplock bags (each such sack will hold boiled soybeans made from one-half cup of dry beans) & then punching lots of holes in them with a toothpick - oxygen suppresses the growth of nasty-smelling and potentially harmful, anaerobic bacteria. Fermentation is complete when the soybeans have become firmly bound together with that fungus' white-colored mycelium (see Figure 5). The resulting slightly mushroomy-tasting, rubbery-textured, mass of super-healthy stuff can be cut into slices/chunks to serve either as a substitute for meat in lots of recipes (GOOGLE them) or spiced-up to imitate cheese or bacon.

If you want to immediately start another batch, mash about 15 grams (one heaping tbsp) of your freshly made DIY tempeh to a paste and stir it up with another batch of dehulled/boiled/cooled/vinegared soybeans. I've found that doing this generally works no more than twice before other bugs take over and begin to rot rather than improve your beans.

Fortunately, tempeh starters like the one that I internet-purchased are rich enough in "clean" spores to add little to the cost of the tempeh made with it[159].

Finally, I discovered by accident that homemade and therefore not pasteurized tempeh is a bit like beef in that "aging" it in your refrigerator for a week or two renders it both darker-colored and better tasting – more "mushroomy". Don't overdo it though, both fake & real meats will eventually rot within a refrigerator[160].

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[159] I did a series of experiments involving scattering successively lower amounts of my $3.99/10 gram EBAY tempeh starter powder diluted with all-purpose, white flour over multiple batches of boiled/dehulled/vinegared soybeans each made with one cup of dry beans. I quit when I'd gotten down to a dosage of 25 milligrams starter/cup dry beans because, although it was just a bit slower working at that point, I can eat only so much tempeh. The cost of that much starter added about one cent to the cost of each pound of tempeh made from ~10 cents worth of commodity cost basis soybeans.

[160] Since I've about one-half English, I instinctively like the taste of somewhat "high" (well-aged) red-but-not-"white"(pork, chicken, or fish) meats.

Natto preparation is similar with a bacterium "bug" (Bacillus subtilis var. natto), not a fungus, doing the fermenting. Its texture (slimy) & taste (stinky) are more "interesting" than are those of tempeh - too interesting as far as I am concerned.

My favorite DIY soy product other than yogurt is the ersatz blue (aka "Roquefort") cheeses that I've "invented" (ha, ha) to make my new-favorite salad dressings and veggie/chip dips (Figure 26).

In that case, the bug is a mold (fungus), *Penicillium Roqueforti*, added as a teaspoon of commercial cows' milk-based "blue" (or "Gorgonzola" or "Roquefort") cheese stirred up with freshly vinegar precipitated/filtered-off tofu curds .

Penicillium Roqueforti is widely used as a fungal starter culture to produce variously named blue-veined animal-milk cheeses. The proteolytic and lipolytic [161]enzymes generated during its cell growth ripens the surfaces of raw tofu's cheese-like curds while imparting, what is to me anyway, a delicious smell & flavor. According to the experts (see Yeasts and Molds | Penicillium roqueforti, in A. Abbas, A.D.W. Dobson, in Encyclopedia of Dairy Sciences (Second Edition), 2011). *Penicillium Roqueforti* doesn't require much oxygen and will grow at temperatures at temperatures as low as 4 C (7°F) which renders it an important "spoilage vector" at food refrigeration temperatures. It also tolerates weak acids (able to grow in 0.5% acetic acid) and its growth is stimulated by modest amounts of salt (NaCl) with 1% apparently being optimal.

The soy sauce seasoning widely used in U.S.A'S food industry and households is currently the USA's most popular traditional soyfood. It's a dark-brown liquid extracted from a fermented mixture of soybeans and wheat[162]. Its production begins with incubating a mixture of heavily table-salted cooked soybeans and wheat flour with a starter containing Aspergillusoryzae spores. The resulting fermented mass, known as koji, contains enzymes, including proteinases, amylases, and lipases which act upon components of soybean and wheat. After several months of fermentation, the liquid is filtered out and pasteurized.

Three years ago, I tried to make some but ran out of both time and patience. Soy sauce is great stuff & definitely improves the taste of many of this book's boiled-up together corn/soybean concoctions but is still cheap enough if sapiently purchased (~$12/gallon) to render further attempts to make it myself not worth the effort.

Bluegill-type panfish

First, here's some background. I attended Montana State University (Bozeman) from 1965 to 1974 with a US Army-paid "sabbatical" during 1969-1971 (I'd been drafted) during most of which time I pretty much fed myself via cheap, productive, and easy trout &

[161] "Proteolytic and lipolytic" means that your fermentation bugs will "eat" some of their substrate curds' proteins and fats.

[162] WALMART sells a similar sauce, "tamari" made without wheat & therefore suitable for gluten-free cooking. Tamari's downside is that costs over 15 times as much as WALMART's house brand soy sauce. (e.g., ~$17/10 oz bottle vs $1.59/15 oz bottle.).

“whitefishing”. After finally getting my PhD and then spending 4 years as a tenure track Chemistry Prof at Milwaukee's Marquette U, I quit to go to work at Idaho's National Laboratory because its bosses were willing to almost double my salary and fishing back there under the Big Sky was still cheap, productive, and easy.

Since then, Bozeman MT has become totally Cali fornicated & sport fishing has been disappointing most people, most of the time, almost everywhere in Big Sky Country for most of the last two decades[163]. I quit buying MT fishing licenses ~15 years ago when its solons decided that old out-of-staters like I’d become should pay over $100 per year to experience additional disappointment. Fishing in that stretch of Idaho’s Snake River serving as my home’s easternmost property line for ~25 years had also gradually died out - first its trout & then its whitefish disappeared.

That’s one of the reasons that my wife was finally able to convince me to move back to where she’d grown up here in Central Iowa.

I now live in its capital city, one half mile from a ~45-acre lake filled with already heat-acclimated fish that don't get much effective[164] fishing pressure and need some thinning-out (too many tiny runtfish). Also, according to Iowa’s nutrition experts[165], “*eating its fish may protect against a variety of diseases and illnesses in adults, such as cancer, heart disease, dementia, diabetes, depression, rheumatoid arthritis, psoriasis, prostate cancer, stroke and autoimmune disease*”.

Consequently, I’ve come to consider Iowa’s panfish - mostly “bluegills”[166], perch, and crappies as one of its “best” food commodities because like corn and soybeans they are cheap, plentiful, nutritious, and government-sponsored/supported (“planted” in hundreds of public-accessible ponds, lakes, and rivers after which we’re encouraged to “fish local”). They are also easy to catch and then prepare if you’re willing to learn how to do it correctly[167].

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[163] That’s one of the downsides of getting old but retaining most of your memories. To newcomers, fishing out there under the Big Sky may still seem OK & its natives aren’t apt to discourage such thinking as long as there’s still money to be made from visitors.

[164] lots of people do go through the motions (try/buy whatever their local ***BassProShop***’s experts are pushing) but refuse to learn how to use a float tube and/or fish with a flyrod.

[165] See regs_fish.pdf (iowa.gov)

[166] Green Sunfish are Central Iowa’s most common “bluegill” (sunfish).

[167] One of the reasons that fishing has deteriorated in Idaho is that its people have been subsidized to dam-up its creeks, streams, ditches, & smaller rivers with tiny hydroelectric plants. Collectively they have contributed under one percent of Idaho’s electrical power while gradually killing off its trout and whitefish due to migration inhibition. Meanwhile, global warming had gradually cut its mountain snowpacks which served to lower and warm the water flowing in its creeks, rivers, etc. during summers &, worse, encouraged the farmers that "own" almost all of Idaho’s real and imagined natural water to completely drain “their” reservoirs more often. They were also using far more fertilizer and pesticides in the fields surrounding Idaho’s waterways which runoff along with its often too-warm water have killed off most of the aquatic insects that trout/whitefish fed upon. Iowa’s

What’s most exciting is that almost any kind of is tasty if properly prepared!

That’s why I’ve added a few panfish recipes to this cookbook.

The left side of Figure 6 should give readers an idea of how to “shop” for them. Note the absence of a huge bobber, sinker, hook, or meat-based bait - I’m a fly fishing “nymphomaniac”[168]. I’ve found that the best places to shop are the little ponds and lakes within or bordering many of Iowa’s towns and cities, especially those that don’t permit motorized boating. Such “markets” are usually infested with lots of nuisance-sized largemouth bass , i.e., too small to keep which here in Iowa means under either 15 or 18 inches long depending upon where you’re shopping. Having to waste lots of time catching/releasing lots of big headed, small bodied, bass is just something that must be endured anywhere that

Figure 7 Iowa's funnest food commodity (left) and HMS Bluegill (left)

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corn/soybean farmers rarely irrigate & their state doesn’t possess enough elevation differences to render damming up its creeks to generate electricity worth doing.

[168] That means that my fly line’s leader is usually tipped with one or two small, lightly weighted, hand-tied, buggy-looking, immature ersatz insects (e.g., size 12 or smaller woolly buggers) that slowly sink down to where those fish do most of their “grocery” shopping. If they are rising (surface feeding) I’ll instead use a woolly worm based “dry” fly featuring a tiny gob of ***Great Stuff Gaps and Cracks Insulating Spray Foam Sealant***™ on its top to float it. (I used the same stuff to glue together my homemade foamboard/plywood/etc. pontoon boat (HMS Bluegill, right side Figure 7) because that lake’s managers won’t let me use my pneumatic float tube because I might punch two big holes in it while swimfin-paddling around, forget how to swim, drown,& then sue ‘em for not protecting me from myself. While my favorite-most flies are still the ones that Moonrise Kingdom's Khaki Scout (Sam) came up with to hang by their hooks from his hot little girlfriend’s (Suzy’s) ears, the ones that I “tie” to fish with aren’t very realistic looking.

bass fishing has become a BIG business . That means that almost every US state's "Fish & Game" department must "plant" some sort of bass almost everywhere that's almost always wet. Anyway, to a gung-ho flyfisherperson, catching/releasing lots of too-little bass while grocery shopping isn't totally terrible[169].

The amount of food (meat) provided by each fish you keep, depends upon how you prepare it (Table 7). Finally, rumor has it that there's also lots of "easy" carp here in Iowa too which to me seems miraculous – my life experiences to date suggest that they are much "smarter" (both warier and food-fussier) than are trout, bass, or bluegills. If I can learn how to get 'em with my flyrod, a remake of this book will include some carp recipes too.

Table 7 Bluegill Partitioning

component	weight fraction
whole/raw	100%
minus scales	96%
minus scales, head, guts, & pectoral girdle*	57%
boneless meat (peeled off a boiled fish))	42%
boneless meat (raw-filleted)	32%
* ready for breading/frying/boiling	

Carp

We're all familiar with the notion that we shouldn't kill/eat certain plants and animals to save them from extinction and protect biodiversity. What we don't hear so much is that killing/eating more of a particular creature can help the environment. But that's exactly the case here in the USA regarding its "carp".

Carp are members of a big family of large minnows native to Europe and Asia. The common carp (Cyprinus carpio aka European carp, German carp, mirror carp, koi, or leather carp) was deliberately introduced in the United States ~190 years ago and is now generally considered to

[169] A quirk common to both Idaho and Iowa is that very few of the bass so-planted ever reach "legal" size. The reason for this is that in most places, bluegills out-compete bass for the tiny bugs, leeches, etc. that any planter-sized(small) fish other than a pike or pickerel must feed upon. Anyone who refuses to eat anything but the "legal" bass he/she has caught would soon be sporting "*Yond Cassius's lean and hungry look*".

be a nuisance or pest almost everywhere. The newer carp introductions, bighead carp, black carp, grass carp, and silver carp are now collectively called "Asian carp". About fifty years ago, US fish farmers began importing them from China to help clean their commercial aquaculture ponds of algae but through flooding and accidental releases they found their way into the Mississippi River. Like the common carp, they are fast-growing and prolific feeders that out-compete native fish and therefore also cause issues.

Over the past 20 years they've spread throughout that river's drainage system and now threaten the Great Lakes. Many a strategy has been tried to prevent them from affecting natural ecosystems from using sounds and building barriers to paying people bounties to kill them.

Since most people have problems eating anything that's been characterized as "dirty", "trash",slimy, ugly, invasive, or bottom feeding, there's a need to rebrand it as a delicacy. Last year, as part of a national initiative, the Illinois Department of Natural Resources began calling Asian carp "Copi", a play on the word copious and a reference to the vast number of carp swimming in its waters[170].

Since most of the carp I've seen and all that I've caught here in Iowa are the earlier introduced common or German carp , I'm going to refer to them as "corn belt tuna".

While I was recuperating from my Medicare Advantage (Part C) insurance plan's lowest bidder-implemented total hip arthroplasty (hip joint replacement) this summer, watching several YouTube videos[171] finally educated me about how best to go about shopping for Iowa's most productive fish, the common/German carp[172]. Doing so turned out to be cheap, simple, fun, productive, & surprisingly educational because I then learned that the corn belt's omnipresent "tuna" is a more useful food fish than are its trout, bluegills, crappies, perch, or bass.

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[170] Changing a fish's name has been a tried-and-true strategy. Orange roughy was originally known as slimehead; Chilean sea bass used to be Patagonian toothfish, and peekytoe crab was once known as mud crab. The same strategy has worked for other foods; e.g., when the Chinese fruit known as yang tao was cultivated in New Zealand, it was called Chinese gooseberries. Its exporters then renamed it kiwi fruit, which label has become so ubiquitous that few people are aware of the original.

[171] Here's a particularly fun-to-watch example Catch and Cook Carp - How to cook carp - carp fishing tips & carp recipe. - YouTube

[172] "Most productive" because the carp within many US lakes, rivers, and ponds outweigh all of their other fish put together. The reason for this is that the common carp is an omnivore that's proven to be tough enough to survive the Anthropocene's environmental impacts.

Here’s the best way I’ve found to get ‘em.‘

- Load up a heavy-duty spinning rod’s reel with heavy duty line (e.g., 15 or 20-pound test Kevlar), tie a two ft long, 10-pound test fluorocarbon leader to its end, run that line/leader through a lightweight, clear plastic casting bobber, and then tip the leader with a sturdy short-shanked, size 8 or thereabouts bait hook.
- Tie a yarn/string bobber stop (see How to tie a Bobber Stop Knot - YouTube) around your line and slide it up about four feet above the hook (this keeps the big, scary bobber well away from the hook which is important because carp seem to be “smarter” (more easily spooked) than are most game fish including Idaho’s trout.)
- Find a pond, lake, or slow-moving river with carp rooting around in it (feeding) not too far from shore.
- Bait your hook by tightly squishing a few grams of your supermarket’s cheapest Wonder-type bread tightly over it. Since carp sometimes prefer to surface-feed, on those occasions (it’ll be obvious) don’t squish out all of the air from your “gluten fly” so that it will float.
- Cast out beyond where you know or expect carp to be (you don’t want to scare ‘em with the bobber’s splash), slowly hitch your bait wad back into that area, stop there, and then set the hook as soon as the line and/or bobber begins to behave “unnaturally”.

Figure 8 depicts the outcome of an hour's worth of fun at a tiny lake located (also depicted) in the center of DesMoines' most heavily industrialized region about three miles from my home as the crow flies, i.e., three of its smaller (~three-pound) common carp. I started off with a hook baited with a boiled field corn kernel but after ~five minutes, switched to a "wet" (sinking) gluten fly. The first fish was landed within the next 5 minutes followed by the other two within the next forty-five.

Figure 8 Dean's lake & three of its tuna

These victims were filleted three different ways:

a) the first invokes filleting the unscaled fish after which the scaly skinned meat slabs (fillets) are skinned by pulling them over a horizontally-oriented knife blade, see How to Fillet, Score, & Fry a Carp - Common Carp - YouTube
b) fully scaling the fish & then removing its skin-covered fillets by running the knife front to back along its back bone's spines down to and then along its rib bones (see How to Destroy YBones in Sucker fish - YouTube) (it's done this way if you want to cook/eat its skin)
c) partially scaling it long its back and belly centerlines on both sides[173], scoring the so-unprotected tough skin with a single edged razor, homemade wood carving blade (see

[173] That's done to render cutting through its skin easier- a big carp's scales are extremely tough and shoes could be made of its skin.

Figure 9 , or sharp knife, pulling each side's skin off with a pair of pliers, and then removing skinless fillets in the same fashion as described in B approach's video, see Figure 9.

The last approach turned out to be my favorite because it's relatively quick and doesn't waste as much meat - its fillets represent about 23% of the whole fish's weight). -

Figure 9 Filleting a four pounder

Chicken

Like corn & soybeans, US chickens have become fully commoditized and are therefore intrinsically cheap but usually offered/purchased in relatively expensive valued-added forms (e.g., already marinated skin/boneless chicken breasts, "buffalo wings", or mysteriously concocted "nuggets"). I usually buy ten-pound sacks of "quarters" comprising the legs, thighs, and halves of the unfortunate birds' rearmost backbone & "parson's nose" (tail) because, to me, they **represent** both the best tasting and, for some reason, cheapest readily obtainable forms of chicken here in the USA. Up 'till recently[174] Walmart outlets in Iowa and Idaho sold them for about 54 and 59 cents per pound, respectively[175].

Because its bones contain the bulk of any animal's phosphorous and calcium, regardless of where or what parts of a chicken I purchase, I generally prepare/consume it/them in a way that will put their bones inside of me rather than a garbage can.

Since I'm not a vegan but keenly interested in learning how our Mother Earth is going to well-feed the UN's-anticipated 11.3 billion humans circa 2100, I performed the following experiment.

It involved nuking (microwaving) Des Moines' cheapest store-bought meat at that time (one of Walmart's then-$0.54/pound chicken hind quarters) for 13 minutes and then weighing each of the resulting fractions.

After cooking had evaporated much of its water, an initially 557 g raw quarter provided me with 73 g of lovely yellow, highly unsaturated chicken fat (liquid at room temperature because that bird had "made" most of its fat out of corn/soybean oil) suitable for lots of culinary applications especially if you happen to be a Jewish mom, 35 g of properly chewed-off (by me) bones, and 189 g of well-cooked, juicy meat & crispy skin suitable for almost anything you might want to add a real, not a veggie-based substitute, meat to. That's enough chick meat for three sandwiches @21 cents each.

However, protein-wise it nevertheless cost me about four times what that same day's then relatively high commodity-priced ($14.50/bushel) soybean protein would have.

Feel smarter now? I did.

Raw shelled or "stock" (unshelled) peanuts

I'd be recommending peanuts – another, & in my opinion, superior to soybeans for some people-food type applications[176] for most of my recipes if it were possible to get them at a

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[174] The USA is experiencing another round of "stagflation" – Walmart's 10-pound bags of chicken quarters currently (20May2023) now costs ~67 cents/pound. Hy-Vee's "regular" price for quarters is now $1.99/pound but occasionally puts them on sale for much less than that (again, shop for, buy, cook, and serve "specials"- don't be a slave to schedules or recipes).

[175] That difference, $0.000042/pound-mile (five cents/pound/~1200 miles), reflects what it *should* cost to bulk-transport foodstuffs here in the USA. Most of Walmart's chickens are raised in the corn belt because that's where most of the USA's chicken feed (corn and soybean meal) is made & therefore cheapest. Missouri is currently the "hot spot" for meat-type chickens (broilers) - Iowa's chicken farmers apparently specialize in egg production.

[176] Dr. Carver's appearance before the House Ways and Means Committee in January 1921 marked the beginning of his national identity as 'the peanut man.' Some of the congressmen initially received the old black man with condescension, but his presentation held their interest well over the allotted time. Carver based his remarks upon an assortment of products including breakfast food, candy, milk, ice-cream flavoring, livestock feed, and ink. "*Man could live by the peanut and sweet potato alone"*, he asserted, because "*together they constitute a balanced ration*." George Washington Carver: The Making of a Myth on JSTOR

reasonable price. Throughout 2021, US peanut farmers got about 21 cents per pound for their stock peanuts. Since "stock" peanuts includes their pods/shells, their "meat" alone was worth about $0.28/pound. At a local WALMART then the fractional markup (retail:commodity price) for its "economy-size" packages of shelled peanuts was 7.1:1—my local Whole Food Market's cheapest peanuts were marked up by a factor of eight. Even Iowa's animal feed stores insist upon huge peanut markups because most of it occured before they are shipped from where the peanut farmers grew them[177].

Here in the USA the cheapest source of readily available peanuts at the retail level is usually peanut butter. Up until recently, one-pound jars of what the laws of many US states insist (thank goodness) must be at least 90% peanuts often went on sale for about one dollar - that's under 50% of what still in-the-shell, already cooked (roasted) peanuts were apt to cost in the same store.

Misc. veggies

Buy, beg, borrow, grow, or scrounge whatever cheap people-food veggies that come your way, e.g., carrots (especially valuable nutrition-wise), onions along with their stems if you've picked/pulled them yourself, potatoes (esp. their peelings), peppers, etc. and add them to whatever "main dish" that you are creating. Both taste and nutrition-wise, veggies don't have to be flawless & because most supermarkets discard both them and fruit that's not "nice" looking, they are often free for the asking if you can find/ask the right person (that's likely not the supermarket chain's corporate management).

Also don't forget that the trace minerals, vitamins, and antioxidants within the sometimes too plentiful "weeds" (purslane[178], lamb's quarters, dandelion leaves, amaranth, stinging nettles,

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[177] The retail cost and availability of the USA's most important food commodities is regulated/controlled by marketing monopolies tolerated, aided, and abetted by both local and national governments. Idaho's spud marketing system establishes the retail cost of its potatoes, Iowa's the cost of its soybeans, and Georgia's, the price of its peanuts, all of which are maintained at levels considerably higher than what those regions' "captive" farmers got for delivering them to their buyers. Until recently, peanuts were among a small group of US commodities regulated via the use of supply-limiting marketing quotas. Established in the 1930s, those quotas were designed to foster high, stable prices, and support the incomes of those possessing a license to grow/sell them. US farm policy has long sacrificed individual liberty to an endless series of schemes to drive up crop prices and is therefore another example of its government's lobbyist-driven debility. The bottom line is that US citizens must pay more for home-grown peanuts, soybeans, or potatoes than do foreigners and therefore don't consume nearly as much of them as they could/should. I for one refuse to pay more than about 50 cents for a pound of spuds because that would mean that I'd be paying over seven times as much per food energy calorie as I would for WALMART'S enriched all-purpose flour that I could quickly convert to bread, buns, tortillas, pudding, or pasta (see APPENDIX XIV).

[178]. See Microsoft Word - superfood weeds.doc (ledameredith.com) My personal favorite, purslane is especially in high omega-3 fatty acids and other nutritionally significant antioxidants including vitamin C (ascorbic acid), vitamin E, vitamin A (beta-carotene), glutathione, and betalain. Like other common weeds, it can grow in soils too salty, dry, or nutrient-deficient for most people food-type vegetables. Like almost

etc.) that voluntarily grow in our gardens, yards, ditches, & parks are every bit as good for us as are Trader Joe's exceptionally "organic" $22/pound microgreens.

"Super salt"

In human nutrition, "salt" or "table salt" means sodium chloride, not one of Mother Nature's thousands of other anion/cation assemblies exhibiting zero net electric charge (inorganic compounds). Each of the billions of molecules within a grain of table salt consists of a singly positively charged sodium ion and a singly negatively charged chloride ion. That salt's use in cooking has also become controversial because most humans (and all herbivores) naturally like its taste[179] and therefore apt to consume more of it than they should – too much of its cation (sodium) tends to aggravate hypertension (excessively high blood pressure) which may eventually damage your arteries, kidneys, and heart.

Since your supermarket's white salt, whether it's from the "sea" or anywhere else, is both too "pure" (no trace element nutrients[180]) and relatively expensive, I'd recommend buying a 50-pound block of the brown-colored, many-mineral-fortified (typically with cobalt, zinc, iron, calcium, manganese, copper, and iodine),"stock salt" at a livestock feed store[181].

That stuff is easy to grind to a convenient particle size (I grind chiseled-off chunks to a coarse powder with my grain grinder) and superior nutrition-wise to the people food industry's especially "healthy" salt offerings. It's also about ~two orders of magnitude cheaper than is the stuff stocked/sold by the USA's natural/organic food stores; for example, a few months ago one of Des Moines' Whole Foods Market's big sellers/money makers were 3.5-ounce bottles of "*iodide-free, natural sea salt*" costing $5.99 each[182]. On the other hand, the cheapest, usual-sized (26 oz) cylindrical cardboard box of officially human-food-type iodized table salt (almost everyone except most of the internet's foodies seem to understand that humans also need iodine) that I could find locally cost me 45 cents, a bit over twice as much per pound as did my

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all highly colored plants, it also contains significant amounts of vitamins B1, B2, B3, folate, copper, manganese, iron, calcium, magnesium and phosphorus and very few calories – about 16 kcal/100 .

[179] "saltiness" is one of the five basic elements of human taste perception: saltiness, sourness, bitterness, sweetness, and umami (the first and last is what makes soy sauce "special").

[180] A recent Food and Agricultural Organization (FAO) report concluded that over one half of preschool children (some 372 million) and 1.2 billion women of child-bearing age, three quarters of whom live in South and East Asia, the Pacific and sub-Saharan, suffer from the lack of at least one of three micronutrients: iron, zinc, and vitamin A.

[181] I paid $7 for my 50-pound block of "Champion's Choice" stock salt at Ankeny's Tractor Supply outlet. It's guaranteed to contain 0.35% zinc, 0.2% each of manganese and iron, 0.03% copper, 0.007% iodide, and 0.003 % cobalt. That salt combined with the mason's/builder's lime added to most of my corn/soy concoctions, pretty much assures me that I'm not apt to suffer from a mineral deficiency.

[182] Advertisements for many of the first world's most profitable consumer products emphasize what they don't contain, rather than what they do contain (e.g., "gluten, iodide, and GMO-free sea salt!!") . Hence, lots of people eagerly seek out/pay more for nutrient-deficient foods than they do for superior ones. That sort of mental acuity is likely why an 18th century techno-wit (Carl Linnaeus) decided to refer to his species as "Homo Sapiens".

lovely multi-mineral-including-iodine-fortified block of “super” salt. Since I’ve somehow managed to reach “advanced youth” (currently 77 years old – I’ve become the Siemer clan’s Methuselah) and still rather healthy, I expect to consume at least two more such blocks before I permanently lose my appetite. Since I’m occasionally somewhat hypertensive (many of us old folks are) and still eat lots of salt, I further supplement my “super salt” with ~3% by-weight as much powdered sodium or potassium nitrate[183] because they are much cheaper sources of the appropriate “medicine” (nitrate) than is a health-food store’s “beetroot” or “super beet” offerings.

Because you taste what’s on the surface of a mouthful, not what’s within it, a simple way to cut down on salt without compromising the taste of what you are eating is to not add it during preparation because it readily “soaks” into food thereby tempting you to add still more later. Instead, lightly sprinkle it over whatever you’ve scooped onto your plate or bowl.

Gypsum

Many of this book’s readers are apt to want to do something about the “bean fart” issue before they commit to substituting soybeans for hamburger, pork chops, chicken nuggets, etc. The easiest way to address that issue for any application not requiring a soymilk intermediate turned out to be boiling your soybeans in an aqueous (water) solution containing ~about 3% as much powdered gypsum as beans for about one hour. Being an ornery old technical nerd, I decided to do it with the cheapest readily available version of that salt - *Lowe’s* “Kentucky Green” $5.98/40 pound sack of gypsum pellets (Item #4660896), rather than AMAZON’S $26.00/lb “Super Brand FOOD GRADE GYPSUM POWDER TOFU COAGULANT 4 Oz (112g)/$6.50 CALCIUM SULFATE”. Other than cost, the differences between the two are that the cheap stuff consists of rather dirty-looking , straight out of the mine fertilizer-grade gypsum pellets

[183] One of the things that’s making it unnecessarily tough for the US corn belt’s “disadvantaged” citizens is that there’s so much fertilizer-sourced nitrate in its wells and rivers that millions of tax/ratepayer dollars have been invested in municipal-scale nitrate removal systems (DesMoines possesses the world’s largest such facility) . Nitrate is indeed “poisonous” to a tiny percentage of newborn humans that didn’t inherit the gene responsible for rendering it harmless to the rest of us – in their case, concentrations >50 mg/liter (PPM) temporarily (up to about six months of age [Nitrate removal from groundwater: a review of natural and engineered processes | Journal of Water Supply: Research and Technology-Aqua | IWA Publishing (iwaponline.com)](iwaponline.com)) gives rise to methemoglobinemia (GOOGLE it – DesMoines’ nitrate removal system costs about $10,000/day to operate whenever its Raccoon River source water’s nitrate concentration exceeds nine ppm) . On the other hand , nitrate may not be the real cause of even those infant’s cyanosis (see Chapter 7 - “*The Policy of Truth”—Anchoring Toxicology in Regulation*” written by Aalt Bast & Jaap C. Hanekamp, of the book, *Toxicology: What Everyone Should Know: A Book for Researchers, Consumers, Journalists and Politicians*, 2017, Pages 71-78. https://doi.org/10.1016/B978-0-12-805348-5.00007-7). Nitrate ingestion is beneficial to anyone who is hypertensive and/or trying to increase his/her physical endurance. (See *Nitrate ingestion: a review of the health and physical performance effects,* Clements WT, Lee SR, Bloomer RJ., Nutrients. 2014 Nov 18;6(11):5224-64. doi: 10.3390/nu6115224.) Making up baby formula for a “*stranger*” therefore represents the only “good” reason for US city dwellers to buy “certified nitrate free” water.

rather than a “food grade”, pure (no trace elements), white powder[184]. My hand cranked grain grinder generated a year’s worth of gypsum powder from 70 cents worth of ”whole-rock” gypsum within ~two minutes[185].

Hydrated lime

The “Cal” (aka slaked lime, pickling lime, calcium hydroxide, or $CaOH_2$) called for in most of cooking world’s corn dehulling (nixtamalization) recipes is poorly soluble in hot water[186] and therefore does not provide enough hydroxide ion to efficiently/quickly dehull tough-skinned field corn kernels. To speed things up you can either use pure (no additives) sodium hydroxide (

Figure 10 Converting sodium bicarbonate(baking soda) to sodium carbonate (washing soda)

“lye”- which is freely soluble) which has now also become difficult to find[187], or make your own by converting baking soda (sodium bicarbonate, $NaHCO_3$) to sodium carbonate[188] and reacting

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[184] Impure (typically 80 to 90% CaSO4.2H2O) elleted whole-rock Kentucky gypsum is used as a soil amendment for several reasons. First, its sulfur is fully oxidized (in the sulfate form) and therefore ready to be used/metabolized by plants, especially high protein crops possessing lots of sufur-containing amino acids, e.g., soybeans. Second its calcium displaces excess sodium from the root zones of over-salinized soils. Typical application rates are from 300 to 500 lbs. per acre but might go up to one ton per acre for extremely saline or sodic soils.

[185] This/my estimate assumes the consumption of 70 grams of soy protein per day from 37 wt% protein beans.

[186] Unlike most salts, calcium hydroxide’s dissolution in water is “retrograde” which means that - heating reduces its solubility. Some of the internet’s DIY hominy and masa-making videos instruct you to nixtamalize your corn in “clarified lime water” made by heating 1.5 cups of slaked lime in 3.5 gallons of water, cooling, letting the excess lime settle out, & then pouring off/using the clarified supernate (liquid). Such protocols discard most of your probably too-costly “CAL” before you’ve added the corn.

[187] Many grocery stores no longer sell pure “lye”

[188] Sodium bicarbonate is cheaper purchased in bulk (five-pound sacks) as a swimming pool maintenance chemical.

it with slaked lime by adding both to hot water. . My 50-pound sack of home improvement store type (cheap) slaked lime ("type S (aka "builder's" or "masons"[189] lime) cost $7 at a local home improvement store [190]).

Sodium hydroxide

When one of DesMoines' WALMART store's managers decided to stock a "100% lye drain cleaner"   (*Instant Power Crystal Lye Drain Opener*™) for "just" $5.63 per pound[191], I bought some of it and did a series of corn dehulling tests to see how it compared to both my DIY baked-out sodium bicarbonate (sodium carbonate)/Type S lime combo and $3.49/pound home improvement store (Menards)-purchased, food grade, CAL ("*Mrs. Wages pickling lime*

Blackstrap molasses

Blackstrap molasses is another intrinsically cheap, by product-type food commodity mostly used to fortify animal feeds, serve as a soil fertilizer due to its high potassium content, or brew into a beer that's then distilled and its "essence" (ethanol) marketed as rum or a motor fuel "whitewash" ender/diluent. After raw sugar cane stalks or sugar beets are crushed and the resulting juices filtered, it is boiled to drive off enough water to concentrate it to the point that most of its sucrose (table sugar) crystallizes-out. The remaining molasses syrup is slightly acidic (pH ~5.6), bittersweet, and mineral rich. Its dark color and strong flavor are mostly due to the caramelization[192] of the juices' remaining sugars during the evaporating/cooking process.

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[189] Don't get "farm" or "barn" lime - it's powdered raw limestone (ideally, calcium carbonate but often dolomite) that hasn't been calcined and is therefore useless for this purpose because any raw limestone's most basic component (calcium oxide) is already fully neutralized with carbon dioxide (CO_2) - an acidic gas. Sodium bicarbonate ("baking soda") is half-CO_2-neutralized sodium carbonate ("washing soda").

[190] Menard's "Type S lime" weighs about 8 grams/level tablespoon and consists of hydrated calcined Wisconsin dolomitic limestone - and therefore likely contains ~43% rather than 67% (56/84) calcium oxide (CaO). The difference is due to magnesium which like zinc is another nutrient that's often deficient in modern diets. Be**cause** it's a "whole rock" product, it is also likely to contain enough iron (several thousand parts per million) to assure that you won't run short of it either. If 50 pounds of lime seems overwhelming, share it with your like-minded friends/neighbors and remember that it also makes a great fence, concrete, brick, outbuilding, or roofing shingle "whitewash"   (which application would substantially reduce your home's summer air conditioning costs see Microsoft Word - 19 Mold redline.doc (lime.org)) , and that adding it to high-organic (e.g., Iowa-type) or too-salty garden soils improves them (see https://www.motherearthnews.com/sustainable-living/green-homes/uses-builders-lime-1601/   - soil "liming's" benefits include increasing the availability of anionic nutrients (nitrate and phosphate) and suppressing the mobility of toxic heavy metals thereby reducing the amounts of them absorbed by food plants.)

[191] The real world price of sodium hydroxide has been rising and is currently about seventeen US cents per pound, see Investment in battery raw materials raises sodium hydroxide prices - KED Global ;

[192] Caramelization is another manifestation of the same "Milliard reaction" that browns the surfaces of any sugar and protein-containing foodstuff heated to over ~300°F. If/when it's done right, the products of those reactions

Further boiling/concentration thermally decomposes (caramelizes) enough of its remaining sugars (mostly glucose and fructose) to form the even more viscous, black-colored, bittersweet, and mineral-rich blackstrap molasses. Unlike highly refined (pure) people-food type sugars, molasses contains substantial amounts of vitamin B6 along with lots of mineral-type nutrients including calcium, magnesium, potassium, iron, zinc, copper, and manganese. Along with color & flavor enhancement, a single tablespoon of blackstrap molasses provides ~20% of the FDA's recommended daily intake of each of those nutrients which explains why it is often marketed as a dietary supplement. I purchase ***Tractor Supply***'s deer attractant- type blackstrap molasses because it costs ~40% as much as does WALMART's cheapest people-food-type blackstrap molasses[193][194].

Tomato Ketchup

I've included ketchup in this section because it represents the cheapest, most readily available, and easiest to use[195] source of the tomato-based nutrients called for in some of my recipes.

WALMART's tomato ketchup vs tomato paste vs tomato sauce*				
	cost/100 g	% nat sugars	% added sugars	cost/natural sugar
paste	0.359	12.2	0	0.0294
sauce	0.166	3.56	0	0.0465
ketchup	0.165	5.56	16.67	0.0296
*all are its largest/cheapest/oz containers of its House Brand product				

Figure 11 Why ketchup?

This probably represents another of my controversial opinions because a great deal of fuss has been raised by the fact that the Reagan administration's nutrition experts had concluded that ketchup should be counted as a "vegetable" in federally supported school lunch programs in spite of the fact that it contains additional sugar and kids would voluntarily eat lots of it (kids are apparently supposed to hate veggies, see Food and Nutrition Service - Wikipedia). Like almost everything else that we go to a supermarket for, we often pay a lot more for it than we should. At this point in time (6/17/2022) Walmart's "Great Value" ketchup ($2.52/64 ounces)

make most things taste better. For example, "liquid smoke" (condensed hardwood smoke) complements lots of foodstuffs- soups, veggie/grain-based stews, soups, roasted meats, "ribs", burgers, and marinades.

193 However, Tractor Supply's "cheap" molasses costs 78% more/pound than does that sold by "*Eastern Iowa's largest supplier of agricultural products*" (**Eldon C. Stutsman, Inc. – the outfit that had supplied my feedstore's sack of "ECS" soybean meal.**

194 Here's another question to ask your spiritual advisor: "*Why can vegans eat molasses*?"

195 Tomato veggie & nutrient wise, cheap ketchup costs about the same as cheap tomato paste (see Figure 11) and ~one half as much as cheap tomato sauce. It's also especially easy to use because it comes in big, squeezable, plastic containers (not tiny "tin" cans) with lids allowing you to store it upside down & squirt it wherever it needs to go.

currently costs about one sixth as much per ounce as my Whole Foods Market's "Heinz Organic Tomato ketchup".

Spices

If you expect to go on living for more than a 2-3 years, it also makes sense to buy your spices by the pound rather than in the tiny bottles/cans stocked by most people-food stores because it will cost much less. In many regions, such shopping can only be done via the internet from outfits like "Nuts.com". I would suggest starting out with powdered or ground red & black pepper, cumin, thyme, mustard, onion, garlic, coriander, sage, cinnamon, allspice, & fennel. If you either don't want to store ~10 pounds of spices or a minimum-order, "*free shipping*" requirement renders them too expensive, get together with your neighbors/friends & split up a sufficiently big order.

Equipment

This is the section of this book that the USA's poorest of its poor- its roughly 0.6 million officially homeless citizens - can't benefit much from because the people and institutions "helping" them at all levels either can't or won't provide them with the necessary cooking infrastructure[196]. However, many needful folks do have friends or relatives possessing the necessary equipment. In any case, you/they shouldn't go overboard buying any of that stuff - just get the basics & borrow the rest. Save your food money to buy food and the gas/electricity required to cook it – not magic machines, kitchenware, or tools.

Heat sources

Any stove that can boil a pint of cold water within five minutes & then simmer it indefinitely is fine. Recently I've done most of my cooking with my relatively "new" kitchen's high-tech integral stove/oven combo but there were lots of times when other equipment made good sense. For instance, you/I can save both money and time by "baking" a batch of muffins by "nuking" them for 5 minutes in a 1000-watt microwave oven rather than for 30 minutes in a ~2500-watt kitchen range's oven[197].

Those occasions usually involve preparing a single serving of something comprising a combination of already-prepared items; e.g., see "thingies" in this book's "wife chow" chapter. However, I've also learned that nuking is the best way to "bake" chicken – especially during Iowa's numerous hot spells. A cheap electric "slow cooker" is handy for doing the long-term moist cooking (simmering) comprising the simplest way to render raw beans and grains digestible. Slow cookers and crockpots are readily rendered both quicker-cooking and more energy-efficient by covering/wrapping them with additional insulation - an old towel or two works fine.

I now usually incubate/raise/proof bread doughs utilizing my "new" home's kitchen oven's "proof" setting[198]. To do it back when I didn't own a modern kitchen range, I just turned my oven's control knob to "bake" for about two minutes every hour or so - for that application,

[196] Scandinavian countries are better organized, better governed (not so much "privatized"), and more egalitarian than is the USA and therefore provide their less fortunate citizens with more/better opportunities. Those opportunities include providing them with the wherewithal required to do their own cooking - the USA's food for the poor programs don't do such things https://getpocket.com/explore/item/it-s-a-miracle-helsinki-s-radical-solution-to-homelessness?utm_source=pocket-newtab

[197] That's a 15 to one energy cost savings – it normally costs as much to bake a batch of biscuits as their ingredients are worth.

[198] Update: because it's cheaper to heat (60 vs 2500-watt power demand), as of 19Jan2023 I've begun to "proof" my bread doughs in Figure 100's homemade oven.

the oven's temperature setting doesn't matter because two minutes is just long enough for it to heat up to ~100°F before its timer runs out. If the oven's timer isn't working (none of the timers on the other/older ovens I've owned did), turn it "off" again yourself.

Refrigerator/freezer

It's almost impossible to "cook" for you and yours without access to refrigeration. If you are a meat eater (I've not yet been fully "cured" of that habit) a freezer can save a tremendous amount of money because freezing along with smoking, drying, and canning, allows you to stock up on meat specials whenever it gets cheap enough. I do not recommend getting the latest/greatest versions of that sort of equipment because most of their manufacturers have been paying more attention to adding computerized bells & whistles than to maintaining product reliability[199] (old refrigerators are more durable than the new ones).

Other food canning-related supplies

Food canning provided me lots of examples of how the USA's food sector's policies/actions rip-off its citizens. For instance, GOOGLEing "Alibaba canning jar lids" during the onset of COVID-19's US "supply chain issues" (7Dec2020) informed me that the cost of Chinese-made canning jar lids ranged from 3 to 8 cents apiece depending upon how many of them are ordered.

At that time, WALMART's website listed, *" Ball Lids for Regular Mouth Jars, 12 Count, Walmart # 1489759, $19.98, Only 5 left!* " (that's $1.25 for one lid - not jar, lid, and ring) Hi Vee's website announced that it would sell me a dozen lids for "only" $3.99 (33 cents/lid).

Since both of those retailers are "big businesses", they were able to order "large lots" (>1000 lids) and could therefore likely have sold them to us for under 10 % of what their US retail customers were asked to pay for them at that time.

One thing that I can do about this kind of rampant but common profiteering during emergencies is to remind readers that I'm often able to reuse mason-type canning lids up to five times. The other is to remind them that some of the items (e.g., pickles) in your supermarket (e.g., Walmart) come within reusable glass canning jars with screw-on metallic lids and cost little more than the same-sized empty mason jars sold in the same store. That sort of

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[199] A few months ago, I spent most of a Saturday evening canning up ~25 pounds of chicken that had been in our five-year-old, malfunctioning and prohibitively expensive-to-fix, almost state-of-the-art, " Life is Good " refrigerator's freezing compartment. I replaced it with a 2nd hand, ~10-year-old, $350 , US-made reefer featuring the same sort of old-fashioned "nonlinear" compressor as had every other refrigerator/freezer I've ever owned. Even though it refuses to keep track of my appointments, nominally diagnose its own ills, or talk to me when I'm feeling lonely, I'm perfectly happy with it. The one thing I've done though is to bypass its icemaker's superfluous & of course, ridiculously expensive, activated carbon water filter (if I ever move to Bangladesh, I'll hook it back up). Just one week ago, my also 2016-built, "Life is Good" over-the-range microwave oven also gave up the ghost. Fortunately, with the help of some You Tube videos, a multimeter, & Amazon, I was able to determine that its magnetron tube had died & that I could (& did) fix it myself for ~$30.

lid is both easier to use and more durable than is the classical two-piece (lid plus band/ring) mason-type jar sealing system marketed to people who still insist upon preserving some of their own food. The thing to look for is a “sucked-in” dimple at the lid’s center. When that jar is first opened, that dimple will pop up - when it’s reused, during canner cool-down, it will be sucked back in/down again when the jar’s headspace steam condenses. If it doesn’t, the lid either has a dirty or scratched elastomeric sealant surface or you’ve chipped the jar’s rim. Be careful with such jars and their lids[200] – they’re often more valuable than their original contents and wasting them impacts both the environment and your pocketbook.

Pressure cooker and/or canner

Pressure cooking entails boiling or steaming food at a temperature higher than that of boiling water at atmospheric pressure (at sea level that’s 100°C or 212°F). Since the rate of many cooking reactions approximately double for each 10 Centigrade-degree temperature increase and condensing steam onto anything is about the fastest way to heat it[201], food cooks about three times faster in a 10 psi (pounds per square inch) pressure cooker than via open-pan boiling and ~six times faster at 20 psi. Additionally, since very little water is required to “boil” or “steam” food in them – basically just enough to hydrate the food and fill the cooker’s headspace with steam (the latter requires under a tablespoon of water), the food reaches its cooking temperature much sooner[202].

Additionally, because you usually don’t need to add much if any water to whatever you pressure cook, vitamins and minerals are not leached (dissolved) away as they would be if it were to be boiled in large amounts of water. This means that they are preserved relatively well.

Another thing to keep in mind is that with a big enough cooker, more than one food can be cooked at the same time – just put one or more other containers inside it. Manufacturers provide steamer baskets for that purpose but almost any sort of little pan or bowl will do.

A pressure cooker’s steam energy is also rapidly transmitted to any micro-organisms, quickly killing even the deadliest botulism “bugs” able to survive at water’s normal boiling point.

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[200] Here’s a video describing the reuse of such jars It's survival 101 Pressure Canning using store bought Jars ! - YouTube

[201] The only sometimes-exception to this would be microwaving (nuking) small items. While a pressure cooker's ~250°F temperature is not particularly high, its heat transfer rate is much greater than that of a “dry” oven. An oven’s heat transfer is done with air subject to thermal boundary layer effects, whereas a pressure cooker’s steam first flushes out that air and then condenses upon the food thereby immediately transferring water's huge (2.275 kJ/g) latent heat of vaporization to it. Because that condensate-steam then drips away, no significant boundary layer forms which renders heat transfer much more rapid/efficient.

[202] This assumes that the raw foodstuff contains enough water to fully hydrate itself when cooked. That’s the case with most raw vegetables and all meats but extra water must be added when starting with something that’s dry to begin with like grains, beans, and pasta.

Because of its germ-killing ability, a pressure cooker can be also used as an effective sanitizer ("autoclave") for jam pots, glass baby bottles, or water while camping.

ALL AMERICAN's old fashioned, genuinely heavy duty, all-aluminum canners are by far the best pressure cooker/canners I've ever worked with because 1) they utilize a metal -to-metal seal and therefore don't require a too fragile, too expensive & too-often irreplaceable rubber gasket and 2) don't waste nearly as much energy as do cookers/canners that are temperature/pressure regulated via steam release[203]. Once brought up to its operating pressure (typically 15 psi or ~250°F) which doesn't take long if there's not too much water in it, my thrift store purchased ($25), ALL AMERICAN cooker/canner/steamer requires the same heat input (stove setting) to maintain that temperature (~250°F) as does my two-quart, covered saucepan to simmer stuff at ~212°F & completes its cooking mission in about one-fifth the time (see APPENDIX I).

Misc. knives, plastic cutting mats, spoons, spatulas, measuring cups/spoons, etc.

Thrift and Dollar stores are great places to get this sort of stuff. Get lots of it & stash where it's easy to locate.

Pots, pans, lids, etc.

It's likely that you might eventually use the full complement of pots, pans, & lids etc. within any of the cookware sets displayed in big box stores like TARGET or WALMART. However, there's no compelling reason to insist upon a matched set and thrift stores usually have lots of much cheaper, still serviceable, pots, pans, and lids. Teflon or "magic ceramic" non-stick stuff-coated aluminum is fine if you take care not to overheat or scratch it too much. Don't get a boil-pot that's so big that your stove can't quickly bring a half-pot full of water to a boil because doing so wastes too much time & energy If you must quickly[204] boil-up a huge batch of something (e.g., enough hominy to feed a dozen people), your gas stove's "big" burner (typ.

[203] I'm referring to stovetop-heated pressure cookers featuring a weighted "rocker" or spring-loaded poppet valve on their lids that release steam above a predetermined pressure/temperature setpoint. ALL AMERICAN's new fashioned , genuinely heavy duty, all-aluminum canners differ from mine in that in the interests of "safety" they too are temperature regulated via steam release; i.e., have a "rocker." Converting water to steam requires lots of heat energy that's lost/wasted along with any so-vented water. The old-fashioned ALL-AMERICAN cooker/canner that I picked up at a thrift store a few years ago didn't have a rocker on its lid - just a pressure gauge, vent valve, & blowout safety plug – which means that I must regulate my stove's heat output to whatever is needed to keep my cooker's pressure/temperature where I want it (usually between 15 and 20 psi – it's not critical). Something that any agency seeking to improve the lives of the world's genuinely poor folks should do is to give them properly designed pressure cookers. The women and children usually responsible for scrounging up their family's cooking fuels would benefit the most.

[204] The key word here is "quickly" – if the dehulled corn and water added to it has already been brought to a boil, my no frills, my no-frills (~$23 at Walmart) crockpot/slow cooker will convert it to hominy within about ~4 hours.

12,000 BTU) could likely be replaced by one scrounged from a rusted-out gas water heater (typ. 30,000 BTU or 8.7 kW).

One of your pans should be an aluminum frying pan with a *glass* lid. They are especially useful for browning/toasting small amounts of grains or making things like French toast and cheese sandwiches. The lid should be glass because it lets you immediately determine whether or not whatever you are toasting has dried out yet – if it's "no", boiled off water will condense upon its inner surface.

Another thing to always keep in mind is that you shouldn't boil/simmer or pressure cook anything in more water than needed to just barely cover it unless you are deliberately making "broth". Boiling the water within a pan generally requires more energy than does cooking whatever's immersed in it.

DIY tortilla press

This "gadget" is something that you won't find in a US cooking-stuff store– don't waste money that could get you 150 pounds of corn kernels (~$30) on a wimpy little commercial "tortilla press".

•One roughly 9 by 20-inch piece of grocery store-type shopping bag plastic (scissor-cut it from any such bag). Waxed paper could temporarily serve the same purpose but isn't sufficiently durable.

•Two smooth, flat, stout (one half inch or thicker) plywood boards or strong, smooth-surfaced ceramic tiles <u>at least</u> 8 inches in both width and length - if your kitchen has a smooth, easily cleaned, countertop (e.g., Formica) or tiled floor, you will need only one such board/tile.

Kitchen-type blender

These gadgets are handy for "pastifying" (see **Glossary/Acronyms** chunky stuff with a liquid for minute or so to generate a smooth paste. "Blipping" them on for just a few seconds is handy whenever you want to convert corn and/or bean kernels to quicker-cooking but still- chunky forms - homemade chilis, stews, & salsas shouldn't be paste-like. There's no compelling reason to pay over about $30 for a blender – WALMART's $28 blender will do whatever you'll need to do every bit as well as would **Vitamix'**s $549, "*3300 Ascent series 'smart' blender*".

Coffee mill/grinder

These gadgets are handy for powdering and/or mixing small amounts of dry spices, salt, flax seeds etc. (they're also handy for making your own fly-tying "dubbing" out of scraps of crochet yarn and/or cat fur).

Grain grinder

The crude, ugly, but well-made, cast-iron grain/nut/salt grinder that Amazon delivered to my front door just over a year ago for $27, would cost me $40 now (hint - check out EBAY's offerings). It's great for making most of the things that I'll be describing in this book but can't reduce grain kernels to flours or pastes ("butters") nearly as fine/smooth as are your supermarket's "flours" - flour-making (milling) has almost always been a "business" performed by strong-backed specialists possessing powerful equipment.

Meat Grinder

Any sort of grinder, big, small, new, old, manually, or motor-powered, will do fine. After you've checked out your grandma's attic and local thrift stores, do some GOOGLE shopping. The nicely built, Chinese made, 350 watt electrically powered meat grinder complete with sausage stuffing attachment and four coarse to fine cutting plates - see Figure 12, delivered to my front door for about $35. Cooking any sort of grain can be speeded up considerably by coarsely grinding it before you do so. The downside is that many people like their stews & soups to be lumpy.

Figure 12 my meat grinder's cutting plates

Digital Kitchen Scale(s)

It is <u>much</u> easier to accurately assemble/reproduce yours or anyone else's recipes by weight than by volume. Sequentially adding everything that's called for (especially powders) to a mixing bowl situated upon your scale and repeatedly taring (rezeroing) it between each addition/removal is also quicker than is using volumetrically- calibrated spoons and cups. For example, I can get a perfectly proportioned (equal size) seven-bun batch of my favorite "summertime" breadstuff (Figure 35) with 25% of its wheat flour replaced with soybean meal) stirred up and ensconced upon its rising/cooking microwave oven platter within five minutes.

Thanks to China's manufacturing genius, good quality, battery-powered digital scales are now quite cheap - under $20. Because I'm "rich" and used to be a research-type chemist, I've bought three of them: one to weigh tiny things up to 20 +/- 0.001 g, one to weigh little things (spices, etc.) up to 200 +/- 0.01 grams, and another for "big" stuff (flour, corn, soybeans, water, etc.) up to about 2200 grams (~five pounds) with a precision of plus/minus one gram for a total of ~$45. Incidentally, one of the assertions in many recipes calling for powdered ingredients is that it/they be sifted before scooping cups or spoonful's of them into your mixing bowl. Any/all powdered material's volume varies substantially depending upon both how finely ground it is and the degree to which its particles are packed/settled together. For instance, 27 grams of well-sifted WALMART all-purpose flour added to a calibrated test tube filled it to the 50 cubic centimeter (aka milliliter or cc) mark. Tapping that tube on my kitchen counter for about two minutes settled that flour down to that tube's 33 cc mark, which figures correspond to from 128 to 194 grams of that flour per "cup"[205].

[205]The heavier of those two observations indicate that even tightly packed flour particles still have lots of space between them. Flour is mostly starch which in its crystalline form has a density of about 1.6 g/cc. 198/236 = 0.84 g/cc.

Soymilk filter

A goodly number of this book's recipes have to do with soymilk. Its manufacture requires the filtering-out of the ~20% of a raw soybean that isn't readily water soluble (okara). I've tried several sorts of filter cloth materials: cotton cheesecloth was too coarse-meshed, a lady's nylon stocking and an "organza" veil both worked OK but were too weak - broke easily when wrung out- so I finally decided to internet-order a pair of 12 by 12 inch, tough, 80 micron-sized nylon mesh "nut milk" filter bags for $5.99 (doing something that spendthrifty "hurt" because it depleted my retirement savings by ~0.0001%!)[206] . If I needed another filter bag now, I'd just ask my wife for one of the big, heavier-duty nylon "organza" bags that the outfit she orders her crochet/knitting yarns from sends her its products in.

Incidentally, your "soymilk" filter is also useful for 1) filtering the miscellaneous chunks out of the deep-fat-frying oil/grease that you should be reusing/recycling (let such grease cool down before filtering it!), and 2) recovering gypsum-solution-defartified soybean meal.

Unit ops

In chemical engineering nerdspeak, a "unit operation" is one of typically several sequences of actions required to accomplish something.

Because the main-most ingredients providing most of this book's concoctions' calories, protein, vitamins, & minerals (field corn and soybeans) are covered with human-indigestible & aggressively "fartlich" hulls (aka skins or pericarps), most of my recipes will be preceded by a step that removes them.

Dehulling corn/maize/Zea Mays

A typical corn kernel consists of ~80% endosperm containing essentially all of its starch (food energy), ~12% germ consisting of an embryo and scutellum containing about 85% of its fat/oil along with a good deal of its protein and vitamins, both of which are covered with a tough, hard, impervious[207] (human indigestible) hemicellulosic "fiber) covering/hull/pericarp/skin

[206] Amazon.com: Nut Milk Bag Reusable 3 Pack 12" x 10" Cheesecloth Bags for Straining Almond/Soy Milk Greek Yogurt Strainer Milk Nut Bag for Cold Brew Coffee Tea Beer Juice Fine Nylon Mesh Cheese Cloth : Everything Else

[207] That's the reason why the room-temperature soaking of field corn kernels is just another waste of your time – 24 hours' worth of soaking increased the weight of my corn kernels by 33% whereas 4 hours of soaking more than doubled the weight of soybeans (fully soaked soybeans will eventually weigh 2.5 to 2.8 times as much as they did when dry).

comprising 3-7% of its dry-basis weight. Because the germ of a grain kernel usually contains

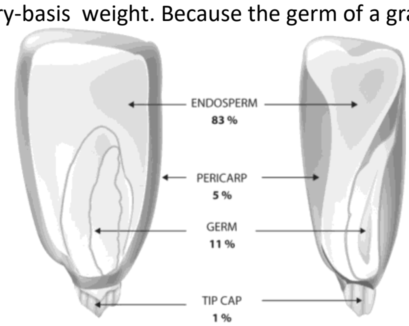

Figure 13 Corn kernel anatomy

most of its fats/oils[208], separating it along with the hull prolongs the shelf life of any flour, meal, or masa made from it while discarding a significant fraction of its nutrients. Most commercial corn flours, masas, grits, and meals are so depleted.

Figure: 14 Corn kernel dehulling/nixtamalization

Unless your corn kernels have already been ground to a meal or flour, cooking them is greatly facilitated by removing their hulls which involves soaking them in a hot strongly alkaline or strongly acidic aqueous (water-based) solution. When dehulling is performed with an alkaline

[208] Grain and soybean oils are largely unsaturated (contain lots of carbon-carbon double bonds) and are therefore readily air-oxidized when fine- ground which thereby renders them "rancid" . Because a grain kernel's oil is usually its most valuable fraction (soybean oil is worth ~3 times as much per pound as raw soybeans), its isolation/separation/recovery is profitable to miller/sheller/crusher-buyers.

(basic) solution, it usually[209] also accomplishes "nixtamalization" because the reactions serving to loosen/dissolve the kernels' hemicellulose hull will then also dissolve its hemicellulose-bound niacin (aka vitamin B3) thereby rendering it more available/useful. while rendering a corn + water dough made from the so-denuded kernel sticky/tough enough to withstand being pressed/molded into whatever shape you wish. Nixtamalized maize is more easily ground, its nutritional value is increased, its flavor and aroma are improved, and any storage mold-produced mycotoxins or aflatoxins are destroyed[210]. The best video I've seen about it yet [What is Nixtamalization? - YouTube] does a fine job of explaining its hows and whys. I usually do it by boiling corn kernels for 45-60 minutes in a strongly basic solution (i.e., one possessing a substantial concentration of soluble hydroxide ion[211] - see the next section to learn how it's made) while occasionally poking them with a potato masher to keep everything mixed and free up their hulls. Dehulling reactions should be performed within a steel or Teflon-coated (not "naked"[212]) aluminum pan or ceramic pot containing just enough water to keep the kernels covered.

After ~45 minutes of simmering, add lots of cold water to the pan, mash but don't crush, the kernels together for another minute or so and then pour off that water along with its loosened-up skins/hulls and partially dissolved yellowish hemicellulosic goop. Refill the pan with water, mash the kernels a bit more, and pour off the still-muddy-looking water before the remaining skins/hulls settle out. After another 2-3 such rinses, your corn kernels will be ready for whatever else you plan to do with them, e.g., convert them to masa (which I do not recommend) or add plenty of fresh water and a bit more lime[213] and then boil/simmer them another ~3-4 hours[214] (or overnight) to convert them to whole-kernel hominy. The weight

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[209] "usually" because if dehulling is done by boiling your corn in a very strongly basic solution (e.g., with 2% as much by weight "Instant Power Crystal 100% " Lye Drain Opener" in an equal volume of water), their hulls will dissolve before the bulk of the kernel reacts with the solution.

[210] This is one of the reasons that I recommend buying whole rather that cracked kernel corn. Treating already cracked/ground corn with a strong base has little effect upon its tough hull fraction because the solution's hydroxide ions will be quickly consumed via reactions with the grain's much more reactive, higher surface area, internal components. This renders a corn-based dish made with cracked corn both "gassier" & less nutritious than one made with properly dehulled/nixtamalized whole corn kernels.

[211] this patent Manufacture of corn products - STALEY MFG CO A E (freepatentsonline.com) explains this unit op's "whys".

[212] Strongly basic solutions also dissolve metallic aluminum and etch silicate glasses but don't damage steel, iron, copper, or most other sorts of ceramic materials.

[213] This sort of lime renders any residual cellulose more digestible and assures that your hominy will provide you & yours with plenty of calcium and magnesium.

[214] A properly sealed and insulated slow cooker is especially good for hominy making. .If you are in a rush, a single hour's worth of 10-15 psi pressure cooking will convert dehulled corn kernels to a properly cooked hominy. If you do it that way with an aluminum-bodied pressure cooker, add a half cup of water directly to the cooker, put the kernels along with four times their volume of water and a half teaspoon of lime into a stainless-steel bowl, put it into the cooker, quickly bring it up to 10-20 psi & then readjust the stove's "burner" downwards to keep its pressure/temperature within that range (again, strong bases corrode "naked" aluminum).

fraction of the so-treated field corn kernels solubilized/lost turned out to be 8.5% as-purchased basis or 9.3 wt% bone-dry basis[215].

Dehulling soybeans

A good deal of research has established that a bean kernel's external hemicellulosic pericarp/hull/skin along with several of its oligosaccharide-type sugars (verbascose, stachyose, and raffinose) are the major cause of bean related flatulence. The reason is that monogastric (not ruminant) animals like humans, chickens, and pigs don't have the alpha-galactosidase enzymes required for their digestion which leaves them to be partially digested/fermented by their lower/large bowel's anerobic intestinal microflora which processe generates gases. Consequently, removing hulls and oligosaccharides from beans before we eat them prevents us male humans from producing the "rich warm gas" that we occasionally share with our wives and too-close friends[216].

Aqueous dehulling Fortunately, the conditions detailed in Kraft Foods Inc.'s US patent US20030219526A1 y provided the breakthrough that I was looking for – boiling/simmering

Figure 15 Dehulled soybeans and their hulls

[215] This was determined by measuring the water-weight lost from as-purchased corn kernels dried for one hour at 275°F (7.3%), dehulling another batch of them, drying them in the same fashion, and then calculating the difference caused by dehulling.

[216] Whereas some males attribute those events to the family dog, I consider them to be "uniquely man boosting characteristics" and therefore nothing to be overly bashful about. Besides I've just learned from TV that it's likely possible to mitigate whatever some people seem to think there're imagining (ha ha) by just rubbing a pea-sized lump of Lume™ into my unmentionable. It's purportedly also "affordable" – each dab is supposed to work for 72 hours and WALMART only wants $33.01 for a three ounce tube of it!

your soybeans for at least forty-five minutes in water containing at least 3% as much powdered "whole rock" gypsum represents an easy, quick, way to rid them of their hulls, "fart sugars" (oligosaccharides), and antinutritional factors (ANFs) while retaining their fat/protein and fortifying them with plenty of calcium, magnesium, iron, etc.

Anyway, to do so cover your soybeans with at least 4 times their weight of water, add ~3% (or more) of their weight's worth of powdered gypsum ($CaSO_4.2H_2O$)**,** bring the pot to a boil, cover it, turn down the heat and simmer for 45 to 60 minutes[217]. When that time is up, fill the pan with cold water, reach in & gently squeeze handfuls of the kernels to dislodge their hulls, swirl to disperse them into the water, and then then quickly pour the water along with the detached hulls through a kitchen strainer perched over another equal-sized or bigger pot. Dump the filtered water back into the bean pot and repeat your water refilling/mashing/squeezing/filtering/rinse water recycling until no "new" skins are released[218].

However, because I'm an inveterate skeptic that effort sparked an experiment involving simmering three carefully weighed batches of soybeans for an hour in 1) "clean" tap water, 2) tap water containing 3% gypsum, and 3) tap water containing 2% Mrs. Wages pickling lime (CAL), thoroughly rinsing them, 250°F oven drying for two- and one-half hours, and then reweighing. The results (see Table 8) suggest that hot water alone will solubilize most of whatever will leach from an intact (hulled) soybean kernel which is the reason why I generally don't bother to add anything else to the water I use to simultaneously cook and dehull my soybeans.

Table 8 Soybean leaching results

leachant	water alone	lime/water	gypsum/water
initial wt	30.11	30.28	30.67
final weight	25.94	25.5	25.57
fractional weight loss	0.138	0.158	0.166
moisture corrected loss*	6.5%	8.5%	9.3%
* the same beans dried directly lost 7.3% of their weight			

Thusly dehulled soybeans will be defartified (no hulls or oligosaccharides) and fully cooked but not yet "tender". Given several additional hours of cooking at simmering water temperature or a half-hour's worth of 10-15 psi pressure cooking, they will become as soft as a supermarket's canned kidney beans.

[217] See APPENDIX for a description of the background of this advice.

[218] This procedure economizes on tap water usage/waste – if you don't care about such things refill the bean pot with fresh water before each rinse cycle.

Dry dehulling

After spending over two years on this project I finally decided to see if I could dehull my soybeans the same way that Iowa's professional "crushers" do. To find that out I adjusted my grain grinder's grinder plate spacing so that it would just barely "break" but not grind soybeans, broke/cracked-up 1165 g of them into a shallow-sided rectangular cake pan, & then blew the air from my shop vac's exit port across its top while stirring the bean bits with a spoon. It worked like a charm -the paper thin, lightweight hull fragments were quickly carried off onto my driveway by that wind leaving 1105 grams of relatively dense/heavy "bean meat" bits within the pan. As I'd hoped those bits weighed ~95% as much as had the whole beans and were very clean/nice looking[219].

Soymeal degasification

In my "healthy dieting via soymeal" experimentation (see this book's "Super Nutritious Hominy-Soymeal Diet Delite" recipe) , a couple days' worth of wifely comments convinced me that it had rendered me considerably "gassier". The cause was/is that I had usually boiling-water-dehulled my soybeans before doing anything else with them which unit op had also hot water-leached out most of their oligosaccharides[220]. Unfortunately, most (all?) US made SBM retains/contains the flatulence-generating oligosaccharides within US commodity-type soybeans responsible for much of the bad press that bean consumption receives. As far as addressing that "technical" issue is concerned, the fact that SBM has already been cooked ruled out germination-type remediation which meant that fermentation and/or some other sort of extraction were my only options.

Consequently, I did some experiments utilizing the same boiling gypsumated water soybean dehulling/deANFing scheme detailed in Kraft Food's US patent US20030219526A1; i.e., boil your leguminous foodstuff in water containing at least 3% as much of a calcium salt[221] and then recover its solids via nutmilk bag filtration. Figure 13 suggests that two- or three minutes' worth of boiling removes whatever will dissolve from soybean meal.

[219] Its hull represents about 5% of a typical soybean's mass.

[220] About one half of a typical soybean's carbohydrate is water soluble much of which (~6% of its mass) consists of indigestible oligosaccharides.

[221] With my latest batch of whole soybeans, filtered-off kernels oven dried for two hours at a temperature (240°F/115°C) high enough to boil off their water without decomposing their protein, oil, carbs etc., lost 12% of their initial weight as had the batch described in KRAFT'S boil 'em with gypsum/water patent . Though not mentioned by KRAFT's patent writers, the probable reason for adding gypsum to the leach water is that calcium tends to lower the solubility of soybean proteins (coagulates them).

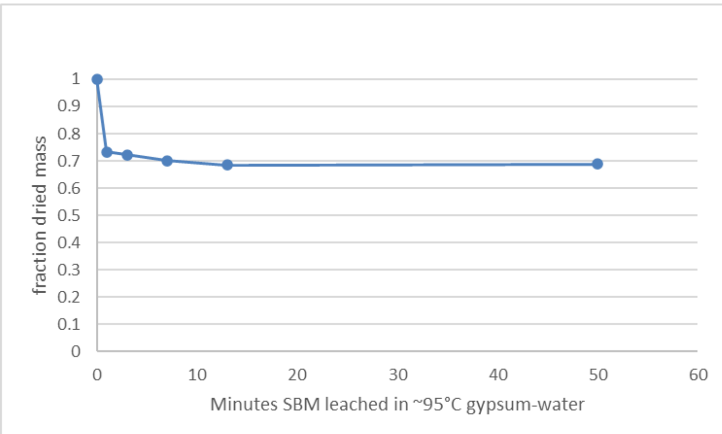

Figure 16 Time vs apparent fractional gypsum/water SBM dissolution

However, as far as I am concerned, this approach to defartifcation may work too well with SBM in that over 30 wt% of its dry matter is lost (**Error! Reference source not found.**) which figure is roughly twice its probable, both good (sucrose & glucose) and bad (RFO), total sugar percentage[222].

These are the downsides of doing this extraction with SBM: 1) unless you're cooking with a fraction of a previously extracted big batch of beans, boiling/filtering will add 5 to 15 minutes of time/work to whatever you've set out to do, 2) most nutritional authorities insist that consuming lots of "prebiotics" is good for us, and of course 3) hot water leaching apparently reduces/discards some "good stuff" too. Unfortunately, the degree to which a soybean's components other than its sugars are leached isn't readily GOOGLABLE and I'm not able to determine such things myself because I no longer have a "real" lab.

However, in my opinion the entire bean-gas "issue" is overblown. A group of USDA molecular biologists recently reported that amply feeding your lower intestinal tract's healthy "probiotic" bacteria with prebiotics (fiber) lowers the probability that you will develop resistance to the antibiotics required to fight future infections with "bad" bugs[223]. The results of another study

[222] Because a good deal of straight out-of-my-bag of SBM is a fine powder it's likely that a good deal of **Error! Reference source not found.**'s loss is simply that dust penetrating my "nutmilk filter"– not dissolution. An evening's work done to determine typical Iowan commodity-type soybean dissolution via a one-hour boiling gypsum water extraction came up with 9.9% which is about I'd expect.

[223] If one of your health care providers has dosed you with enough antibiotics to kill off your lower gut's "good" bugs, WALMART will be delighted to send you a 28-capsule box of Align Probiotics™ containing some especially healthy lower gut bacteria plus a bit of roughage to feed them with (total weight= 0.073 pound) for only $26.86! Since I'm stubborn old philosophy-type "doctor", under such circumstances I'd probably just rectal syringe-apply

involving over 3500 Japanese adults whose dietary habits were followed for two decades suggested that higher levels of dietary fiber, in particular soluble fiber[224], strongly correlated "*with a reduced risk of* developing dementia". To me that explains why so many of us older Americans seem to insist upon eating unnatural stuff like RUFFLES™ rather than soy nuts or homemade taco chips[225].

Again, none of this question's fuss and uncertainty would be necessary if the USA were to amend its soybean grading system to reward its farmers for growing the more nutritious, better digested, low RFO soybeans better suited for feeding all animals including us humans.

Canning

Some of this book's recipes invoke the preparation of foods that are then preserved in several ways, one of which is canning.

Canning involves stuffing stuff into a jar leaving 2-3 cm of headspace air above it after which a lid is added, and the jar heated. While that's happening, the jar's headspace air is displaced by steam which upon cooling then condenses creating a vacuum that sucks the lid down tightly thereby affecting a more or less "permanent" seal.

There are several ways to can foods differing primarily in the temperature attained and how the heat is added. Low temperature, conventional water pack or "steam" type canning is described in my discussion of "Zucchini, cucumber, and/or pumpkin pickles" and high temperature pressure-type canning in "Chicken cookery".

The text accompanying Figure 46 and the paragraph referencing it describe a novel (?) way ("steam canning") which I thought I'd "invented" to can small batches of stuff. It's proven to be rapid, safe, and reliable and applicable to almost any sort of food stuff that doesn't require pressurized-steam-temperatures (~250°F)[226].

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a bit of healthy-person s..t to myself instead. If that's too radical sounding, I seem to remember watching a movie (***The Help***) featuring that treatment orally administered via a lovely-looking chocolate pie.

[224] *…raffinose family oligosaccharides (RFOs) (raffinose, stachyose, verbascose) are another important dietary fiber fraction…*Raffinose - an overview | ScienceDirect Topics

[225] Walmart's current (June 2023) for RUFFLES is $5.38/13 ounces. Each 28 gram (one ounce) serving contains 10 grams of fat, one gram of fiber, 9 grams of starch, 2 grams of protein, and 0.38 grams of salt.

[226] For example, any sort of pickled veggie, most sauces, fruits, and vegetables – anything acidic enough prevent the growth of the bug that causes botulism. Unless deliberately acidified, high protein foodstuffs -meats, beans, and fish - require pressure-cooker-implemented canning.

DIY “liquid smoke”[227]

I’ve recently (9Sep2022) worked out several ways to make my own “liquid smoke” for seasoning barbecue sauces &my corn/soy/chicken concoctions.

The best way discovered so far involves charring (“charcoalizing”) hardwood twigs and capturing the resulting smoke via its condensation upon relatively cool, cooking oil-covered metallic surfaces. One of which surface is the inside of a big steel coffee can “chimney” with its top and bottom removed and the other the bottom of an ice/snow-filled stainless-steel bowl[228] both of which are perched over a disposable (“*No return Frontier*”) pie tin with its bottom cut out & that cut’s inside edges turned up to form a trough to prevent the condensate leakage onto the stovetop (right side Figure 17). To make your “smoke”, place about 30 grams of hard wood chips/twigs directly onto the surface of one of your kitchen stove’s small-diameter radiant heating elements, set the modified pie tin/oil-smeared chimney over them, and then cap them both off with the bottom-oiled ice/snow-filled stainless-steel bowl. Turn the stove’s heating element on “medium”, its overhead vent fan[229] on “high”, and put your DIY carboard smoke shield around it (left side Figure 17). After about twenty minutes, shut the stove off, let everything cool down, remove the “condenser bowl”, dump out its water along with any remaining ice, and then put both it and the chimney onto a cookie sheet or cake pan (this will keep your counter or stove top cleaner). Wipe the smoky oil off both with a finger and scrape it from your finger into the top of a storage jar or bottle. Add some more cooking oil to those surfaces to rinse them off and transfer that oil into the same storage container (I typically end up with about 25 grams of smoke-oil/batch). Done!

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[227]This section is apt to be especially controversial because wood smoke is another thing that we’ve been taught to fear: rumor has it that might be even more poisonous than gluten because it may contain polyaromatic hydrocarbons that may be carcinogenic. I’m not afraid of condensed smoke because I’ve been smoking/eating stuff that I’ve scrounged up (mostly trout, whitefish, and chicken) for about 60 years. If things like that frighten you, don’t make or consume any other wood smoke exposed stuff either including honestly barbecued ribs, “real ham”, grilled burgers, or chicken.

[228] The veggie oil renders smoke condensate “rinsable”- it otherwise forms a varnish most of which can’t be collected unless you happen to have some absolute (no water) food-grade alcohol, -not E-85 (poisonous) or vodka (~60% water) on hand .

[229] Before I cobbled together Fig 14’s “smoke leak minimizer", several previous experiments had “tested” my home’s fire alarms -they all worked fine!

Figure 17 DIY liquid smoke making: right side – wood/trough/chimney/bowl condenser, left side - DIY cardboard smoke leak minimizer

I've made this seasoning with twigs from my hickory tree and rose, lilac, and viburnum bushes -they all worked fine but a bit differently (it's just a matter of taste, try 'em all & pick your favorite).

BBQ sauce made with this stuff is especially nice sprinkled over overnight slow-cooked mixtures of sprouted soybeans or soymeal with nixtamalized whole corn kernel hominy.

Recipes

The purpose of this section is to present examples of what can be done with several of the USA's most plentiful foodstuffs, not dictate overly specific ways of preparing particular dishes. I've written its/my recipes/procedures to be as quick/simple/efficient as possible and produce something that is both nutritious and reasonably tasty – not to titillate jaded appetites, impress friends, or win a food tasting contest. The key to achieving "nutritious" is combining high & low protein whole food commodities with whatever other vegetables, greens, etc. you can buy, beg, borrow, or scrounge[230]. In cooking my goal is to provide whomever I am cooking for with everything their bodies require which for grownups requires ~17 cents worth of corn and soybeans (one pound of corn plus a quarter pound of soybeans provides ~2100 kcal worth of energy and ~70 g of "balanced' protein).

There is nothing etched-in-stone about the relative proportions of most of the ingredients of my recipes, especially their seasoning suggestions. Because seasoning with anything other than "super salt" doesn't significantly affect your food's nutrient value, feel free to add or leave out whatever you wish. Like religion & politics, taste is mostly just a matter of taste & everyone should be free to do anything consistent with real, not "alternative", facts, and the Golden Rule (don't deliberately hurt anyone).

[230] Wash, don't peel, most of your veggies.

Since the corn and soybeans comprising the chief ingredients of most of this book's recipes require a good deal of cooking, some self-styled food gurus are apt to opine that the resulting foodstuffs would be "useless" nutritionally because "*raw is better than cooked*". The USDA has quantitated nutrient retention data with a variety of cooking methods for 17 vitamins and 8 minerals and 290 different foods[231]. While it is true that some micronutrients, minerals, and vitamins in grains, fruits, and vegetables may be either decomposed or eluted by cooking, it is also true that nutrients in the whole foodstuffs called for in this book will be adequately retained. The bioavailability of vitamins such as thiamin, vitamin B6, niacin, folate, and carotenoids in corn and beans are increased, not decreased, by cooking because they become freed from the raw foodstuff's "tight" indigestible microstructure - again, we humans don't possess a cow, goose, or rabbit's relatively huge/tough digestion system.

The bottom line is that the procedures/recipes in this little book will neither harm you/yours nor "destroy" your food's nutritional value[232].

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[231] "USDA Table of Nutrient Retention Factors, Release 6" , USDA. December 2007. https://www.ars.usda.gov/ARSUserFiles/80400525/Data/retn/retn06.pdf]

[232] Statements/opinions like those demonstrate another unfortunate human characteristic – most of us tend to see things as being totally black or white (perfect or useless) rather than admit that almost everything and everyone in the real world is some shade of grey -somewhere between Vladimir Putin & today's Catholic Pope.

Soybean Cookery Fundamentals

Traditional soy foods, aka "Oriental soy foods", are generally classified as non-fermented or fermented. Non-fermented soy foods include soymilk, tofu, soy sprouts, yuba (soymilk film), okara (soy pulp), vegetable soybeans, soy nuts and toasted soy flour, whereas fermented soy foods include soy sauce, tamari, miso (fermented soy paste), natto, tempeh, yogurt (fermented soymilk), sufu (fermented tofu), and soy "nuggets" (fermented whole soybeans)[233]. Traditional soy foods commonly marketed in the USA include soy sauce, tofu, soymilk, tempeh, green vegetable soybeans (edamame), soynuts, and soy yogurt. While most non-fermented soy foods are consumed for nourishment, fermented soyfoods other than miso and tempeh are generally used as seasonings, condiments, or for making soups.

Soybeans are "special" in several important ways and can also be substituted for people-food type beans as is amply demonstrated by Dorothea Van Gundy Jones' still readily available book's ~350 recipes.

Any/all of my recipes featuring either whole raw soybeans or SBM can be implemented with "defartified" versions of them. Whether or not to go to the trouble of fermenting, sprouting, or leaching them is a decision that is and should be up to you to make for yourself.

However, I'd recommend sprouting your soybeans most of the time (raises vitamin and lowers oligosaccharide concentrations) will be mentioning when and why it doesn't make as much sense.

Here are some things to keep in mind. First, when cooking any sort of bean, don't add

Figure 18 Improvised double boiler soymeal (SBM on top) leaching/corn dehulling (bottom)

[233] PNAAK122.pdf (usaid.gov) is a comprehensive review of the worldwide uses of "*Soybeans as Human Food*" written in 1979. Wayback Machine (archive.org) lists SANA's (SOYFOODS ASSOCIATION OF AMERICA's) "VOLUNTARY STANDARDS FOR THE COMPOSITION AND LABELING OF SOYMILK IN THE UNITED STATES".

anything that's "acidic" like tomatoes or vinegar to the cookpot until they've become as soft as you want - acids harden (coagulate, aka denature) proteins which inhibits further softening.

Second, if you plan to combine your soybeans with hominy, a good way to save time & cooking energy is to simultaneously dehull both with a purpose-built or improvised double boiler (see **Figure 18**) .

Third, although presoaking is almost always recommended by bean cooking experts, I've discovered that while soaking soybeans before hot water dehulling them does somewhat reduce the amount of flatus-inducing polysugars within them, it wasn't nearly as effective as is the 30-45 minute's worth of hot water-simmering required to simultaneously dehull, "degas", and cook them.

Figure 19 One half cup of dry soybeans after one half hours' worth of boiling both with and without four hours' worth of presoaking (no difference)

Finally, water in which you have boiled whole soybeans or within any "milk" made from them will contain enough sticky/viscous solubilized stuff to enthusiastically foam up and out of your cook pan and all over your stovetop if you don't watch out. When boiling them, use a relatively big pan, stir vigorously when nearing the boiling point, and then cover the pan and turn your stove's power/flame down to gently simmer them. This is particularly important when pressure cooking any sort of pea or bean: because that approach's higher cooking temperature dissolves more sticky stuff, the resulting especially viscous cooking liquid and detached hulls so-generated may clog its safety valve – do not over fill your pressure cooker.

The remainder of this section describes some of their characteristics, advantages, and possibilities that I've demonstrated or invented for myself.

Soy milk

Let's begin this section with a Table and spreadsheet (Figure 15) summarizing some of my own soymilk experimentation. The figure describes my first set of experiments performed with one of the little batches of soybeans obtained from local grain elevator personnel.

5aug21 soymilk expts		
first just did ~45 min boil with 90 g beans , dehulled, measured dissolved solids in boiled down water got 5.1 g (slightly soluble "sug		
caramalized) that's 5.75 % of raw beans soluble in boiling water		
2nd made soymilk with overnight soaked beans		
90 g beans converted to "milk" by soaking overnight* , dehulling (dry weight hulls), blenderizing with warm water filtering reextracti		
okara with more warm water, (drying and weighing that okara)		
boil "milk"for about ten minutes skimming off drying & weighing the skimmed-off skin		
67 g as-is beans after 220F "bone dry" drying temp weighed 66 g		
g fully dry beans /half cup (90 g)	81.90	
g wt 220 F dried okara -dry tasteless granular t	20.2	
wt 70/582 dry milk solids 1st weighing**	70.51	g in all "milk"
wt 70/582 dry milk solids 2nd weight**	44.15	
dry basis milk solids via 1st measurement	86.09%	
dry basus f solids in milk via 2nd drying wt	53.91%	
f milk solids via bean -okara-hulls-soak solids	73.20%	
wt dry milk boil down skin as 1.54 g in tot=	1.75	
wt dried hulls	3.59	
wt dried bean soak, not boil, water	0.07	
* must soak, not preboil soybeans for milk making tried yesterday with boiled beans gots very little dissolved solids with boiled bea		
* *milk solids caramalize upon drying difficult to dry to a consistent weight		
I suspect that the by difference value is sufficiently accurate		

Figure 20 First set of soymilk experiments (GMO beans)

Table 9 reflects the results of a study performed to see how much difference there is between the "*no GMO, low antinutritional factor, high protein N-2358*" soybeans currently being raised in Minnesota for export to Japanese people food producers[234] and a typical batch raised for Iowa's oil/soybean meal manufacturing "crushers". My conclusion is that while the special beans are demonstrably slightly "better", that difference is small – in other words you can expect to make almost the same amount of almost the same milk (or tofu) out of either of them.

Because the seed company's (Benson Hill's) brag sheet about its N2358 variety is designed for US farmers and their customers, it doesn't disclose/say anything about its product's "fart sugar" (RFO) concentrations[235]. Their relatively high protein and oil concentrations, 45.0 and 18.9% respectively (dry matter basis) which along with the fact that everything must still add up

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[234] This low raffinose oligosaccharide (RFO) soybean variety was originally developed by Schillinger Seeds Inc. ~three decades ago and then well characterized in Ms. Baker's MS thesis which compared "regular" soybeans with them for use as livestock feed.

[235] Dr. Clem Weidenbrenner, a recently retired seed scientist & the most helpful genuine expert I've talked to yet, dug up this factoid for me.

to 100%, suggests that those sugars remain as low as they were in Schillinger Seeds Inc's. That and the fact that they are "non GMO" are likely the main reasons that tofu-loving Japanese buyers are buying them rather than Iowa's soybeans.

Table 9 Varietal differences re DIY soymilk

bean kernel source →	**Albert Lea***	**Benson Hill****	**typ. IA**	**typ IA sprouted*****
g for water determination	10.45	10.86	10.82	22.32
post 240°F dry	9.92	10.29	10.07	9.29
f water in kernels	0.051	0.052	0.069	0.584
g for milk/okara ratios	20.07	20.07	20.06	40.76
dried okara	3.7	3.81	3.74	3.14
f okara	0.184	0.190	0.186	0.172
wt dried tofu curds	11.09	11.74	10.48	9.29
f tofu solids	0.553	0.585	0.522	0.518
tofu solids/okara	3.00	3.08	2.80	2.96
f neither okara nor tofu	0.224	0.182	0.238	0.241
tofu curds/okara dried 120 min at 240° F				
*** "N2358 CONVENTIONAL NON-GMO SOYBEANS"**				
**** "conventional Viking N 2358" [44-45% protein, low ANF, high yield]**				
***** seeds sprouted for 48 hours at 30°C (roughly one-inch-long sprouts)**				

Regardless of which beans are used, DIY soy milk is surprisingly tasty,   super "healthy", and simple to make. It is of course also additive-free, certainly organic, almost "natural", & useful for almost anything calling for a low fat (~2%) cows' milk, e.g., drinking or compounding your own baby formula,   yogurt, "soy cheeses" (various sorts/forms of tofu - (GOOGLE **making homemade tofu** and/or **non-dairy yogurt recipes)**, ersatz blue (Roquefort) cheese, and frozen confections like ersatz fudgesicles and "dream bars".

No special conditions, ingredients, pots/pans, or machines are required. The tough part for anyone who isn't special is obtaining the soybeans cheaply-enough to render making your own milk/tofu/etc. worthwhile.

The following discussion's quantities assume that you wish to make about two quarts of milk

Figure 21 Simplified soymilk making (from one half cup (90 g) soybeans)

rather like low fat ("2%") cow's milk, both taste & mouthfeel (texture) wise. If you want/need a creamier/thicker version for soy cream or soup, leach your powdered beans with less water.

Like most of the internet's and foodie-type book recipes, most of the soymilk-from-scratch procedures I've seen insist upon preceding bean grinding/filtering/boiling with several hours of room temperature soaking. While that much soaking may <u>slightly</u> decrease your product's "indigestibles", the degree to which that happens is insufficient to render such a substantial delay worthwhile. On the other hand, if you are going to be eating/drinking it either as is or as a yogurt, six hours (or overnight) worth of soaking followed by at least 28 hours worth of sprouting does make sense because the milk will be somewhat more nutritious and definitely less fartlich. On the other hand if you are going to be making tofu, sprouting isn't worth doing because your beans' sugars both good and "bad", will end up in the whey, not the curds (see [Soy Carbohydrates: The Flatulence Factor - The Weston A. Price Foundation (westonaprice.org)]

Here's how I make about 24 ounces of the stuff –scale up/down if you need more/less of it (see APPENDIX V for additional details).

Add one cup (~180 grams, dry basis) of either raw soybeans or its equivalent (about 2.5 cups) of ~2-day-sprouted soybeans to your blender's jar & blend them on "hi" for about one minute – exact timing isn't critical.

Add two cups of warm tap water and reblend for another minute. Place your strainer over a good-sized, heavy bottomed, saucepan, drape a fine mesh filtering cloth/bag (aka "nut milk filter") over it, and dump your blenderized bean/water paste into it. Gather up the edges of the filtering cloth/bag (see "Equipment") , twist to enclose the bean paste within it & then

Table 10 Nutrient partitioning between soybeans & soy milk (my findings)

Constituent	% in milk*
calories	81%
protein g/100	89%
fat	90%
total carbs	54%
fiber	~0%
Calcium	76%
Phosphorus	94%
Iron	91%
Zinc	87%
Magnesium	95%
thiamin"	98%
niacin	99%

Basis FDA's okara (88.1% water FDC ID: 172452) a soybean (8.54% water FDC ID: 174270) compositi figures & my observations that dried okara represents ~20% of the beans' weight

gently knead/twist/squeeze to force most of its liquid out through it and into the pan. Dump the filter bag's contents back your blender's pitcher/jar, add another ~2 cups of warm water, reblend for a few more seconds, & repeat filtering/wringing/bag squeezing to transfer most of the rest of the paste's soluble matter into the saucepan .

Bring it up boiling (~212°F, 100ºC) while constantly stirring/scraping the pan's bottom to prevent boil-over (be careful, raw soymilk loves to boil up-and-out over your stove). Add a half tsp (about three grams) of masons/builders lime and simmer for a few minutes with enough stirring to prevent boil over. The purposes served by these steps are to beef up its calcium & other trace element concentrations, cook its proteins, discombobulate its ANFs (e.g., trypsin and phytates), and eliminate its otherwise somewhat "beany" taste. Cool it and store in your refrigerator.

The fibrous pulp trapped within your filter cloth/bag is called okara (or *u no hara).* Although about 50% of "regular" okara[236] is indigestible veggie fiber, that's not necessarily "bad" because

[236] The residue of making soymilk with as-is, not fermented, soybean kernels.

it's nevertheless quite nutritious - the rest of its solid matter is mostly protein, almost tasteless, and most Western World inhabitants should be consuming more fiber anyway.

I'll be mentioning several applications for it and there's a zillion other uses out there on the internet - GOOGLE "Okara recipes". It can also be used as a fertilizer, soil conditioner, or mushroom growth media.

Nutrition-wise a cup of this recipe's soymilk is a bit higher in protein, 70% lower in sugars (readily soluble carbohydrates), and about the same, fat, calcium, and phosphorous-wise as is 1% butterfat cow's milk. It's much better-balanced nutrition wise than are some of the veggie milks being sold in some of our especially high-end supermarkets.

Flavor-wise, fresh soy milk is rather "blah" but the addition of a few drops of vanilla or maple extract (my favorite), a dash of salt, and some sugar or no-calorie sweetener renders it quite nice. However, I don't make it to drink because up until a year ago my local Aldi supermarket sold 1% fat cow's milk for ~$2/gallon (that's about one half what it cost anywhere else then and two thirds of what it costs there now). I usually convert my DIY soymilk to ice cream, yogurt, tofu, "blue cheese" salad dressings, fudgesicles, or **Error! Reference source not found.**.

It is of course possible to further improve it. This article (it's free) [Food Quality Improvement of Soy Milk Made from Short-Time Germinated Soybeans - PMC (nih.gov)] does an exceptionally fine job[237] of describing factors relevant to soymilk production stressing the benefits of preceding bean grinding/dissolution/extraction with a short term (~28 hour) germination (sprouting) period. Germination improves soymilk by reducing its concentrations of trypsin inhibitors, phytic acid, and indigestible carbohydrates while increasing those of its vitamins, protein and "total phenolics"[238]. While that Chinese research team's goal was to develop a practical way to improve soymilk in an industrial setting, their paper's description of the process discloses what's apt to be the "best" way to produce many of your own value-added soy foods - certainly those (e.g., tofu) requiring the manufacture of soymilk.

Second, if you need/want a creamier-tasting milk, you can blenderize soybean oil into your filtered soymilk extract either before or after you boil it. For instance, the "half & half" typically called for in DIY ice cream recipes or tea/coffee diluents contains 10-15% oil/fat and whipping cream is about 40% oil/fat.

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[237] Many peer reviewed technical reports are poorly written, the most common foibles being insufficient descriptions of how and why the work was done.

[238] "Phenolics" are themuch studied plant-generated bioactive compounds that reduce the risk of chronic illnesses due to their antioxidative properties. That mechanism is important in the reduction of lipid oxidation in plant and animal tissues because phenolic antioxidants conserve the quality of such foods and reduce the risk of developing cardiovascular diseases , diabetes, cancers, age-related eye problems and immune dysfunctions. Many studies have concluded that a diet rich in whole grains, fruits and vegetables delays aging, loss of cognitive function, and other neurological diseases.

Peanut milk

I recently (January 2023) picked some raw peanut chunks out of the rather pricy[239] "wild bird feed" ($1.40/#) that we winter-feed local wildlife with & made some peanut milk out of them. The above detailed soymilk procedure worked beautifully with them too and the yield was significantly higher– under 10% of the raw peanuts vs about 20% with soybeans ended up as water insoluble okara - and after it'd been boiled was both delicious and would ideal for any application calling for a rich, creamy, milk – ice cream, whipped cream[240], yogurt, etc. Unfortunately, it would also be lousy for tofu-making because none of the usual coagulants ($MgCl_2$, gypsum, or vinegar) would curdle it to a filterable form likely because its protein-to-fat ratio is too low.

Baby formula

Most of the First World's babies are not nursed by their mothers but instead bottle fed with one of its medical/health/food business sectors' most profitable products – baby "formulas". As of May 2022, supply chain disruptions related to the US federal government's response to the COVID-19 pandemic along with its now-customary regulatory muddling/delays had caused widespread infant formula shortages and price gouging throughout the country. By that time, over 43% of their baby formula offerings were "out of stock "at US supermarkets which situation many mothers characterized as "a nightmare" Infant Milk Formula Recall 2022 & Safety Alerts: Similac, Kirkland, Enfamil, Hipp, etc., Everything You Need To Know - Motherhood Community. To this old nerd, that's a totally phony nightmare.

"*Ignorance isn't always blissful"*

(me)

According to Wikipedia, "soy-based infant formulas" are often prescribed for infants who are not being strictly breastfed, allergic to either cow milk proteins or lactose, or being fed a vegan diet due to parental bias and/or confusion. They are sold in powdered, concentrated liquid, and ready-to-feed forms.

Many studies have concluded that this practice has no adverse effects to human growth, development, or reproduction. A recent meta study published in the Journal of Nutrition concluded that there are…

... no clinical concerns with respect to nutritional adequacy, sexual development, neurobehavioral development, immune development, or thyroid disease. SBIFs provide complete

[239] It's "pricy" because last month (January 2023) our backyard's squirrels and birdies consumed two 35-pound sacks of "wild bird seed" and a 50-pound sack of cracked corn costing us a total of about $115. I eat cheaply – they didn't.

[240] A "whipped cream" made of either soy or peanut milk must contain at least 35% fat and 3% protein. Higher protein concentration milks (blend up/leach your raw soybeans or peanuts with less water) require less additional oil.

nutrition that adequately supports normal infant growth and development. FDA has accepted SBIFs as safe for use as the sole source of nutrition.

Here's a recipe that provides a safe whole food vegan substitute for what you would end up with by diluting the contents of a 12.4 ounce, $17.46 (WALMART's price), can of Enfamil powder with enough water to provide ~26, 4-oz feedings or enough to feed a typical 15-pound infant for about 3 days. Blend together raw soymilk made from 140 grams of twenty-eight-to-forty hour-germinated soybeans[241], 67 g soybean oil, 2 g builder's lime, one of WALMART's "*Equate Complete Multivitamin Dietary Supplement*" pills and one third of one of its 500 mg "*Spring Valley Natural Orange Flavor Chewable Vitamin C*

Table 11 Several candidate baby formulas

Nutrient per 100 grams											
nutrient per 100 grams →	kcalories	protein g	fat g	carbs g	Ca mg	P mg	Fe mg	Zn mg	thiamin mg	niacin mg	vit C mg
human milk	70	1.1	4.2	7	30	14	0.030	0.17	0	0.17	5.3
Enfamil powder recommended dilution	65	1.6	3.24	7.43	50	34	1.2	0.66	0.053	0.068	7.8
whole cows milk	62	3.5	3.3	4.6	121	95	0.05	0.59	0.029	0.075	0
cow milk,water, sucrose, veg oil*	73	1.1	4.2	7.1	44	29	0.08	0.57	0.12	0.68	6.3
DIY "hypoallegenic" formula**	61	1.5	3.1	6.7	40	28	0.4	0.5	0.1	0.7	6.5
*30 g cows milk, 60 g water, 5.7 g sucrose, 3.2 g veggie oil, 0.034 of one Equate™ vit pill+0.01 of 500 mg chewable Vit C tablet											
** 4 g bean soymilk/5.5 g sucrose/2.3 g soybean oil/0.07 g builders lime/ same WALMART vitamins & water to 100 grams											

Figure 22 DIY corn belt baby formula

Dietary Supplement" pills, and a pint and a half of water(~700 grams), pour it into a saucepan, bring it to a boil with lots of stirring, take the pan off the stove, let it cool off, pour it into a pitcher or gallon jug and dilute with sufficient tap water to bring its total volume up to ~2.9 liters. Cover it, refrigerate it, and give it a shake before (re)filling your formula bottle(s).

[241] This recipe and Table 9's numbers assume that 80% of the original soybeans' fat and protein ends up in your mix.

Figure 22 is a picture of a two-day refrigerated off example of this recipe's outcome (nothing had settled out) and Table 11 compares it to several alternatives[242]. Assuming July 2022's commodity soybean & WALMART soybean oil, sugar, & vitamin costs, its total cost adds up to ~53 cents - under 3% of what that supermarket wanted for its *Enfamil™* and ~1% that of some of the concoctions flown over to the USA's desperate parents & WIC administrators from foreign countries will cost whoever ends up paying for them.

Another reasonable, simpler, and still under $2-per-batch alternative to store-bought baby formula would be scaling Table 11's water-diluted cow's milk/veggie oil/sugar & WALMART vitamin pill-based recipe upwards ~30 fold.

To learn more about soymilk and US baby food boondogglingand profiteering. see APPENDIX V.

Veggie (soy milk) yogurt

As far as I'm concerned , one of the things that makes DIY soymilk worth the effort is that it's dead simple to then ferment it to a very nice tasting, low calorie, and super nutritious "soft" ice cream clone – sweetened/flavored yogurt (Figure 23).

I started that project by making a rather dilute soymilk - the soluble stuff (~ 80%) within one half cup - 90 grams - of raw (not pre-fermented) soybeans ended up in a "big" cottage cheese/sour cream -sized container (that's 24 fluid ounces, three cups, or ~680 g). To that container, I then added five packets of a sucralose-based artificial sweetener[243], 1/8th tsp of salt, and a flavoring agent (e.g., initially 2 tsp of vanilla extract, in later batches 1 tsp vanilla extract plus 1 tbsp cocoa, or a half teaspoon of orange, cherry, almond, maple, etc. extract)

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[242] Considering okara's dry basis compositional similarity to raw soybeans (see: The chemical composition of soybean, soymilk powder and okara. | Download Table (researchgate.net)) along with the fact that about 20% of a raw soybean ends up as okara, my calculations assumed a composition equivalent to that generated by the quantitative dissolution of 80% of my recipe's soybeans (i.e., 80% of 90 grams of the USDA Food Data Central's "*Soybeans, mature seeds, raw*")

[243] For this purpose, no-calorie sweeteners based upon sucralose (e.g., "Splenda") seemed to be superior to those made with Aspartame (e.g., "Equal") or saccharine. The "bug' that turns milk into yogurt seems to destroy (eat?) Aspartame.

Figure 23 Soymilk yogurt

and then stir in one tablespoon of either store-bought, cows-milk-based yogurt (e.g., “Yoplait”) or, if there’s some already-made soybean yogurt on hand, mix a tablespoon of it, mix them together and put the container into the same warmish place that you raise/proof your DIY yeast-leavened breads for a few hours (typically 3-5). When it’s become well thickened (see Figure 14; i.e., an inserted spoon will stand up in it), refrigerate it.

Corn belt “pea” soup

When I’d finally figured out how to “dry dehull” soybeans, I decided to see if I could come up with something new, tasty, and especially Iowan featuring such things. Since I’ve always loved pea soup but like Iowa’s farmers hadn’t raised any peas myself , this is what I came up with..(nutritionally, its 1:1 combination of corn and soybeans approximates dried peas).

I began by chopping up a single slice of my wife’s bacon (46 g), fried its pieces in a saucepan until almost crisp, added one tablespoon of dried onion granules and a chopped-up medium sized, my-garden-raised, red pepper and fried everything together for another 2-3 minutes.   I then stirred in 100 grams of dehulled/cracked soybeans and two cups of water, brought it up to a boil and then simmered everything together for ~45 minutes. Then I stirred in 100 grams of home ground corn flour, a half tsp each of Wright’s Smoke and black pepper, one tsp each of super salt and ground thyme and enough additional water to make a lumpy- gravy-like soup and simmered it for another ten minutes (it’s ~ 870 grams supplied me with 850 kcal, 51 g protein, 104 g carbohydrate, & 40 g fat).

Ragoût de soja mousseux   (Cream of anything soups)

These great tasting & highly nutritious soups consist of quick-boiled-in-water, veggie chunks - carrots, celery, potatoes, beets, onions, mild peppers, etc. either alone or in combination - to which unfiltered and not-yet-boiled (raw) soy milk, corn flour (and/or okara), and salt/pepper is added & that combo simmered together for a few minutes. There's no law prohibiting you from adding anything else that sounds good (cheese, bacon, purslane, etc., etc.) – variety is the spice of life & generally good for you as well. Be brave.

Here's a recipe for two ~2¼ cup servings (~18 g protein, 320 kcal each). I've never made a big batch of it because it consists entirely of things that my spouse won't touch & I've gotta start watching my waistline (again) .

Begin by powdering a half cup of dry soybeans for about 45 seconds using your blender's highest setting. Add two cups of warm tap water to that powder and blend for another 60 seconds or so.

Chop up (for example), two medium sized carrots (~200 g) , one stalk of celery (~40 g) and one half of a medium sized onion or bell pepper or anything else that's both wholesome & potentially tasty (e.g., any of this book's chicken meat and/or bone suggestions) you happen to have on hand, dump everything into a saucepan along with another two cups of tap water, cover the pan, bring it to a boil and simmer-the veggies for about five minutes. Then "blip" your blender on again for a second or two to resuspend the bean solids, dump them and their milk into your veggie-boil saucepan. Stir in four tbsp of corn flour plus a tsp each of super salt and black pepper and, if you like, (I do) a half tsp of powdered cumin. Bring back to a boil and simmer, occasionally stirring, for another ~5 minutes or so. Done!

If you want to make your masterpiece even healthier, natural, and organic, sprout your soybeans for at least 28 hours and blend them with four cups of water before dumping into your cookpot.

Another and a bit "stouter" soup (or stew) can be made by nixtamalizing two cups of field corn, decanting/rinsing off/discarding the hull goop, adding water & simmering the kernels at least 2-3 more hours. Then you may (it's optional) add some chopped up whatever is handy (sprouted soybeans, carrots, onions, leeks, peppers, celery, chicken sausage, boiled/deboned bluegills, etc. …) and after bringing everything back up to a boil again, adding the same water-extracted soybean paste, salt and spices described above, and stirring/boiling for another ~five minutes.

Here's a specific example:

"Cream of Tempeh Spud Stew"

(produces ~10 cups of stuff containing a total of ~120 grams of protein, 55 grams fat, and 2000 kcal)It's a super nutritious concoction put together on a hunch that it'd probably be tasty which turned out to be right. It's rather like a cross between a rather "thick" cream of mushroom and potato soups.

Cook together two pound's worth of sliced or cubed whole potatoes, crumpled up tempeh made from/with one and half cups of soybeans (it's even better tasting if aged for a week or so in your refrigerator), and one cup of either raw or 2-3 day sprouted soybeans blended up with four of water for 30-40 minutes. Add a single carrot and two stalks of celery chopped up together, a half teaspoon of mason's lime, and a teaspoon each of super salt and black pepper. Simmer everything together for another ten minutes. Done!

Tofu and other soybean "cheeses"

I've spent a good deal of time trying to make the various kinds of tofu stocked by some US supermarkets. Tofu is the chunky solid stuff (bean curd) much like cottage cheese curds generated when a coagulant ("clotting" agent) is added to soymilk rather than cow's milk. How that's performed and what happens next determines what the product looks like and is called. For instance, "silken tofu" is a pudding-like semi solid made by coagulating soy milk- but not then heating to consolidate/separate the resulting curds. Because it consists of undrained/unpressed curds, it is soft/mushy & nutritionally equivalent to the soymilk from which it is made except that it also contains whatever was added to coagulate it (usually powdered gypsum). Because the filterable solids formed by the curdling any sort of "milk" consist primarily of its protein and fat, silken tofu has/retains the highest water and "fartlich" carbohydrate content of all tofu varieties. All of the other (firm/firmer/firmest) varieties of tofu at your local Whole Foods Market consist of filtered-off-from-the-whey[244] curds pressed together to form successively "harder" and higher percentage of slids containing/retaining along with lesser variable amounts of the original soymilk's carbohydrate and water (firmer means less water & more nutrition per ounce/gram/pound) – my local Whole Foods Market firmest (most nutritious) tofu is nevertheless ~74 wt% water (whey).

[244] "Whey" is the liquid left when cheese curds are removed via settling, filtration, and/or centrifugation.

Figure 24 three tofu and one dairy cheese curd batches

Getting soymilk to curdle to something approximating cottage cheese curds is simple -- the addition of any sort of water-soluble divalent metallic salt or acid (hydrochloric, sulfuric, citric, tartaric, etc.), lemon juice or vitamin C or to warm soymilk will quickly curdle it. Cheap sources of such salts are gypsum (powdered sheetrock, plaster of Paris, or the same whole-rock stuff that I'm now using to defartify soybeans and soymeal), and/or "driveway ice melters" like magnesium chloride (aka "Nigari") or calcium chloride. However, the curds formed by adding any of these things to merely warm soymilk were neither big nor tough enough to not quickly clog up my filter-strainers (i.e., unfilterable). However, heating everything to near boiling for a minute or so rendered all of them along with another specimen made with about 2/3rds as much cow's milk, readily filterable (Figure 24). Relative curd volumes paralleled their total protein contents.

I then did some experiments to determine what my (your?) chances of success in making a "hard" cheddar or "American"-type cheese from homemade soymilk might be[245]. The questions I asked myself & their answers were as follows:

- If veggie oil is added during soymilk making (blended up with the water and soybeans), will that oil end up staying within the milk? (ans "yes")
- What fraction of the bean kernel ends up in the filtered soymilk? (Ans, ~80% varying a bit depending upon how you go about doing the extraction)

[245] these experiments involved 225°F oven-drying the various factions created & then determining what their residues weighed relative to the "dry" kernels from which they were made. The resulting tofu-making milk was coagulated with vinegar instead of a calcium or magnesium salt because oven drying would remove it.

- if veggie oil is added to already filtered-off soymilk & the two then blended together, will it remain suspended within (emulsified) within the so-enriched soymilk…(ans “yes”)
- If that fat-enriched soymilk is curdled to make a tofu-type “cheese”, will that oil/fat be retained by the tofu curds?   (Ans, "yes")
- How much of the stuff extracted into soymilk is <u>not</u> curdled; i.e., what's in the "whey" (ans. ~13% of the beans' weight ended up in the whey)
- What fraction of the original bean ends up in tofu made from it (Ans, (0.8-0.13) or about two thirds of it).

It turned out that the lessons learned by doing those experiments rendered many of this book’s subsequently written recipes easy to “discover”, easy to understand, and immediately successful.

To make anything other than silken or cottage cheese-like tofus, the freshly precipitated curds must be separated from the “whey” and pressed together to form a block or “wheel”. One of the ways I’ve done that was to drill lots of tiny holes in the bottoms of two 24 oz plastic cottage cheese tubs (your supermarket’s “big” cottage cheese containers), line their bottoms with pieces of some sort of filter cloth (an old nylon stocking or piece of cotton cheese cloth will do), put one of the filter cloth pieces into one of them, added the cheese curds, and then covered them with the other piece of filter cloth. Finally, I inserted the other tub/container into the first/bottom one, and then topped off the stack with a barbell plate and whatever else happened be both handy & heavy enough to squeeze the last of the soymilk’s whey out through the filter tubs’ bottom holes.

Figure 25 Tofu cheese block pressing

The results of this work suggested that it should indeed be possible to make a passable-tasting low-fat, mozzarella-like,   “hard” cheese with soymilk. However, other than making the ersatz Roquefort cheese flavoring my new favorite salad dressing (see Figure 26), that’s a project that I’ll put more effort into when I get enough free time to fool around with it.

The bug used to make that/my salad dressing cheese is a mold (fungus) *Penicillium Roqueforti* added in the form of a teaspoon of commercial cows' milk-based blue (or "Gorgonzola" or "Roquefort") cheese gently stirred up with freshly precipitated/filtered-off tofu curds (don't pack them down tightly) which combo is then allowed to sit around in a cool, loosely covered plastic container for a few days. When it has become covered with a greenish brown "fuzz", it's ready to be turned turn into salad dressing or whatever by dumping roughly equal volumes of it, some "rich" freshly made/boiled soymilk, and vinegar into your blender's pitcher (jar?), adding a teaspoon each of powdered garlic and salt per pint & then blending everything together for about 30 seconds. Try it, it tastes great, and I have eaten enough of it to convince myself that it's as least as harmless/healthy as were its unfermented components[246].

Figure 26 New fave tofu curd blue cheese salad dressing

The only "hard" cheeses I've made enough to time to try to make yet were two examples of "mild soy cheddar". I started making up 2 batches of tofu curds both with & without sufficient

[246] Michael Pollan's latest best-selling "cookbook", *COOKED* is mostly about his observations and experiences having to do with food fermentation (sauerkraut, kimchee, yeast leavened breads, pickles, cheeses, etc.). He too is still alive & well. Here's a video [PICKLING vs FERMENTING - What's the Difference? Quick Grocery Store I.D. - YouTube] that explains the difference between fermenting and pickling.

added soybean oil (50 grams per cup of soybeans) to match the fat content (~34%) of a typical cowmilk-based cheddar cheese. In both cases I started out with one cup (180 g) of soybeans powdered up with warm tap water after which their milk was strained off into a saucepan, brought to a boil & while still hot 2 tbsp vinegar stirred in to precipitate tofu curds. After straining again and squeezing out most of the whey I stirred in 1/2 tsp each of salt & sharp cheddar cheese mashed up with a tsp of milk and then pressed them into little cheese wheels with Figure 25's DIY cheese press. These wheels were then loosely wrapped with saran wrap and put on a shelf in the basement to "cure" at room temperature for a week[247]. At the end of that week, both had developed a paper like "skin" along with an array of spots with colors ranging from green to black. The cheeses underneath those skins didn't differ much in appearance (white), physical properties (rather creamy, easily spreadable but not meltable), or flavor (like a very mild cheddar).

To date, I've neither discovered nor invented a way to make a "hard" soybean-based cheese

Figure 27 Creamy soy cheddar/"open faced sandwich corn slab"/homemade mustard sandwich

possessing all of the physical characteristics (esp. "meltable") of good quality animal milk-based cheeses while retaining its nutritional characteristics[248].

[247] Curing is another fermentation process performed to convert an almost tasteless rather mushy, generic substrate (fresh cottage cheese-type curds) into something more special.

[248] 100% of the internet's vegan-type DIY cheese videos/recipes I've seen seem to be describing variously flavored, starch-thickened puddings, not an especially flavorful and nutritious/proteinaceous complement for high-carb "energy" foodstuffs.

However, since making good-quality hard cheese apparently requires at least a few weeks' worth of "aging " I've started another experiment guided by the principles beautifully explained in this video having to do with making cowmilk based cheddar cheese https://www.youtube.com/watch?v=6tfn4uSgY7Y. Those principles include:

- The equivalent of one tsp of salt per cup of the soybeans producing the original soymilk is to be stirred into my/your freshly filtered, acid (vinegar) coagulated, soy curds.
- Those curds must be strongly consolidated/pressed together for at least one full day in some sort of cheese press to squeeze out most of the whey-water. In my case, that translated to stacking 25 pounds of barbell plates onto my 3.4 inch/8.6 cm bottom-diameter cottage cheese tub-based cheese press (~2.8 pounds per square inch pressure).
- The surfaces of the resulting pressed curd cheese "wheel" is to be thoroughly dried out for at least one day after which it's either…
    1. wrapped with cheese cloth which is then either swabbed with a thick layer of an edible grease or molten wax, or…
    2. dipped directly into hot molten wax, or …
    3. vacuum-sealed within a plastic bag (that's what I did)

To make a genuine cheddar cheese, the resulting surface-dried, air-sealed, pressed cheese curd wheel must then be stored/cured at 50-55°F for at least three months in a dry, dark, place.

At the time that this was being written (12Mar22), I was two full days into making a tiny soy cheddar-type cheese wheel consisting of filtered off, vinegar-coagulated, curds made from 191 g of soybeans (no added veggie oil) seeded with a bit of sharp, real "white" cheddar cheese blended up with a teaspoon of water. That wheel weighed 238 grams after about 3 minutes in the press, 192 grams after 16 hours therein , and 178 grams by the time I'd dried it overnight and sealed it into its curing ziplock bag where the real cheese's "seed bugs" will hopefully perform their curing magic (maybe to be continued).

Veggie shrimp

As far as I am concerned, taste wise, both my homemade & the even lovelier looking(?) commercial tofus are totally blah unless turned into something like salad dressing, "baloney", or "veggie shrimp". The last suggestion is simple to accomplish – just make up some tofu curds, filter 'em off before they harden up too much, mix the curds with a bit of super salt, wrap them in your nut milk filter and squeeze to express the remainder of the whey and consolidate the curds into a firm tofu lump[249], let it cool off in the refrigerator, slice into shrimp-sized/shaped pieces, roll them in a mixture of gently-baked corn flour/salt/pepper & then pan-fry in EVBG or soybean 'till golden brown. Dipped in a mixture of ketchup with

[249] Too-firm tofu makes too-dry "shrimp"- what you end up frying should be no more than 70% water .

either a “Miraculous Wipp”-type salad dressing (e.g., see Figure 44’s light-yellow stuff), “real” mayonnaise, or horseradish, they are both yummy and, ***extremely*** nutritious.

Figure 28 "Veggie shrimp" with a ketchup/horseradish cocktail sauce

Edamame (Boiled Green Soybeans)

Edamame (eh-dah-mah-may) are likely the most nutritious snack food you are apt to run into other than homemade corn nuts (ha ha) or pickled panfish. Boiled or steamed edamame (sweet young soybeans) have a “*pleasing toothiness and a sweet, buttery taste that makes it tough to eat just one*”. In Japanese drinking establishments, edamame replaces the peanuts or popcorn served as salty snacks in US bars.

As is the case with mature soybeans, US grocery store aisles rarely feature fresh, green, whole, and unadulterated, edamame. If you do manage to get some at a reasonable price[250]

[250] Whole food’s 12 oz package of edamame currently costs $2.49. That makes its especially nutritious “soy protein” 57 times as expensive as is that of $14/bushel US soybeans.

(another “ha, ha” unless you have some sort of “special” connection), you can freeze the pods in ziplock bags and prepare them whenever you wish.

Ingredients

- 1 pound of still-in-green pods soybeans
- 2 Tbsp salt
- 2 quarts of water

Instructions

1. Put a big pot of salted water on the stove on high heat.
2. If your soybeans are still on their stems, while the water is coming to a boil, strip the pods off the stems. When the water is boiling, throw them into the water and boil for 5-7 minutes.
3. Drain and place in a bowl. Add another tablespoon of salt and toss the still steaming beans.
4. Let the beans cool to room temperature. Pick up a pod, hold it close to your lips, and gently squeeze the beans into your mouth. It’s easy, fun, and good for you.

Sprouted soybeans’ infinite possibilities

If boiled with just enough water to cover them for 10-15 minutes and served with salt & pepper and/or or soy sauce, short-sprouted (1 3 cm long) soybeans are a fine tasting (not “beany”) and exceptionally nutritious standalone veggie. Because steam dislodges the kernel’s hulls & carries them to the top , if you wish to reduce your fiber loading (there’s plenty of prebiotics in the kernel itself), it’s easy to comb them out with a fork.

If you then add some hominy, noodles, rice, chunks of potato and/or any other veggie(s) you have on hand (even things like lettuce or arugula), and boil ‘em for a few more minutes they’re even better tasting. Finally, blending/pastifying some of your sprouted kernels (e.g., one third of them) with water before adding them to the cookpot, generates a creamy sauce for your veggie masterpiece that you can spice up any way you wish (a mix of black pepper, super salt, and cumin or coriander[251] is one of my favorites). There are an infinite number of permutations and combinations of ways that you can put such things together – invent a few of your own.

Boston “Baked” Soybeans

(76 g protein, 1030 kcal)

If starting from scratch, boil/simmer one cup of soybeans for about a half hour in a saucepan, dehull them, dump about one of them into a blender along with about two cups of water, blend & put both it and the whole beans back into the saucepan. Reheat to the boiling point and stir in about 2/3rd cup of coarsely chopped onions (if they happen to be green onions, add their

[251] As far as I can tell, powdered coriander and cumin are identical.

chopped stems as well)). Simmer for another 15 minutes or so and then stir in one rounded teaspoon of ground cloves, one tbsp each of dry mustard powder and vinegar, one level tsp of super salt, 2 tbsp blackstrap molasses, and 4 tbsp of gently baked soybean flour. Remove the pan's lid and stir/simmer your project until its sauce (liquid) phase becomes darkish brown and thick & gooey (see Figure 29).

This high protein/low carbohydrate/low fat wonder food tastes great "straight" as a side dish or poured over high carb stuff like bread, biscuits, tortillas, boiled potatoes, pasta, or hominy.

Figure 29 Boston "baked" soybeans

(options: this recipe's final boil-down/thickening/browning step can also be accomplished in the more traditional manner by pouring the stuff into a shallow dish and oven-baking. The addition of a tablespoon or two of EVBG will make it taste a bit richer & also help keep you and yours from becoming too skinny. Finally, if you happen to have some tomatoes on hand , blending 2-3 of them up with the water added to the dehulled beans will add some vitamins (especially vitamin C) – a couple tbsp of tomato ketchup, tomato paste, or "hot" chili sauce would serve that same noble purpose.)

Soy nuts (1605 kcal/130 g protein)

This recipe makes a very nice tasting and genuinely "healthy" roasted peanut-like snack food costing about 25 cents per pound at today's commodity soybean price (~$14/60-pound bushel). If you like your peanut butter "crunchy", you'll love a mix of these "nuts "with it.

Again, if starting from scratch, dehull 2 cups of soybeans as described in this book's "Unit Ops" section simmering for a least a half hour to fully cook them. Dump them into a strainer or colander to drain, add a heaping tsp of powdered super salt, swirl to mix, dump/spread them onto/over a big EVBG-lubricated cookie sheet, and bake at 325°F until darkish brown but not black.

Soymeal Crunchies

Figure 30 Soybean meal crunchies (aka “Minisoynuts”)

If your intended application invokes adding relatively small amounts[252] of crunchy “peanuty” stuff to something (stew, casserole, etc.) or just want to sprinkle something that’s more nutritious than toasted bread bits over your alad, not having to dehull and oven-roast this recipe’s “Minisoynuts” saves lots of time (Figure 30). To make them run/rub about four times as much (grams) soybean meal as you want crunchies through a kitchen strainer, dump the large particles retained by the strainer into a tared bowl, add ¼ of their weight of soybean oil, 2% as much super salt, mix thoroughly, spread over a cookie sheet, and bake at 300°F for one half hour.

Gluten-free Wonton strips

Usually made of wheat flour, eggs, and water, Wonton is the thin sheet of dough used to encapsulate any of a Chinese dumpling’s zillions of possible fillings. Baked or fried little strips of Wonton dough also make wonderful-tasting salad crunchies and are therefore often included in your supermarket’s pricy, little (2 servings-sized), “salad kits”. French fried strips of this

[252] “small” because dry soybeans don’t contain enough water to efficiently couple to a microwave oven’s radiation which renders roasting them that way relatively energy inefficient.

book's corn/soybean tacos represent a great tasting and more nutritious substitute for those crunchies.

Ersatz peanut butter ("soybutter")

One of my soy-based masterpieces is ersatz peanut butter (soybutter). It's proven to be good for lots of things, my favorites being garnishing/protein balancing hominy, any sort of bread/bun, or baked potatoes.

I started out by baking three cups (about 510 g) of raw (not dehulled- it was meant to be a "whole food") soybeans at 400°F for a half hour and then fine grinding it along with a couple tsp of super salt plus enough veggie oil (~250 grams of Walmart's "Great Value" house brand soybean oil) to give it the about same percentage of fat (~47wt%) as store-bought peanut butter (see APPENDIX 1, my electric blender wasn't tough enough to do it and my meat grinder's finest-holed cutting plate was too coarse) . It was OK but had a slightly burnt taste because it'd been baked too long/hot which probably also reduced its digestibility.

Figure 31 (left) first attempt soybutter (overcooked): (right) SBM based version & spread over a chunk of nerdly artisanal-type bread

Taste-wise, genuine success didn't happen until I had given up trying to buy reasonably priced whole soybeans and decided to see what could be achieved with a local feedstore's soybean meal instead. The best way to make the stuff I've come up with is to toast a cookie sheet's worth of soymeal (e.g., 300 grams) for about 45 minutes at 300°F, add a heaping tsp of super salt, a half teaspoon of mason's lime, and 130 grams of Walmart's Great Value soybean oil and run the mixture through my grain grinder twice. It is at least as good tasting as genuine peanut butter, more nutritious (more protein and less fat -~34 vs 47 weight %) and is of course, considerably cheaper - about one third as costly as WALMART'S "Great Value" house brand peanut butter.

Finally, a literature search revealed that the "best" way to make soy butter would be to roast your soy meal (or soybeans) much longer (90 minutes) at a much lower temperature (115°C

/239°F instead of 400° F) before grinding it up together with the oil and salt. Doing so renders it almost impossible to overheat your "butter" which is apt to make it somewhat more nutritious[253]. In any case your DIY creation will be considerably lower in fat, better tasting, more nutritious, and much cheaper than any of the "nut butters" that Trader Joe or AMAZON can sell you[254] (see Table 12 – my DIY entry was made with 169 grams of as-purchased (~10% - water) ECS soymeal, a half teaspoon (~3 grams) of super salt, two grams of mason's lime, and 82 grams of WALMART's soybean oil) .

Table 12 Comparison with AMAZON'S nut butters

	amount/cost per 2 tablespoon (32 g) serving			
"nut"	**g. protein**	**kcal**	**g. fat**	**$ cost***
peanut	8	190	16	0.23
walnut	5	223	21	1.64
cashew	4	190	17	1.06
pecan	4	200	19	1.78
pistachio	5	185	12	2.56
almond	4	220	24	0.68
DIY soymeal/oil	11.8	175	10	0.047
*** GOOGLE- shopped 21Nov2022**				
****my calcs. AMAZON didn't list/sell soybutter**				

This stuff is a seriously useful foodstuff because it perfectly complements high carbohydrate foodstuffs like hominy, corn/wheat/rye/barley-based breads, pasta, rice, or any sort of potatoes. About 50 cents worth of any of them garnished with soybutter feed an average grown up person for a full day.

Finally, after convincing myself that I needed to lose ~15 pounds, I made up another batch of dry roasted soymeal and ground it with a "rich" soymilk instead of soy bean oil – see Low calorie soybutter in this book's ***Technical nerd dieting*** chapter. It was indeed "healthier" but not nearly as tasty. Frankly I don't recommend bothering with it - dieting requires consuming less, not fundamentally "different", foods [255] .

[253] Professor Hans Stein (University of Illinois Urbana-Champaign) has performed/supervised/published a great deal of work having to do with determining the digestibility of various sorts of animal feeds. Like us pigs are "monogastric" omnivores and therefore similarly digest/metabolize both carbohydrates (sugars, starches, etc.) and proteins which fact renders them excellent "lab animals" for characterizing the digestibility of people foods. It turns out that the temperatures required to "toast" soybean meal (Milliard reaction) reduces the digestibility of several indispensable amino acids, especially lysine.

[254] The only US company making soybutter went bankrupt in 2017.

[255] Unlike "dry" oil-based soy butter, this stuff quickly spoils unless refrigerated.

Barbecued Tempeh

In the Far East, tempeh is almost never consumed raw, but is instead heated to develop meat-like flavors, e.g., by frying spiced and salted slices of it in oil to make "Tempe ripik' or 'goreng' (crispy tempe); by stewing (tempe 'bistik' = steak), by roasting spiced tempeh kebabs ('sate tempe'); and in peppered ground pastes ('sambel'). It's also been widely used as a meat extender and ingredient of lots of different potato/tempeh snack foods.

Here's a "barbecue" recipe that my wife's sister (Hollie) gave me to fool around with.

Ingredients:

Tempeh made from 1 cups of dry soybeans (about 13 oz of it) either sliced into pork rib-sized sticks or crumpled back into individual beans.

3 tbsp EVBG

1 cup chopped onion & one half chopped-up green or red bell pepper (feel free to add anything else that sounds good to you; e.g., carrots, broccoli, celery, etc.)

Sauce/spice mixture

3 tbs vinegar

1 tbsp each of table sugar and "liquid smoke"

2 tbsp molasses

1 heaping tsp each of super salt. powdered mustard seeds, red pepper, coriander, cumin & fennel

1/2 cup tomato ketchup or tomato sauce

Procedure

Saute (fry) the chopped onion with the EVBG in a good-sized frying pan until the pieces begin to clarify, add the chopped bell pepper & tempeh and continue to fry until the tempeh begins to brown. Cover everything with the veggies and sauce/spice, mix well & and either bake it for a half hour so at ~375°F or stovetop simmer until the sauce has thickened and everything is nice & brown.

The "rib" version of this stuff is fine as-is but I usually make the crumpled- version & pour/spread it over homemade bread (either yeast-leavened wheat or baking powder leavened corn bread), boiled ramen-type pasta, baked potatoes, or & my favorite of course, hominy.

Tempeh & noodles main dish

This recipe makes about four cups (~1100 grams total of 59 grams protein & 1200 kcal) of an especially "healthy", "natural", vegan "whole food" that tastes like it was made with finely chopped chicken and mushrooms.

Since I'm a great fan of anything comprised of big fat noodles cooked up with almost any sort of high protein foodstuff (e.g., cheese, pork, chicken, etc.), another of my most successful experiments involved boiling up an eight-ounce package of crumpled-up homemade tempeh with some noodles made with 150 grams all-purpose white flour, 50 grams of corn flour, one each tsp of super salt, powdered sage, and garlic, and ~105 grams of tap water. Mix the noodle ingredients together, knead for 2-3 minutes, break the dough up into eight little balls, roll each into about 2 mm thick "tortillas" on a floured surface, slash 'em lengthwise into 15-20 noodles/doughball, pick them with the tip of your knife and stir them into the same boiling water that you are cooking your tempeh in. Simmer everything together for at least a half hour and then add some chopped veggies –e.g., a carrot, two stalks of celery, a small onion or tbsp of onion granules, etc., and cook for another ten minutes.

You will be ending up with something that a Chinese or Taiwanese person would likely call "rad na". The Chinese generally make it up with garlic, mushrooms, chopped broccoli or cabbage and thin sliced chicken, beef, pork, seafood, or tofu.

Yeast leavened wheat breads

“Standard” white bread

Wheat-based breads continue to be “the staff of life” in much of today’s world especially in temperate (not too hot & not too cold) regions that get enough rain to raise it. Wheat makes better-looking, fluffier, and more nutritious breads than do other grains because of both its relatively high total protein content and the fact much of that protein is gluten – the stuff that makes a “wet” wheat bread dough tough enough to retain most of the carbon dioxide generated by “slow acting” leavening (gas generating) agents - especially yeasts. One of the things I’ve learned during my ~60 years of messing around in kitchens is that bread making can be both simple and quick if done a bit differently than is usually advised. The biggest time savers are 1) use an “active” yeast, 2) don’t make your dough too “stiff“ or in other words, too dry (yeast needs both lots of water & lots of room to stretch out your bread’s gluten), 3) don’t bother to knead your dough for more than 2-3 minutes (Figure 32) , or 4) let it rise (“proof”) more than once before baking[256]. Simply mix everything together, knead the resulting dough for a couple minutes on a floured countertop or plastic cutting board, put it into a well-greased pan, let it rise, & then bake it. The whole operation should not take over about 3 hours, ~5 minutes of which involves effort on your part.

Weight-wise, a reasonable set of ingredient proportions would be (weight wise) one part of all-purpose flour to 0.7 parts of water stirred up with one half of a level tsp of active dry yeast and one level tbsp of either table sugar[257] or molasses per pint (pound) of water. By the time you’ve finished kneading it you will probably have added another 10-15 grams of flour to prevent its sticking to your hands or countertop.

[256] State-of-the art commercial bakeries can turn raw flour to a loaf of conventional “wondrous” or “sponge” bread within ~90 minutes. They do so by using an especially high gluten, super fine-ground, white flour, lots of yeast force fed with lots of corn syrup, super powerful/super quick kneading machines, and close-coupled proofing/baking/cooling ovens with conveyer belts running through them.

[257] If a golden- brown (black?) crust is especially important to you, your customers, or foodie contest judges, add some sugar to your bread dough – it’s unnecessary otherwise.

Figure 32: 2 and 10 minute-kneaded mini loaves with my homemade bread “knife[258]”

Until I had learned how to make artisanal bread, my favorite “everyday bread” was made as follows: mix two cups (about 440 g) of warm water, one tbsp of either white sugar or molasses, a half tsp each of dry yeast and salt, 630 g all-purpose flour, and 70 grams of gently baked soybean flour all sequentially weighed into a lightweight mixing pan. Knead once for 2-3 minutes , put it into a conventionally shaped (rectangular) bread loaf pan, let it rise (typically 3-4 hours), put it into the oven, turn it on to 400°F and bake for about 40 minutes or until it’s become golden brown or whatever other shade/color that seems “perfect” to you[259].

[258] My breadknife started out as a $1 thrift store hacksaw with a worn-out blade & cracked plastic handle - money-wise, I don’t like to spoil myself too much - that’s for my wife & relatives to do. To facilitate its cutting through a normal-depth loaf, I cut its “C frame’s” ends off & then braze-welded them back together with strap steel spacers bridging the cuts. To render its blade razor sharp, one of its sides was shallow-scalloped out with my bench grinder. It renders melba-toast-thick (~3/16”) bread, ripe tomato, salami, and big summer squash disassembly much easier.

[259] If it’s getting too late, I just set the timer at 30 minutes & go off to bed. It’ll have become good enough for this ex-government worker by the time I get up again.

No knead wheat breads

Since ***You Tube's*** artisanal breadmaking videos suggested that "great" bread would likely prove to be overly troublesome and expensive to make, I went back to the internet to seek something simpler. The best "sorta-artisanal" bread-making video I watched, Faster No Knead Bread - So Easy ANYONE can make (but NO BOILING WATER!!) - YouTube was similar to a more serious example previously/similarly published by the New York Times chief food guru, Mark Bittman, but its creator, "Jenny Can Cook", recommended using "hot" water with her premixed flour, salt, & yeast mixture which causes it to rise much faster – brilliant! In particular, she stressed "*how forgiving its "shaggy" dough is - unlike **some** people she knows"*[260].

Figure 37 depicts what I got by following Jenny's instructions[261] up to the point where I was supposed to scrape its first-time-raised dough wad onto a big piece of parchment paper. Since I didn't have parchment paper and am both too lazy and too cheap to buy either it or a Dutch oven, I scraped my dough into the liberally EVBG-greased two-quart hemispherical stainless steel mixing bowl which would serve as its baking pan. That bowl/pan was then set aside for its contents to poof up again while my oven was heating up with two larger, similarly configured, steel mixing bowls within it (see left side of Figure 37). When the oven reached Jenny's recommended 450°F, the little bowl containing the dough was popped into one of the big, already-hot bowls, the other put over its top to loosely seal in steam and the oven's door shut again. After 30 minutes, the big bowls/pans were removed and the now-naked little bowl/pan allowed to bake for another ten minutes to brown up its content's surfaces, especially its top.

It worked great – its product was poofy/spongy (722 grams, ~1820 cc volume) , tasty, good looking, tough-crusted, soft-middled, easy to cut, and almost simple-enough to make again.

However, based upon instincts later that evening I decided to repeat that experiment using enough more water (357 not 333 grams) to raise the dough's water/flour ratio up from 0.70 to 0.75 and skip the initial first-rise; i.e., after the water/flour/salt/yeast mix had been stirred (not kneaded) together for a couple minutes , it was dumped directly into the same liberally EVBG-greased little stainless steel bake pan used for my first Jenny-loaf. After it had poofed-up nearly to the top of that pan in my current home's high tech, proofing-capable, oven (about 4 hours), it was then baked in the same fashion as the first had been. It turned out even "better" - a bit poofier anyway.

A subsequent run done with a 9:1 mix of wheat and gently baked soy flour worked fine too.

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[260] She'd apparently washed her husband's grubby-looking old baseball because an ex-girlfriend named "Ruth" had scribbled her name on it & he'd then kept screaming at her even after she'd said that she was "sorry" - the beast!

[261] 3 cups of all-purpose flour (476 g), 1.5 cups of water (333 g), one tsp of super salt, and one quarter tsp of dry yeast granules – stirred, not kneaded (it's too sticky to knead), together in a saucepan and then set aside in my warm place to rise for 3-4 hours.

As far as I am concerned, No-Knead Bread's chief virtues are that it is easy to make and its porous, open structure (right side Figure 37) is "perfect" to melt cheese on/into. One of my favorite quickie sandwiches consists of two toasted slices of it, over which are first poured an egg beaten up with soy sauce and then some shredded cheese, which combo is microwave nuked for one- and one-half minutes. Topping it all off with this book's ersatz blue cheese dressing and/or pickled squash-like thingies renders it truly almost perfect.

Gluten free baking

When my wife's brother-in-law's bothersome digestive issues were finally diagnosed as "celiac disease" (an autoimmune reaction to wheat gluten), I decided to see if I could come up some reasonably tasty, "new", and of course, both super nutritious and gluten-free corn/soybean-based breadstuffs to serve at family get togethers.

Because baked goods made with wheat flour rely upon its stretchy gluten protein for their structure, many of the recipes featured in cookbooks dedicated to such things include various sorts of gums (xanthan, guar, tara, pectin, etc.) to bind, thicken, and emulsify gluten-free flour-based batters/doughs, I purchased some of the most recommended one, xanthan gum[262] to fool around with. Several hours' worth of experimentation with various combinations of corn & soybean flours and differing amounts of baking powder and water convinced me that although xanthan gum proved to be a great viscosity improver with

	water g	Xanthan g	final weight g	vol% "air"	% water retention
1	30	0	35.3	27	68
2	30	0.66	41.2	7	51
3	35	0	38.7	31	69
4	35	0.66	43.5	6	62
	all specimens contained 13.6 g corn flour, 4.5 g soy flour , and 1.9 g baking powder				

Figure 33 Xanthan gum biscuit experimental results

[262] Xanthan Gum is a "sticky"(snot-like) carbohydrate made by fermenting corn sugar with the bacterium, Xanthomonas campestris. Internet shopping concluded with my purchase of an 8-ounce bag --about a cup and a half - of it for $8.99. Typical recipes call for about one tsp (about 4 grams) of it per cup of a mixture of gluten-free grain flour(s) with corn or potato starch.

cold, wet, batter mixes, its improvements in finished baked product appearance (degree of "poof" or volume) were merely cosmetic and primarily due to much-increased water retention during baking.

Figure 33's data and photo explain what went into and the results of a specimen-set generated to determine what the addition of that gum's effects would be upon "*gluten-free corn/soy muffins*" made with different amounts of water.

Next, in order find out what else that gum might prove to be useful for, I performed an experiment to see what if anything interfered with its ability to thicken aqueous mixtures. This involved adding either a tablespoon of white sugar, a tablespoon of vinegar (an acid), a teaspoon of table salt (a neutral-pH water soluble salt), or a teaspoon of builders lime (a basic solid) to four of five 50 cc aliquots of tap water each containing 1/8 tsp of xanthan gum, blenderizing them, dumping the resulting homogenized mixtures into individual muffin tin cups, and then recording what might happen. Nothing "happened" - they all quickly set up to form equally "stiff" jellies. Next, I set the muffin tin onto my kitchen range's biggest (~12-inch diameter) electric "burner" and brought them all up to near-boiling after which I let them cool back down again. The jellies' appearances and stiffness appeared to be unchanged. Finally, I perched that tin onto a 11°F snowdrift to solidly freeze everything after which I rewarmed it up again and looked for differences. There were still none which findings in toto , suggest that we could likely find lots of uses for it in thickening-up almost any kind sauce, jelly, etc. that we might set out to make (for an immediately-conceived and successful such example, see this book's "mustard recipes").

Consequently, as far as I am concerned, xanthan gum or any other viscosity improver is apt to be more useful for improving the "mouth feel" of sauces, jams, desserts, and frozen confections (e.g., low fat ersatz ice creams) than for everyday bread/muffin baking. However, at family get-togethers, I'll surely be adding some of it to whatever breadstuff I put together to render it even more beautiful.

"English" muffins

Bread bun style muffins

Since my wife buys/consumes lots of English muffins, most of which happen to be *Bays Original English Muffins*, 6 count/12 oz (currently $3.24 at WALMART), based upon what I'd learned about making no-knead-type breads, I dispersed a half teaspoon of dry yeast into 360 grams of almost-hot tap water and then stirred in 480 grams of all-purpose white flour (water:flour=0.75: 22 cents worth of raw ingredients) plus a teaspoon of super salt. ~95-gram gobs of that dough were spread over a well-greased cookie sheet, more EVBG brushed over their tops to prevent dry-out, and the cookie

Figure 34 No Knead English Muffins

sheet put into a nice warm place to maximally proof/raise/fluff up which took about four hours in my “new” home’s high-tech, proofing-capable, oven. The cookie sheet was then removed from the oven which was then turned up to 450°F and when that temperature had been reached, the pan put back in for fifteen minutes’ worth of baking To me anyway, they turned out “great”: tough-crusted, better-sized (three not two ounce), poofy, and easily capable of soaking up a least twice their weight of everything she likes on her muffins They are also excellent burger buns (see Figure 73) and are of course, dirt cheap – under 10% of what BAYS pale little specimens cost.

Microwave-baked (nuked) muffins

However, those muffins didn’t possess the exceptional “chewiness” distinguishing English-type muffins from typical bread buns. Since I’d learned a long time ago that “nuking” a piece of bread made it tough, not “toast”, I then made up another ~430 g batch of no-knead bread dough (weight-wise flour:water:salt:yeast ratios = 1:0.75:0.02:0.002), split it up into seven chunks containing about the same amount of flour (~35 grams) as did BAYS two-ounce muffins, arrayed them symmetrically around the periphery of my EVBG-lubed microwave oven’s glass tray, let them room-temperature rise overnight, and then nuke-baked them on it for five minutes. Figure 35 depicts this demonstration’s dough blobs before they rose and after they had been nuke-baked.

Figure 35 Nuke-baked, no-knead English muffins

These muffins were more like the “real” ones in that they were about the same size (a little lighter, averaging 54 vs 60 grams due to less water retention), equally tough-textured, and almost colorless rather than golden brown. Taste-wise I can’t tell them apart. Due to their toughness (chewiness), a sharp, thin-bladed, bread knife like that depicted in Figure 32 is required to slice them.

Then just for the heck of It, I made up, single-proofed, and then nuke-baked another muffin batch substituting a mixture of soybean meal with WALMART’s all-purpose flour for my previous effort’s 100% wheat flour; i.e., 90 grams of soymeal, 280 grams all-purpose flour:240 grams water: one eighth tsp yeast, and a half tsp super salt. Its water:∑flour ratio was 0.65 rather than 0.75 (“stiffer”) because I wanted its dough to be kneadable to compensate for its flour mixture’s gluten-dilution. It was broken up into ten little dough balls, evenly distributed onto my microwave oven’s glass tray, allowed to rise/proof overnight, and then nuked-baked for six-and-one half minutes[263].

[263] My rule of thumb for nuked bread baking is one minute per 100 g of dough. With a 1000-Watt microwave oven that’s generally enough to cook and evaporate off about one third of a trayful of doughball’s water.

Figure 36 Nuke-baked English soymuffins

These muffins turned out to be so nearly perfect that they've since become my favorite everyday breadstuff. They taste great, simple to make[264], super nutritious (each provides me with 8 grams protein & 122 kcal muffin) and baking them doesn't use nearly as much electricity or heat up the house like oven-baking does (that's especially nice during Iowa's summers).

If you wish, the tops of these muffins can be quickly rendered golden-brown by putting the tray under your oven's broiler for two or three minutes.

However, my wife still insists upon buying ***Bays English muffins***. Oh well – they come in a handy-dandy resealable package that's just the right size to hold a batch of my better-tasting, nuke-baked, & soy enhanced "English muffins".

Soy flour fortified wheat flour biscuits/breads/etc.

There's not much to be said about this other than that finely ground, gently baked, soybean flour is substituted for some of the wheat flour called for in those sorts of recipes. The nutty-tasting soybean flour improves any such bread's flavor and nutritional value but gluten dilution renders it somewhat "less poofy".

[264] I typically make up the dough in the late evening, let it rise overnight, and then nuke-bake it the first thing next morning. In that case I use very little yeast (about 1/8 tsp), wet the inside of a big stainless-steel bowl, and invert it over the dough lumps perched upon my microwave '"baking" tray to prevent dry-out, put that combo in my kitchen range's oven, turn it "on" for 2 minutes to warm it up a bit, & then leave it to fester overnight.

For instance, a nice little batch of biscuits can be made by mixing up one cup of white flour, one quarter cup of soybean flour, 1 tbsp EVBG , one heaping tsp of baking powder, ¼ tsp of super salt, and **2/3**rds cup of water (don't over mix - biscuits aren't supposed to be tough and wheat flour's gluten is developed by stirring), gobs of it spooned onto an EVBG- lubricated cookie sheet and then baked for about 20 minutes at 350°F (total of ~16 grams of protein and 340 kcal.)

Another even finer tasting batch of biscuits – my wife even liked 'em – involved replacing another quarter-cup of the above-recipe's wheat flour with gently baked corn flour.

Artisanal bread-making experiments, opinions, & procedures

On the other hand, if you don't mind spending extra time & effort to make something that's genuinely "artisanal" (poofy, with a dark colored, super chewy crust surrounding a tender interior featuring huge bubbles/gas pockets totally different from your supermarket's finely pored sponge-like "wondrous bread") here's how to do it.

I'll begin by summarizing how "real bread" is supposed to be made[265].

To begin with, the internet's bread experts' most consistent artisanal principles[266] include 1) add lots of water, typically 75 to 90 % as much by weight (not volume) as flour, 2) use much less yeast than is generally recommended for "regular" bread making (e.g., one eighth rather than a full teaspoon of it per two pounds of flour) or, preferably, leaven your loaf with a sourdough starter, 3) add lots of salt – typically about 2% as much of it as flour, and 4) don't feed your yeast's and/or starters' bug(s) with table sugar (sucrose), molasses, maltose, or corn syrup – they're supposed to feed themselves during the next day or two by converting the flour's oligosaccharides & starch to the simple sugars that they can convert to the loaf's carbon dioxide gas leavener plus ethanol.

You are supposed to start off by stirring together about one half (this fraction varies from artist to artist) of your organic flour with warm water and then setting it aside to rest for a while (which time is also another variable). You then are to stir in your sourdough starter, cover the bowl/pan to prevent dry-out & set it aside overnight in a nice, warm place to give its natural yeast leavening bug(s) time to get used to their new surroundings and begin feeding. The next day you are to stir in the rest of the flour – enough to reduce the dough's water-to-flour ratio to where it's supposed to end up (another variable – typically 0.75 - 0.85:1 but some experts recommend making a super shaggy (pourable?) 1:1 dough.

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[265] About one half of Michael Pollan's latest best-seller (*COOKED)* is devoted to artisanal bread making.

[266] Another real bread principle is to not add any sort of oil or shortening to your dough. I usually don't add oil or salt to my bread/pizza/roll doughs because it'll be going on along with whatever else ends up being consumed with it/them.

- You are to then recover the mixing bowl/pan & set it aside in your special warm place to affect your dough's initial "proofing" step (with most bread-type yeasts, an ideal (fastest) proofing temperature would be~ 90°F but some celebrity chefs recommend cooler/longer/slower proofing protocols to "*develop more flavor*").

Figure 37 An almost artisanal loaf oven baked within a pair of preheated stainless-steel bowls

- When it's poofed up to at least twice its initial volume, you are to transfer the dough onto a flour-covered surface with your $39.99 plus S&H artisan bread making kit's pan/bowl scraper and then "fold" its edges towards and over its center four times. Don't even try to knead it - it'll be far too "shaggy" (sticky/sloppy). Some experts insist that folding interspaced with rests be repeated several (another variable) times .
- Transfer your gently folded-up, shaggy dough ball to a well-greased bowl or pan with a volume at least five times greater than that of your initially stirred-together ingredients, cover it and put back into your warm place to rise again until its volume has at least tripled (become rather "bubbly").
- Finally, carefully pour/slide your poofy dough-thingy onto a piece of parchment paper dusted with flour (the type of "flour" recommended is another variable – corn meal is most common) & set it aside again for another half hour (or more) of additional proofing to regenerate the CO_2 lost during your last dough dump.
- Finally, pick up your fully proofed, shaggy, doughy-thingy with its parchment paper & dump both into a superhot (at least 500°F) preheated Dutch oven or "special" but basically similar baking pan/pot, immediately cover that pan/pot with its also-preheated lid & put it back into your super-hot oven.
- Bake for ~30 minutes, remove the pan/pot's lid, and continue to bake for however long it takes (another 5 to 15 minutes?) to almost blacken its crust.

You are cautioned that if you will be entering your masterpiece in a contest you must buy/use a special flour, preferably imported from northern Italy, "sea", not "super" or iodized, salt, and a sourdough starter either flown in from Milan or San Francisco, or if you are both lucky and persistent enough, DIY-made by exposing a sloppy mixture of flour and water to your home's natural “organic” airborne yeasts/bacteria for a week or two while periodically dumping about half of it out & replacing with fresh flour& water.

Doing all of this “right” is relatively costly in terms of time, effort, and money. Cheap all-purpose, medium, or low gluten, white flours won’t form a tough-enough dough to retain big-enough CO_2 bubbles to impress judges and Walmart’s house brand of “guaranteed” high gluten bread flour costs ~four times as much does its all-purpose flour - its genuine “*Antimo Caputo Chef's 00 Flour*” will set you back ~30 times as much[267].

However, a good bit of fooling around in the kitchen has taught me that very little of the typically recommended fuss, time, & expense is needed to make a good-enough artisanal bread. For some time it seemed that key to success was baking the same sort of shaggy, no-knead bread dough that “Jenny can cook” had taught me about (Figure 35) on a preheated “pizza stone”, not semi wrapped with parchment paper and baked within a super-hot Dutch oven or pottery kiln. Likewise, the imposition of multiple folding/proofing cycles between initial dough mixing and baking didn’t seem to improve anything. Figure 38 depicts two loaves made with the same amount of super salt (1/2 tsp or 3 grams), flour (400 grams), and water (300 grams) differing in that the “conventional” example on the left side was made with “Gold Medal Full Strength” bread (not all-purpose) flour, a borrowed gob of professional-grade sourdough starter, and dough that had been repeatedly proofed/folded for about 20 hours before being oven-baked on a preheated 13” diameter, 450°F, 1.6 kilogram (2.2 pounds = 1 kg), professional grade cordierite pizza stone (another Christmas gift). The one on the left was made with WALMART’s all-purpose flour, a half teaspoon of active dry yeast, raised/proofed just once for ~four hours, and then baked at 450°F on a preheated, in-store-damaged & therefore free-to-me, 12-inch square, 1.4-kilogram glazed ceramic floor tile.

In both cases, my poofy, thoroughly proofed, dough wad was sprinkled with corn flour, scraped onto a corn flour-covered ~14-inch square of supermarket shopping bag plastic (also free), and then immediately rolled/dumped off onto its respective preheated pizza “stone” - no parchment paper or Dutch oven. Both specimens consisted of thick, tough, chewy, tasty crusts surrounding soft, chewy, tasty centers featuring lots of big random-sized holes/bubbles exhibiting a great deal of “spring” (for a closer-up look at the more nerdly example, see Figure 31).

We’ve finally gotten to the point where I can reveal the “best” way to make a 1½ to 1¾ pound loaf[268] of the best tasting bread that I’ve come up with yet.

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[267] According to Busby's Bakery School Busby's Bakery School (busbysbakery.com), 00 flour is a finely milled Italian flour that’s “perfect” for pasta or any long-fermented Italian-type bread. Its protein content is 11-12% which is similar to that of <u>some</u> all-purpose flours (there’s no such standard and manufacturers generally don’t disclose such things on their package labels) and a bit under that of a typical US made “ bread” - (or “strong”) flour.

[268] Its weight will depend upon how much of the dough’s water is retained during baking which factor varies substantially. A slice of typical US Wondrous-type bread is about 35% water.

- Perch a mixing bowl onto your food balance & “zero” it
- Add a ¼ teaspoon of active dry yeast and 400 grams of warm water.
- Rezero the balance and add 533 grams of flour (water to flour ratio = 0.75) and a teaspoon of super salt.
- Stir together for a minute or so.
- Dump/scrape the dough into a well-greased glass[269], ceramic, or stainless-steel bowl & set it into a warm (ideally ~90°F) place to rise (overnight is especially convenient).
- When it’s poofed up to at least 2½ times its original volume which typically takes about 4 hours, scrape/dump it onto your preheated, 450°F, corn flour dusted cookie sheet[270] and bake it at that temperature until it’s “perfect“, typically 30 minutes.
- Take the loaf out of the oven , let it cool off for few minutes, and then brush its surface with butter, margarine, or EVBG to keep its crust from drying out.

Figure 38: “Properly made” (right side) and technical nerd-type (left) artisanal bread.

[269] The purpose of that grease/oil is to minimize the scraping required to dump your dough onto the pizza stone/cookie sheet –so-“working” your dough at that point squeezes out some of its CO_2 thereby reducing the final loaf’s volume.

[270] Several side-by-side experiments revealed no consistent differences between specimens baked upon a ceramic “stone” and a sheet steel cookie sheet.

Neither I, my wife (my second-toughest critic - DeeBee Kittycat's mattress on the right side of Figure 39), nor my easiest/best critic (left side of Figure 39[271]), could apparently detect the "difference" between the nerdly and properly-made specimens.

Figure 39 My best/easiest (left) and two worst/toughest food critics

Is artisanal bread "easy" to make? Ans –"Yes", <u>if it's done right</u>. Is it "quick"? Ans – "Yes", <u>if it's done right</u>. Is it worth the effort/trouble? Ans - that's another matter of taste but as far as I'm now concerned, "yes", especially whenever you are expecting company, need to please your better half, or feeling either especially penitent or decadent.

Focaccia

The recommended ways of consuming concoctions like my chili or chicken/noodle suggestions usually invoke some sort of salty, high carb, bread-like side dish - corn ships, saltine crackers, corn bread, baguettes, tortillas, or some kind of biscuit. However, if you "need" some extra especially wholesome (tasty) co-calories, make up some "focaccia" smothered with lots of EVBG[272] Mr. GOOGLE informed me that he had about 162,000 focaccia entries most of which seem to describe an otherwise naked except-for-top-seasonings, especially thick, yeast-

[271] Though he's my "best" critic, Fatboy Coon is also a real pain in the tuchus. Last year on two occasions while "helping" to clean up my patio deck's frying pan in the middle of the night, he dumped it face down upon that deck. My worst/toughest critic, DeeBee Kittycat can't be even tricked into eating anything I've made containing soybeans or field corn.

[272] You don't have to purchase extra virgin olive oil to make good tasting/nutritious Italian or Greek -type foodstuffs but please don't tell your doctor, coroner's investigators, or health insurance guy that I was the one that told you that.

leavened, crisp-baked pizza crust covered with coarse-ground salt, granulated onions, oregano, and powdered whatever sounds good[273]..

Figure 40 First & second focaccia attempts

garlic . The left side of Figure 40 is my first attempt at focaccia making. It's just another ~240 g lump of "standard white bread dough" (see Figure 32 – mass-wise flour:water:salt ratios ≈100:60:2) squashed down into an EVBG-lubed cake pan, more EVBG smeared over its top and then sprinkled/slathered with the above-mentioned toppings. Despite it's being a bit over

Figure 41 Top-of-the-line "good old days" artist's model

baked"(it had been baked at 400°F for 20 minutes – apparently two or three minutes too long), even my second toughest critic deemed it "OK.

[273] I seem to recollect another GOOGLE hit claiming that focaccia was invented by a renaissance painter named "Focaccio" needful of something cheap to feed his too skinny, bargain basement-type, figure models to build up their convexities to match those of his richer rival's (Rubens) top-of-the line models (Figure 41) .

My follow up, "lessons learned", effort (right side Figure 40) differed in that my dough was a bit shaggier (more water) and broken up into about 50 little lumps before being put into the pan and then their "doneness" checked during subsequent baking rather than simply assuming that twenty minutes @400°F would be perfect enough. Dough-lumping resulted in a pebbly-surface[274] capable of absorbing even more super nutritious fatty/salty/spicy toppings - the most important feature of any truly successful party food mash-up (see this book's "Wife Chow" chapter.)

Garnishes, dressings, salsas, etc.

Anything goes homemade salsas

If you have your own little garden plot[275], you should learn how to convert its/your bounty (both some of its weeds and your veggies)- into readily stored goodies to complement/supplement your super nutritious whole-food bean, corn, & flour-based foodstuffs throughout the entire year.

More or less traditional salsa

The following "recipe" is just one of a zillion ways to make salsas -- be adventurous.

- Cut your peppers, tomatoes, and onions plus their still green stems & still green stems into pieces under two inches long in any dimension. Volume-wise, tomatoes should constitute at least one half of your salsa's veggies.
- Process (just chop, don't pastify) that pile batchwise for a few seconds with your blender, food processor, or food grinder
- Dump it onto a coarse strainer perched over a big cook pan(or bucket" , press out most of the juice, and set the veggie chunks.
- Boil off enough of the veggie juice's water to produce a thin ketchup-like veggie paste
- After it's cooled off a bit, dump your veggie chunks into the boil down pan & add about 10% as much vinegar volume wise, plus as much super salt, powdered cumin, coriander, red pepper, cilantro, etc.[276]. as you like, and then…
- If you want keep it indefinitely, either boiling-water can (see "Zucchini pickles") or bag up in ziplock bags and freeze.

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[274] One of my foodie-experiments' victims informed me that my "lessons learned" focaccia's had been invented before – if its dough lumps are covered with sweet, gooey, nutty ,etc. stuff instead of salt, garlic, onion, ESBG, etc., it's called "monkey bread".

[275] Don't buy your super or "farmers'" markets' $ 2-$5/pound raw veggies to make salsa. Sapiently-purchased commercially produced salsa is much cheaper than would be enough of the so-obtained components to make your own.

[276] Adding some finely chopped "whole" (with peel) lime or lemon after your salsa has been cooked makes it taste even better to some people and also jacks up its vitamin C concentration.

Not so traditional salsa (no tomatoes)

- Fill a 2-quart saucepan with chopped up zucchini stalks, add a half cup of water, cover the pan, bring it to a boil, and cook for about three minutes.
- Dump it into your blender's jar, add a few chunks of deskinned onion, whatever hot and/or cold peppers you happen to have, a half cup of vinegar, and as much super salt, powdered cumin, basil, red pepper, etc. as you like, a half teaspoon of xanthan gum and then blend everything together for about 30 seconds. DONE!

It'll stay great tasting for a week in your refrigerator as is but if you want to keep it indefinitely, either boiling-water can it (see "Zucchini pickles") or bag it up in ziplock bags and freeze.

Easy Peasy BBQ sauce: Shake together 10 ounces (~280 grams) of ketchup with 2 tablespoons each of vinegar and molasses, one tsp each of super salt and liquid "smoke", and one packet of an artificial sweetener like "Splenda". Done!

This recipe is sized to fill a handy/dandy twelve-ounce plastic "brown mustard" squeeze bottle that I'd stashed away.

This sauce is great tasting as is but if you want a "hot" sauce, add powdered mustard and/or any other sort of pepper you like - red, black, white, cayenne, or jalapeno, either fresh or powdered.

Artisanal BBQ sauce: If you want to make a tomato-based BBQ sauce from scratch, cook until thick enough, a mixture of tomatoes either ripe or green blenderized with some onion, salt, vinegar, molasses, "smoke", and chili pepper. Though I've not proven it yet, I suspect that zucchini leaf stalks/stems would work every bit as well as tomatoes for any such sauce.

"Carbogel stretched" salsas

Because its main ingredient, tomatoes, are about 93% water, making a traditional salsa requires lots of time, tomatoes, and energy because lots of water must be boiled off to render it "thick " enough to stack up nicely onto your homemade taco chips. A simple way to speed preparation and produce more salsa from your garden's goodies is to stir in about one 15th as much fine-ground corn flour as your veggie-batch's tomatoes and bring that combination up to the boiling point before cooling it. It's also highly likely that stirring in a half tsp of xanthan gum per pint of your "cold" veggie mix would impart the same characteristics as does the heat/water gelled corn starch.

Hollie's potato/posole nacho topping

Chop up two small onions and three parboiled medium sized potatoes and then fry them up together in about one tbsp EVBG. Add one cup of already-prepared hominy, 1 tsp salt, one half tsp each of powdered cumin and curry powder plus enough black pepper to suit your taste. DONE!

Mustard recipes

First: Since I (not my wife) feel that a spritz of mustard improves almost anything other than *most* desserts[277], here's a recipe that makes just enough to fill a convenient-sized (~24 ounce) plastic commercial mustard squeeze-container. Put 2 1/3 cups of water, 2/3 cup of vinegar, four tablespoons of corn starch, two tablespoons of mustard powder, one tablespoon of turmeric, two tsp of super salt, and one tsp each of red pepper and cumin powder into your blender's pitcher, blend it a few seconds, dump it into a saucepan, put it onto one of your stove's "burners", and heat with constant stirring until it suddenly thickens up. Immediately take the pan off the stove and funnel its contents into your handy-dandy recycled mustard squeeze container. It keeps indefinitely in the refrigerator - just give its container a shake before dispensing.

Second: Almost a year later, because I had just run out of mustard again and the results of my experiments having to do with "gluten-free baking" had suggested that the following recipe would probably work, I tried it. It did work & is much quicker/simpler to do because no heating is required. .

1) Add ¾ cup of vinegar to your almost "empty" 24-ounce mustard squeeze container and follow it with enough cold tap water to nearly fill it.
2) Dump it into your blender's jar, add 2 tbsp mustard powder, 1 tbsp (more or less) of powdered red pepper and/or cumin and/or turmeric, 1 tsp of super salt, a "big" (full or half gram) vitamin C tablet, and one level teaspoon of xanthan gum.
3) Blenderize everything together for about one minute and immediately pour it back into your handy-dandy 24-ounce mustard squeeze-container.
4) Done!

Barbeque sauces

I've made many such sauces in many ways. However, they all consisted of a cooked/canned veggie base material including both commercial and homemade, green and/or red tomato ketchups, canned zucchini stalks, canned squash, pumpkin, and dandelion leaves, blended up together with vinegar, molasses, some sort of sweetener (usually SPLENDA) plus various spices which combo always included dried/powdered onions, red pepper , and super salt. To make it "healthier" I usually also add a one-gram bolus of ascorbic acid (vitamin C) to each batch. There is no magic recipe for these sorts of sauces - try anything that sounds good to you.

Soyranch Dressing

This recipe makes ~500 g (~one pint) of a delightful tasting, sweet & sour, salad dressing or bread/veggie/chip dip. Blend 90 g of dry soybeans for about 30 seconds, add a cup and a half

[277] To me, a nuked, fifteen cent, mystery-meat hot dog is a fine dessert that's further improved by mustard. Four or five so-slathered fakefoods comprise a great dessert.

of warm water , reblend for about 30 seconds, let it sit for 2-3 minutes, reblend for another ~20 seconds, dump the paste into a filter perched over a saucepan ,squeeze the milk out into it, dump the solids (okara) back into the blender, add another cup of water, reblend ,squeeze the rest of the milk out into the saucepan, bring it to a boil stirring/scraping it's bottom & sides with a stainless steel spatula to prevent protein separation: Cool the milk for a couple minutes & dump it back into the blender along with 2 packages of SPLENDA, 1 tsp onion flakes, 1/2 heaping tsp each of super salt, mustard, and garlic powders, 70 g soybean oil (optional- it's good without the oil but creamier/better & 3x higher calorie with it), add 1/3 cup vinegar & blend for another minute.

Refried soybean chip dip or sandwich spread

This recipe was inspired by our first trip to a nearby (Pleasant Hill) Mexican restaurant that's situated next to my favorite bluegill shopping lake. Its offerings were/are very good but as far as I am concerned, homemade taco chips, salsa, and the following bean dip are every bit as good tasting, more nutritious, and of course much cheaper (under 10%) than that "outsider's" offerings are.

Here's how to make that dip: 1) boil/dehull one cup (180 g) of soybeans 2) put them plus 2 cups of water into your pressure cooker, tighten its lid down, put it onto your stove , bring it up to 10-15 psi pressure/temperature, turn the heat down and cook the beans for ~45 minutes , 3) while that's happening, fry/brown one-half of a small onion or one TBSP of granulated

Figure 42 Refried soybean chip dip

onions in two tbs EVBG in a saucepan, 4) when the beans are done, take your pressure cooker off the stove, put it into your sink and run/spray water onto its lid until it's no longer pressurized[278] ; 5) dump the beans into a strainer and then into the saucepan containing your browned/fried onions, add a heaping tsp super salt and a half tsp each of powdered garlic, cumin, and red pepper. 6) Scrape everything into your blender's pitcher and then blend it along with some additional tap water (about a half cup) until it is nicely scoopable (Figure 42, total weight about 475 grams).

"Super Queso""

This recipe t makes about 350 g of a thick, nutritious, tasty, cheesy dip/spread for any sort of bread, pasta, hominy, potato chips, or taco chips.

Finely chop two small onions, a medium sized green or red "hot" pepper, and a larger mild pepper with a knife or food processor. In a saucepan fry your onion bits 'till clear in two tbsp EVBG, add the chopped peppers, a half tsp each of super salt and turmeric (for color), 2 tsp cumin, ~two cups of freshy filtered raw soymilk made with 1/2 cup soybeans, bring everything to a boil with lots of stirring and then stir in ~100 g of shredded "sharp" cheddar cheese

Soymeal corn/potato chip/veggie dip & sandwich spread.

1st version: I made this stuff to provide something nutritious & tasty to scoop up with slices ("spears") of the last of my 2022 zucchinis. Since I was almost out of whole soybeans again, it was made with soymeal which substitution simplified/quickened its preparation (24 grams protein & 390 kcal total or 1.6 g/22 kcal/tbsp).

Fried 10 grams of dried onion flakes in 20 grams of EVBG for 2-3 minutes in a saucepan until they begin to brown (this went quickly because there's no water to boil off) and then added 50 grams of soymeal and 3/4ths cup of water , covered the pan, brought it to a boil and then simmered for 5 minutes to fully hydrate/soften the soymeal. I then scraped everything into my blender's pitcher, added one tbsp each of vinegar and powdered cumin, one tsp each of super salt, powdered garlic, and red pepper, and then pastified it for about one minute ending up with 260 grams of a great tasting dip that subsequently served double duty as a sandwich spread.

2nd version: This stuff started out to be a test of whether I could make soybean meal, not soy milk-based ersatz blue cheese. That involved stirring 15 grams of WALMART's veggie(soybean) oil, one tablespoon of vinegar, two tablespoons of water, ¼ tsp of super salt, and 2 grams of commercial "Gorgonazola" (blue) cheese up with 60 grams SBM, and letting it sit on my kitchen's counter for two weeks within a loosely-lidded plastic cottage cheese container. By then everything had become profusely covered with a green-grey growth of Penicillium Roqueforti.
After pondering what to do next , I hit upon trying to turn the stuff into something approximating Figure 26's "new fave" tofu curd-based salad dressing" – I'd eaten the last of my

[278] In this fashion my 15-quart pressure cooker/ canner can be cooled within forty-five seconds.

last batch over six months earlier & couldn't/wouldn't replace it because I'd run out of raw soybeans again and, of course ,couldn't get them for anything like what they should cost.

Figure 43 Soybean meal blue cheese dressing/dip

Procedure: scraped fermented SBM into my blender's pitcher, added 220 grams of cow's milk, 50 grams (~3 tablespoons) of vinegar, 30 grams of soybean oil, 1 tsp of powdered garlic, and ½ tsp super salt, blender pastified everything together for two minutes & then scaped everything into a pint-sized plastic storage container.

My first application for this stuff was as a dressing dumped over baked potatoes – it was delicious and , of course, rendered them far more nutritious than would have butter or a typical gravy.

Miraculous Wipp[279] - a much cheaper & genuinely nutritious ersatz "Miracle Whip"

I've never liked genuine mayonnaise much because it tastes like what it is - veggie oil that's been egg yolk-emulsified with about a third its volume of slightly salted vinegar in a blender. On the other hand, Kraft's iconic substitute, "Miracle Whip" tastes good – sweeter & tangier - and assaults its consumer with under half as much uselessly calorific veggie fat, ~40 vs ~100 kcal per single tablespoon "serving" (ha ha).

[279] WIPP is the USA's miraculously logical/reasonable, one and only, transuranic-but-not-high-level radioactive waste repository. After forty years and ~15 billion dollars' worth of electricity ratepayer-funded "study" our country's topmost decision makers still haven't decided what to do with radioactive waste they consider to be "high". US radwaste classifications ("high", "intermediate", "incidental", "transuranic", "low", etc.) are based upon the stuff's origin and associations, not by how radioactive or chemically toxic it is. Some   low-level US radwastes are much "hotter" rad-wise than are some of its "high level" radwastes.

After teaching myself how both corn starch and soy milk would likely behave, my first attempt at cloning Miracle Whip produced the following recipe's even better tasting, somewhat nutritious (it contains some protein), much less uselessly calorific (~10, not 40 or 100 kcal/tbsp), and **much** cheaper ersatz version. WALMART's current price for Kraft's current fake-quart-sized[280] jar (30 not 32 fluid ounces) of Miracle Whip is $3.96 - Safeway demands $4.98 for the same thing – the wherewithal required to make 30 ounces of this recipe's "whole food" substitute would cost about twenty-five cents[281].

This recipe makes an especially handy, 24 ounce (big cottage cheese container)-sized batch. To begin with , make yourself up a batch of soymilk as described elsewhere beginning with a half cup (~90 g) of powdered soybeans and then blend-up with 2⅔ cups of warm water (you want to end up with about 500 grams of soymilk. After it's been filtered the first time, blend the okara with another cup of warm water & filter the rinsate into the saucepan containing the milk. Put that pan on the stove to boil and while it's heating up, blend together 2/3rds cup of vinegar, 3 level tablespoons of corn starch, four packets of an especially wholesome/no calorie/naturally Mankind-improved sweetener[282] (anything containing "sucralose", e.g., Splenda or Aspartame), a half teaspoon each of super salt and dry mustard powder, plus a dash (roughly ¼ tsp) of turmeric (it's the stuff that makes yellow-colored mustard yellow – its purpose is to add an especially wholesome-looking color). When the soymilk begins to boil, turn the heat down, dump the vinegar/starch/salt, etc. mixture, into it & stir like mad for 2-3 minutes. Remove the saucepan from the stove, let it cool for a minute or two and then dump everything back into your blender's pitcher. Blend everything together for about 30 seconds & then pour your lovely creation into a handy-sized jar, plastic container, or bottle, cap/cover it & store in your fridge. Done![283]

[280] More confusion is caused by the food sector's addiction to confusing/undefined units. For instance, in the USA, an "ounce" may be either 28.3 grams(or cc) of water or 29.57 grams (or cc) of water depending up whether it's referring to a dry or fluid ounce.

[281] It'd be even cheaper if your stove were powered with reliable clean nuclear, not unreliable wind/solar or dirty coal/gas-fired power plant-type electricity. Write your congresspersons!

[282] In the **Sucralose** that I generally substitute for Kraft's evil high fructose corn syrup , one or more of the hydrogen atoms in the otherwise notoriously fattening "table sugar" (sucrose), has been replaced by natural chlorine atoms (i.e., chloride atom/ions possessing a $^{35}Cl/^{37}Cl$ isotopic of 3:1). If anyone protests that your creation is nevertheless insufficiently "natural", reassure them that it also doesn't contain the even more evil things within KRAFT's product: "modified" Food Starch (your starch would be natural, not "modified"), cellulose gel, potassium sorbate, xanthan gum, cellulose gum, and Acesulfame Potassium.

[283] The addition of tablespoon or two of finely chopped, garden-raised, cayenne pepper after you've blended up this stuff makes it more nutritious (add vitamin C) and taste even better .

Figure 44 Homemade bread, Miraculous WIPP, Swiss cheese, pumpkin pickle, homemade mustard & homemade bread sandwich subassemblies

The next time that you can afford to purchase both ham and cabbage at the same time, use it to make ham sandwiches & coleslaw. Meanwhile, you could use it to fabricate something along the lines of Figure 44.

Mexican quick dip

When my first-year's tiny[284] Iowa garden attempt began to produce, I dreamed up this stuff to dip its zucchini sticks into. It also nicely complements any sort of corn or potato chip.

Procedure: Boil/dehull one half cup soybeans. Blend them with 2 medium sized tomatoes, 2 tbsp each corn flour and vinegar, 1 tbsp powdered red pepper and cumin, and 1 rounded tsp each powdered onion, garlic, & super salt,

Scrape into a saucepan, bring to a near boil & simmer for ~ten minutes.

If you're feeling a bit underweight or just need some comfort food, stir in some EVBG or soybean oil too.

Greatest-ever, super nutritious, low calorie bean dip*

(Makes about 2½ cups,   480 kcal/33 g protein) Boil up/dehull one half cup of soybeans. Chop up about one ounce each of onion (any kind) and sweet pepper(bell type - any color)• and add them along with the drained/cooked soybeans , two tbsp. of vinegar and fine-ground red pepper, 1 tbsp. each of molasses, fine-ground red pepper and cumin plus a single level tsp each

[284] Most of my home's backyard is covered with a driveway, paved turnaround space, storage shed, two decks, and a 24'diameter swimming pool. Both it and most of my front yard is also shaded by lots of big trees, flowers, & bushes – efficient veggie-growing requires both "cleared" dirt and lots of sunlight.

of garlic powder & super salt to your blender's pitcher. Blenderize/pastify everything together dribbling in just enough cold water to your blender's pitcher it to render it possible (roughly one cup).

The bell pepper is just a suggestion - a celery stick, carrot(s), different pepper(s), or almost anything thing else that you have on hand would also be fine.

*if you would prefer a considerably higher calorie (~700 kcal) but even greater/tastier to me anyway, chip dip, add a couple tbsp of EVBG or olive oil

Zucchini, cucumber, and/or pumpkin pickles

Like tomatoes, pumpkin & zucchini usually present anyone who has decided to grow them with plenty of "opportunities for excellent ". O. Something that brightens up the taste of many of my soybean, corn, and bread-based self-offerings (especially sandwiches) are any sort of cold pickled veggie. To make a big batch of them 'em, pack one eighth inch thick slices of cucumber/pumpkin/zucchini, radishes, etc.[285] cut about ¾ inch shorter than your canning jars into them, add 1 tsp super salt and some of your favorite spice (e.g., powdered dill, mulling spices, cloves, etc. either with or without some sort of sweetener) then fill to within about an inch of the top with a 50:50 mix of vinegar and tap water.   Put lids on the jars, add the rims, and screw them down just barely enough so that the jar can be picked up by them – not tightly because you want steam to displace the jars' headspace air while they are being heated. Put the jars into your canner, add a couple cups of water[286], cover it, put it on the stove and bring that water to an active boil. After 25 minutes worth of steaming,   shut the stove's "burner" off, remove the canner's lid, drape a lightweight towel/rag over your dominant hand , reach in and screw the jars' rims down tight. Done!

[285] Peeling is unnecessary if your zucchini-type (or "summer") squash or pumpkin is fresh and not fully matured, i.e., you can still readily punch your thumbnail through its skin.

[286] The usually recommended way to do water pack canning is to fill the canner almost completely with water totally immersing the jars and their lids. Immersing them in steam rather than boiling water is more efficient/faster/cheaper because far less water must be heated. Steam canning was approved by the National Center for Home Food Preservation as equivalent to water bath canning eight years ago (2015).

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Figure 45 (left)open faced nuked egg sandwich (bottom to top: toast, mustard, egg, pumpkin pickle slices) (right) summer squash pickles(ice cube on top)

Finally, if you decide to can up only 1-3 pints of veggie stuff, you can further speed everything up by preheating it to the boiling point in a saucepan before putting it into the jars[287] and then transferring them to an already boiling hot canner-pan[288] containing just two or three cups of water. Cover the canner (or saucepan) immerse your already hot canning jars in its steam for about five minutes and then shut off the heat. After another two or three minutes take off the pan's lid, perch an ice cube on each of the cans' lids, and look to see if their contents boil. If "yes" the jar is sealed.

Since my first-attempt string bean pickling demonstration/experiment had worked out so well, I then decided to see if I could preserve edible "weeds" that way as well. This involved stuffing pint canning jars with blanched[289] dandelion leaves, radish bulbs along with their greens, and zucchini stalks[290], adding three tbsp of vinegar, one packet of Splenda (I like my pickles sweet) and 1/4 tsp salt before nuke heating followed by steam-canning.

Canning done in this fashion is simple, quick (completed within ~15 minutes),   and reliable - the jars always seal.

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[287] If you don't preheat the food before putting it into the canning jar, its bottom is apt to crack when It is then put into the canning pan/pot's boiling water. If you have only one jar's worth of stuff to can, you can pack it into the jar, fill it with water/vinegar, etc. up to within an inch of its top and then microwave (nuke) for about two minutes per pint.(if you don't add lots of water, the jar's bottom will likely crack/break off).

[288] A tall saucepan will do fine. The jar(s) within it should be perched upon several canning lids, screen, etc., to assure that their bottoms don't overheat/crack.

[289] Blanching means immersing leafy matter in steam or boiling water for a minute or so to kill bugs & inactivate enzymes. In this case the primary purpose served is to render it much easier to pack the stuff into jars.

[290] These turned out to be a real hit – chopped into short (~1/4 wide sections) they made a nearly perfect sandwich relish made with the most productive parts of my tiny garden's most productive veggie.

Incidentally, my weed pickling experiments as well as several others performed with other veggies (e.g.,) all worked OK because their sweet & sour products admirably served their intended purposes - brightening up[291] the taste & texture of this cookbook's bluegill patty, ersatz "braunschweiger, chicken sausage, etc. sandwiches while adding some vitamins, antioxidants, etc.

Figure 46 steam canning

Unlike numerous experiences with pressure cooker-type canning, I rarely experience "failure to seal" with boiling-water type canning. The probable reason for this is that during too-rapid pressure cooker cooldown (I'm naturally impatient), the jars' contents' temperature become too much higher than that of their surroundings causing them to boil which forces grease, etc. out between the lid's elastomeric seal and the jar rim. Cure? When pressure cooker canning, let it cool off naturally - don't blow air on it or flood its lid with tap water. Finally, some folks are much more adventurous than I am spice-wise – cloves, allspice, sugar, pepper(s) etc.— almost anything goes in pickle-making --- be adventurous!

[291] Adds a nicely contrasting texture and taste along with some vitamins, minerals, antioxidants, etc.

Tortilla/taco fixin's

Masa

Masa is an already-cooked nixtamalized corn flour[292] that can be made from the dehulled corn kernels described in this book's "unit ops" section by adding more water and a bit more lime and to the dehulled/cleaned-off kernels and reheating to a near-boil for about an hour after which that water is also poured off and the-then-sufficiently swollen-up kernels rinsed again. After adding a bit of salt (about a half tsp/2 cups of the original corn kernels) the wet/swollen kernels are ground with your grain mill (meat grinders don't work very well for such things) to make masa – a stiff dough consisting entirely of corn that's been rendered sticky enough to hang together when rolled/pressed out to a desired, usually round (tortilla-like), shape. It can be used immediately or covered/wrapped to prevent dry-out and stored in your refrigerator for a week or two. If you would rather make/store/use your own commercial-like dry DIY masa, your now wet/swollen nixtamalized corn kernels must be first dried by baking them at about 200°F on a cookie sheet and then finely ground.

However, I've discovered that it's much more sensible to forego masa-making altogether – see the next section. Commercial masa is far more expensive than is your DIY "tortilla fixins" - WALMART'S cheapest masa is 6 times and my local Whole Food Market's 15 times more costly than is a feedstore's shelled field corn.

100% corn (traditional) tortillas

(657 kcal/17 g protein) 100% corn (traditional) tortillas are very thin, unleavened, nixtamalized-corn "pancakes" that are often fried but may be baked (this recipe's products would already be cooked) or wrapped around or placed under fillings which combination is then cooked up together, e.g., tamales or corn-based "lasagna ".

While most of the recipes I've read/seen/tried for homemade tortillas call for commercial or homemade pre-prepared masa , making them as follows is much quicker, more reliable, and apt to produce a more nutritious product[293].

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[292] The other "corn flour" is simply fine-ground raw field corn - pick out any sticks, bug parts, rocks, and especially scary-looking weed seeds or off colored corn kernels before grinding it. Baking the raw kernels for a half hour or so in a 300°F oven renders grinding easier and imparts a pleasant nut-like smell/flavor to the flour. To make your own "self-rising corn flour" mix one cup of it with ¼ cup white flour, one tablespoon of baking powder, and 1/2 tsp of salt. Doing so will reduce its cost relative to similarly labeled commercial products by an order of magnitude (GOOGLE it) and likely produce more nutritious products because most commercial corn meals, masas, and flours are made with "degermed", not whole-corn kernels.

[293] The reason for this is that no part of the corn kernel is discarded and 100% of the calcium employed to nixtamalize it is retained - not poured off along with "hull goop". It's safe to do so because nixtamalization's reactions neutralize the strong base that makes it happen. I've checked this out many times – the final food product (tortilla, hominy, etc.) invariably possesses a pH under that of the tap water that had gone into it. Corn starch or white flour will also neutralize any free hydroxide in solutions that they are boiled in.

To one cup of water that has been brought up to the boiling point in a stainless steel or Teflon/Magic Ceramic-coated aluminum saucepan, add one cup of your homemade corn flour (~140 g) and one level tsp each of super salt (or more/less to taste)

Figure 47 Corn tortillas

and builder's lime. Immediately cover the pan and turn the heat down "low" or put it into a double boiler (I often use my hominy pot) – the object is to keep the mixture hot enough to quickly nixtamalize the corn flour[294] but not boil away the water. After about 15 minutes, the mixture becomes a tough, rubbery, dough that's easy to work with. Cool it a bit, split into 6-10-portions, and then pack/roll them into dough balls which you then squash/flatten-out into

Figure 48 (left) freshly stomped wheat flour/EVBG and (right) 2:1 corn/soy flour tortillas

[294] Calcium hydroxide (slaked lime) and boiling hot water will quickly nixtamalize fine-powdered but not whole-kernel corn.

tortillas. You can also wrap up your dough lump in plastic to prevent moisture loss & store it in the refrigerator where it'll safely keep for at least one week.

Let's assume that you wish to make 6 good-sized tortillas. To make them, smear a bit of EVBG over your piece of plastic film, place one end of it grease side up onto one of your boards/tiles, weigh one sixth of your cooked masa[295] put one of your dough balls onto it, fold the other end of the plastic film over it grease side down[296], put the other board/tile on top, and press down upon it to squash the dough ball to a five-to-seven inch diameter, 2-to-3 mm thick tortilla. If the dough is tough, put the whole assembly on the floor and step on it - I do it that way most of the time because it's easier/quicker.

You can either immediately fry, nuke, or otherwise cook them after flattening or scatter corn flour over/between them to prevent sticking, cover with plastic film to prevent dry-out, & store the stack in your refrigerator..

Figure 49 Smoky chili bean enchiladas

Tortillas made this way are already "cooked" but rather soft/fragile. That makes them fine as is for making enchiladas comprised of corn masa tortillas filled with something nutritious, covered with a savory sauce and eaten with a knife/fork or spork (Figure 49). If you want to make something that you can pick up with your fingers (taco) – you'll have to toughen them up a bit more by either frying or nuking (microwaving)them for 60-90 seconds. If you decide to fry

[295] The simplest/quickest way to do this is to subtract the weight of the empty pan from that of the pan plus cooked dough, divide that number(X) by six (or whatever), and split that dough into 6 (or whatever, e.g., X/6-gram) mini doughballs.

[296] Once so greased, the same piece of plastic film will press well over a hundred tortillas without sticking.

them, it's best done one-at-a-time on a smoking hot[297] frying pan or griddle liberally lubricated with EVBG.

Corn/soybean tortillas

If you plan to make a tortilla-based dish that doesn't include something "proteinaceous" like beans, cheese, eggs, or meat, you can "balance" it

up by adding soybeans to the tortillas themselves. To do so just replace ~one third of the corn flour in the above detailed recipe with gently baked soybean flour.

100% Wheat flour tortillas

My initial attempts to make full-sized wheat flour tortillas failed because my doughs were far too rubbery/stretchy. Since my pressed-out dough balls always quickly shrank back to form too small, too thick, & too tough "flap jacks", I'd mistakenly concluded that supermarket flour tortillas must be made of an especially low gluten flour & flattened by world's strongest man contest finalists. However, a bit of internet research and experimentation revealed the "secret" of making them - simply add some EVBG or other solid shortening to your flour/water dough mix[298]. I've found that the weight-wise proportions of their ingredients (all-purpose flour/water/EVBG/salt) should be on the order of 1.0:0.5:0.15:0.02.

Here's an example recipe scaled to make three, seven-to-eight-inch diameter, wheat flour tortillas.

Put your frying pan onto a stove burner, wipe a bit of EVBG over its bottom, and turn the burner on "high". Quickly mix together one tbsp of EVBG, ½ tsp of super salt, 100 grams of all-purpose enriched white flour, plus 50 grams (50 cc) of water & knead the resulting "stiff" dough" for about one minute - no more . Tear it into three pieces, roll each into a ball and then flatten one of them to a 7-to-8 inch diameter tortilla in the fashion described above (put the dough ball between greased sheets of plastic grocery bagging, sandwich it/them between a flat/smooth board and either another board or a smooth clean floor, and then stomp on it- see Figure 48). Since your frying pan should have become hot enough by then, peel your raw tortilla off the plastic film and slap it into that pan[299]. While it's cooking, stomp out another dough ball, flip the one in the frying pan over to cook its other side & when it's also done, replace it with your second tortilla. Repeat until your batch of dough has become a stack of tortillas.

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[297] "Smoking hot" both because it's quicker and the steam immediately created when the wet dough hits the pan tends to poof the tortilla up a bit rather than leak away.

[298] Most of the internet's "flour tortilla" recipes include baking powder - it's neither necessary nor desirable – we're trying to make tortillas, not pancakes.

[299] Flour tortillas can also be nuked for about 45 seconds each – doing so poofs them up more than does pan frying.

Tortilla thingies

About the quickest way that you can put together something that is both nutritious and tasty is to sprinkle shredded cheese over a raw or pre-fried tortilla, shake some salt over it, and then nuke (microwave) it for about 45 seconds. They are great either as-is or smothered with salsa, chili, sour cream, peanut butter, chicken nacho/taco filling (see below), or hot pepper sauce (kids are apt to want their hot pepper sauce diluted with lots of ketchup).

They can also be jazzed up with almost anything else that sounds or tastes reasonable to you & yours – ground sausage, pieces of bacon, hot dog slices, any sort of chopped peppers and/or onions, etc., etc.

Another fabulous tasting & nutritious creation consisted of 2-3 tbsp of gelatinized chicken bone paste/broth smeared over a tortilla after which that combo is "nuked" for ~45 seconds.

Substituting peanut butter or this book's soy butter for the chicken bone paste is apt to be perfectly satisfactory to most of your customers. Sprinkling a few soy nuts over any sort of "nut" butter will render it even better tasting.

Here's another suggestion: press a tortilla down into a small bowl, break an egg into it, sprinkle on some salt, pepper, hot sauce, shredded cheese, or whatever, and then nuke it for about one minute.

Tamales

Tamales are thick-walled tortilla-dough "sacks" stuffed with almost anything (e.g., various meats and/or beans and cheese or the higher calorie version of this book's "bean dip"), wrapped in a corn leaf and then steamed.

Enchiladas

Enchiladas are corn tortillas wrapped around some sort of filling, covered with a savory sauce, and then baked. Their fillings can consist of almost anything including meats, cheese, beans, potatoes, vegetables, or any combination of them. The sauces used to cover them including chili-based sauces, such as salsa roja, salsa (either home-made or commercial), almost any kind of "moles" (sauce), or cheese-based concoctions such as "chile con queso" (chili with cheese). Become creative.

Taco chips

These are handy sized/shaped pieces of baked or fried all-corn tortillas generally eaten with some sort of sauce, melted cheese, or dip.

They represent two of my great successes - even my wife likes 'em, especially the deep fat fried ones. To make them add an inch of two's worth of EVBG to a saucepan & put it onto a hot stove "burner". Cut your tortillas into strips, squares, triangles, or whatever other shape that meets your fancy. When the grease gets almost smoking hot, dump two or three tortillas worth of pieces into it and cook for 3-4 minutes. When they are done (golden brown), remove the now-crisp chips with a slotted spoon or whatever, dump them onto a paper towel-covered plate, and add another batch of raw tortilla pieces to the cook pot.

To make the almost-as-tasty but-not-so high calorie (less fat) baked versions, brush your tortillas with EVBG on both sides before cutting them, put the tortilla pieces onto a lightly greased cookie sheet, sprinkle them with salt, and bake for about 20 minutes at 400°F.

Either of them taste great as-is but are even better smothered with some sort of dip, salsa, or whatever else you/yours feel that "nachos" should include.

DIY fake Fritos.

Since I like any kind of corn chip & and am especially fond of Fritos, I had to see if I could come with a cheaper version of them too.

At that time (10Sep2022) the chips within a "big" (9.25 ounce) bags of Walmart's Fritos would have cost me 42 cents/ounce -the Walmart soybean oil, super salt, and feed store purchased corn required to make one ounce of the following recipe's little gems cost me 1.8 cents.

Mix 1 cup cornmeal with 2/3 c boiling water, add a level tsp of salt. place the dough in a ziplock baggie, cut a pencil sized corner off the bag, and then squirt 2" long sections of the dough into a saucepan containing an inch or greater depth of smoking hot soybean oil & fry them until dark/crispy-brown. These "chips "don't taste[300] exactly like Fritos – they're better - & are especially nutritious if you dip them into something proteinaceous like this book's Ersatz peanut butter or one of its other soybean-based dressings or dips.

Vegan tortilla stuffing

Here's a nice tasting tortilla stuffing that also makes a nice DIY Frito or taco chip dip.

Dehull one cup each of soybeans & corn kernels. Mix them together in a good-sized boilpot, cover with about two inches of water, cover the pot, bring it to a boil and then turn the heat down and simmer for at least two hours adding water as necessary to keep the grain kernels covered. Blenderize about two thirds of it and add it back to the boil pot along with 1 heaping tbsp. each of powdered red pepper, cumin, garlic, and onion plus 1 level tbsp. super salt.

I like to intersperse this stuff with 2 or 3 raw tortillas, nuke that stack for 2-3 minutes, and eat it with a mix of ketchup and hot sauce. It's also great tasting mixed with about twice its volume of boiled hominy

Corn Belt tortilla stuffing

Dehull/cook 1 cup of dry soybeans as described in this little tome's unit ops section. Grind the still-wet soybeans with your grain[301]r or meat grinder to make a granular (coarse) bean paste.

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[300] I suspect that the reason that they don't taste exactly like Frito-Lay's Fritos is that even though also French fried, they're only about 10% by weight fat vs ~35% fat.

[301] loosen up your grain grinder's grinding plate –the goal is a coarsely granular, not smooth, paste

Add an 8 oz package of your homemade chicken sausage, 1 heaping tbsp. (tablespoonful) each thyme, cumin powder & red pepper (or cayenne pepper powder or chili powder), & 1 tsp (teaspoon) super salt (and/or anything else you might like including chopped up carrots, sweet peppers, onions etc.), two tbsp. of vinegar , and one 6 oz. can of tomato sauce (4 oz. of any kind of tomato ketchup or tomato paste is OK too). Cook 'til nice & thick & serve with a big plate of home-made tortillas or corn chips.

Chicken nacho/taco filling

(I'm assuming one pound – two ziplock-type snack bags - of this book's chicken sausage - scale up or down according to how many people you wish to delight)

Saucepan-brown (caramelize) about 50 grams of chopped onions in a tablespoon EVBG & then stir in your sausage along with two or three blenderized tomatoes (or three tsp of tomato paste or ketchup), & a tablespoon each of ground oregano, and cumin.

Corn belt "lasagna" options

This dish consists of multiple layers of raw tortillas sandwiched with a pasty mixture of either dehulled, fully- boiled soybeans or soy cheese (tofu) curds combined with tomato sauce, paste or ketchup, super salt, spices, thin sliced carrots and chopped onions, molasses, soybean sprouts, etc., topped off with shredded cheese & then baked.

Proportions based upon 2 cup's worth of corn or wheat flour-based tortillas (roughly 20 of them)

- one cup of dry soybeans dehulled & boiled until tender or the "cheese" curds made from one cup of soybeans (see Soy milkne cup of shredded "hard" cow milk-type cheese or two of cow milk-type cottage cheese
- one medium-sized (~230 g) chopped-up onion
- 2 or 3 thin sliced medium sized carrots
- two 6 oz cans of tomato sauce or 6 oz of tomato paste or ketchup plus 1/2 cup water

either

- (Mexican style - made with 100% corn tortillas) 2 tbsp each of molasses and cumin powder, 1 tbsp powdered red or cayenne pepper or an equivalent amount of Mexican hot sauce (you can decide what "equivalent"' means -it's just another matter of taste) plus 1 heaping tsp of super salt.

or

- (Italian style - made with wheat/corn flour tortillas or long/wide homemade pasta noodles) 2 tbsp. each of molasses, oregano, basil, and cumin powders, plus 1 tsp super salt.

Blenderize the tomato sauce/paste/ketchup + water, molasses, spices and boiled soybeans - if it's too dry to blend properly, dribble in water until you can. Cover the bottom of an EVBG-greased baking pan (a square cake pan works fine) with raw tortillas, spread some of your tomato /soybean, molasses/spice…etc. paste over it/them, sprinkle with some of the chopped-up veggies & cheese, add another layer of tortillas, sauce, cheese, etc., etc., Finish-up by covering the pile's top with the last of the sauce and cheese. Bake until it looks "perfect "(roughly 45 to 60 minutes at ~375°F).

Option: for an even "healthier" version of this stuff, substitute homemade tempeh or short-term-sprouted (1 to 2 days) soybeans for the raw ones.

Iowa/Missouri/Italian Lasagna Noodling

(22/23Jan22 brainstorming) Made some **"Iowa/Missouri** (where the chicken probably came from) **/Italian**[302](where my pasta machine had been made**) "lasagna"** with homemade soy flour enriched noodles.

I'd run out of gently baked soybean flour so to speed remanufacture, I stovetop roasted a cup of soybeans with a tbsp of EVBG. It took only about 3 min to nicely brown them for subsequent quick/easy grinding.

Figure 50 Marcato's handy dandy lasagna/spaghetti extruder

Mixed 240 g white flour+ 60 g of my brand-new gently baked soy flour+ 150 g water+ 1/2 tsp super salt +1 tbsp EVBG. Kneaded for 2-3 minutes (you want this sort of dough to become "tough") & then divided & rolled to form a dozen ~1 inch diameter "marbles". Pasta maker (or rolling pin) rolled/flattened them into ~2 inch-wide, ~6 inch long, ~ 1/16" thick "noodles".

302 Rumor has it that Italy is Iowa's southeasternmost county. Because its soil is apparently too poor for raising soybeans & corn its unfortunate inhabitants have had to fall back onto sun-bathing, touristry, opera singing, and pasta machine/movie/wine/fast car manufacturing/drinking/driving, to make their livings .

Then I nuke-thawed (microwaved) one ziplock bag (~8 oz) of chicken sausage & broke it up into a 2-quart saucepan along with 3 tbsp vinegar, one finely chopped celery stalk & 80 g chopped raw onion, 150 g ketchup, 2 tsp each thyme & oregano , & 1 tsp Super salt. Cooked/stirred for a couple minutes & then layered up a stack of interspersed noodles, meat etc. sauce & shredded cheddar cheese layers in an EVBG-greased cake or bread pan sprinkled some rosemary (the spice) over the top & baked at 350°F for ~35 minutes

It was OK but too "dry" because my sauce wasn't wet enough to rehydrate the raw noodles baked-up with them. To fix I could either 1) add more liquid (mostly or 100% water) to the meat/ketchup/veggie/spice sauce mix (about 192 g to fully rehydrate [303]), or 2) boil the noodles before "assembling."

Recommended recipe (scale up/down as required)

The next morning, I applied yesterday's "lessons learned" to create Figure 51's perfectly nutritious and delicious foodstuff assemblage. Key changes/improvements included a higher proportion of sauce & cheese to noodles and boiling the latter before stack assembly.

Raman/oriental-style noodles[304]: 120 g white wheat flour, 30 g gently baked soy flour, 75 g water , 1 tsp each EVBG- & super salt, knead about three minutes, pasta machine rolled ~1" "marbles" of the resulting stiff dough to lasagna noodles which were individually fed into rapidly boiling water, cooked for about five minutes, & then drained.

Sauce: 4 oz chicken sausage, one chopped-up celery stalk, 1 tsp super salt, 1 tbsp each of dry granulated onion , thyme,& oregano, 100 g water, and 150 grams of ketchup, saucepan-cooked up together for about 3 minutes.

Layer-up your boiled noodles with this sauce and ~6 oz of shredded pizza-type cheese in an EVBG-lubed, 8-9" diameter, cakepan and then bake at 350°F for 25-30 minutes.

[303] How much extra water? I made up a smaller, 67 g, total batch (same proportions) of those noodles & boiled 'em. Their fully hydrated post cooking weight was 110 g which means that properly implemented lasagna-making with my 300 g "raw" noodle batch would have required the addition of another 300/67*(110-67) or 192 g of water to its sauce**.**

[304] Homemade Italian-style differs from ramen/oriental-style pasta in that hens' eggs replace the water and a good deal of veggie oil (ideally "extra virgin olive oil") is usually also added. Since eggs are about 76% water, it takes about 1/0.76 or 131 grams of eggs (~two large eggs) to replace each 100 g of water.

Figure 51 Optimized cheesy noodlestuff

These super nutritious lasagna-type noodles are also fine-tasting simply boiled and eaten with butter, salsa, spaghetti sauce, melted cheese, barbecued tempeh, butter, lard, shredded cheese, or any kind of gravy***.***

Demystified Home-Made Ramen Noodles

Since I consider Ramen noodles to be the world's most nearly perfect "pasta", I decided to see if I could come up with something even cheaper than is the stuff that US supermarkets and Dollar stores sell us megatons of every year.

For some reason or another- maybe its foreign-sounding name (***Maruchen***) - I went into this project thinking that Ramen noodles must be made of rice flour. However, about ten minutes worth of research (noodling?) beginning with reading the nutrition information on the side of the commercial stuff's package, revealed that they surely consist almost entirely of the same sort of white wheat "bread" flour as do most of any US supermarket's bakery offerings.

Here's how I came to that conclusion. The package's total net product weight (mass) was 85 g including (my measurement) 7.5 g of salty, meat bouillon-like, stuff within a flavoring sub-packet. It's supposed to provide 2 servings each of which provides 25 g of carbohydrate, 7 g fat and 5 g protein and 1.92 g of sodium. Ramen weight = 77.5g (85-7.5), total protein = 10 (5*2) g, total fat =14 g, total carb =50 g, total "salt" (NaCl) = 1.92*2*(23+35.46)/23= 9.8 g; % noodle protein = 12.9% (10/77.5) According to the FDA's Food Data Central's tables (FoodData Central (usda.gov)) "*Flour, wheat, all-purpose, enriched, unbleached*" (**FDC ID:** 789951) contains 13.1 wt% protein, 73% carbs, and 1.5% fat.

Since "*flour, wheat, all-purpose, enriched, unbleached*" is a fairly cheap readily available flour almost everywhere here in the USA and 13.1% ≈ 12.9%[305], I decided that it must be the major component of those noodles.

A bit of hands-on experimentation with EVBG, Walmart's "Great Value" house brand all-purpose enriched white flour, Des Moines tap water, and fine-ground super salt revealed that a weight wise proportional ratio of 50 (flour):22 (water): 12 (EVBG or veggie oil) was close enough to perfect. To duplicate it, dump those ingredients in those proportions into a mixing bowl, stir them up together, and then knead the resulting stiff dough for 2-3 minutes. Done!

I've found that substituting corn flour for one quarter of the wheat flour works fine too as does leaving out the EVBG and compensating by raising the dough's water:flour ratio up from 0.43 to 0.50. The reasons for doing the latter are 1) that I consider EVBG to be too "special" to waste on something as mundane as ramen and 2) fat-free noodles are both less uselessly calorific (~2.5 vs ~3.3 kcal/gram) and a bit tougher, which makes them even better because it's easier to achieve "al dente perfection" rather than "tepid flaccidity" when cooking them.

To turn your dough into ramen or vermicelli-like noodles, tear/roll it up into ~1 diameter balls[306] and then either flatten each out to a thickness of ~1 mm (a bit under 1/16") with a rolling pin and then knife-cut into same-width noodles or do the rolling/cutting a bit more quickly with a begged/borrowed/bought or scrounged "pasta machine" (see Figure 50 Marcato's handy dandy lasagna/spaghetti extruder (see Figure 50).

Ramen noodle, onion, & chicken-stuff Delite™

Here's a recipe for and picture of one of the zillions of the possibilities with the above-described super simple/quick/cheap homemade Raman-type noodles (its quantities assume the same 84-gram (almost three ounce) single-serving-sized,) noodle batch described above - scaled up/down proportionate to your needs. For example, to make yourself one pound (454 grams) of dry ramen noodles, multiple each of the numbers you see above (50/22/12) by 454/(50+22+12) . Another thing you might consider is adding spices that complement whatever you want to do with your noodles. For instance, to make up your own "*real chicken ramen main dish*" (i.e., a pound of ramen stewed up with one or more chicken quarters), adding some powdered garlic & sage to the dough makes good sense.

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[305] That's close enough for an ex-government worker.

[306] Unless you are built like a bull gorilla, rolling a big batch of low-fat pasta dough out to the proper thickness is almost impossible. However, lots of people apparently manage to do so by letting their freshly kneaded dough ball "relax" long enough to get over some of its kneading trauma (they're the YouTube cooks with Pop Eye-like forearms). Since I've become too old and weak to do things that way, I roll out little dough marbles instead.

Figure 52 Cooked, Marcato-machine cut (left) and raw, knife-cut, ramen noodles

Dump your freshly cut noodle dough into 5-6 times its weight (mass) of rapidly boiling water, continue to boil for about three minutes, add one tablespoon of dried onion powder or granules, a half teaspoon each of ground black pepper and super salt, and two ounces (a quarter of a snack-sized ziplock bag) of either chicken bone paste or whole canned chicken, give it quick stir,   cover the pan & shut the heat off. Everything will have become nicely married together ("done") by the time it's cooled down to the point that anyone could eat it – another 5-10 minutes. If you want to start with fresh/raw chicken instead, slash the raw pieces up to speed cooking, and boil/simmer them for at least 45 minutes before adding your noodles.

"IA Poutine" (Ramen with sour bacon-soymeal gravy

(Makes two 355 kcal, 26 g protein, 13 g fat each servings)

This was inspired by a tv cooking show featuring one of Canadian cuisine's greatest hits, "poutine"—a hefty-sized heap of French-fried potatoes and cheddar cheese curds smothered with brown gravy. That stuff looked and sounded so good that I felt compelled to see if I could come up with a knockoff consistent with this book's themes. My first decision was to substitute DIY ramen for the Canuck's no-redeeming-nutritional-value French fried potato substrate.   The next was to forget all about cheese curds because I'd run out of soybeans again & therefore couldn't make a tofu-type substitute. The final decision was to render its "gravy" nutritious as well as delicious by compounding it with bacon grease-fried soymeal and onion seasoned with soy sauce, vinegar, cumin, and, of course, super salt.

Procedure: Stir together a Ramen-type pasta dough consisting of 150 g all-purpose flour, 90 g water and ½ tsp each of garlic powder and super salt, knead it for about two minutes, tear it into five or six lumps, roll them in corn flour, rolling-pin roll each of them out to make "tortillas" with thicknesses of about one millimeter and then knife-cut into ~3/8 wide noodles (right side Figure 52)

Figure 53 My first poutine knockoff with optimized pasta-eating utensil (DIY spork)

Next, fry two thin-cut slices of bacon (roughly 60 grams) to a crisp in a good-sized frying pan, add a heaping tablespoon of onion flakes to the hot bacon grease and, after they've become well browned (which will only take about one minute), stir in one-third cup (about 50 grams) of soymeal and brown it as well for another 2-3 minutes. Add three cups of water and, after it's come to boil, stir in your noodles, cover the pan, turn down the heat and simmer for another 15 minutes or so[307]). Add three tablespoons of vinegar, one tablespoon of soy sauce, a heaping teaspoon of cumin powder, recover the pan & resume simmering for another 5-10 minutes or until your fabulously nutritious brown gravy noodle sauce looks something like Figure 52's right-side PIC . Done!

PS this turned out to be one of my greatest hits: my wife opined that while my noodles were still too tough, "*the sauce was pretty good*" (I then had to go ahead and ruin everything by saying that she'd just admitted that soybeans were edible)[308].

[307] "Or so" means for whatever it takes to cook them which depends on up how thick they are which of course is another variable with rolling pin-rolled anything. – it's things like this that makes cooking as much an art as a science.

[308] When I asked one of my Canadian friends about poutine, he said "*Yes Darryl, my wife and I treat each other to poutine once or twice a year. Too rich to eat too often*". My reply was," *Yeah but just think about how much more nutritious it'd be if that greasy old cow cheese were to be replaced by tofu & the French fries with low fat genuine Canadian-corn hominy. Hell, then you could have it every day for every meal & be both "greener" & super patriotic as well*."

"Iowa's DIY super healthy whole grain flake/nut cereal"

(This recipe makes about 10 oz of "breakfast food" containing ~224 kcal/and 8 g protein per two-ounce serving)

A trip last year to a nearby (Pleasant Hill) Hy Vee supermarket to get some of its then-advertised 99 cent/pound chicken breasts, revealed another "special" running on 12 oz boxes of Kellogg's corn flakes –"only" $3.29 ($4.38/lb.) Since corn flakes don't contain much of anything but field corn[309] which was then worth about 9 cents/pound ($5.30/56-pound bushel) to the farmers producing it, I decided to see if I could come up with something else that an especially caring, & smart-enough parent might feed their kids for breakfast.

Figure 54 DIY mostly-corn flakes before and after being "flaked"

It's considerably more nutritious than are commercial cornflakes or most of your supermarket's other breakfast cereals because it contains whole soybean flour, lime[310], and molasses as well as 100% of the nutrients within the original corn kernels. Also in my opinion, except for shredded wheat, "Grapenuts", and Cheerios, it tastes better than any of the commercial cold

[309] Smithsonian channel 's "inside the factory" documentary about the UK's cornflake industry revealed that the commercial version of that much valued added foodstuff consists of whole corn kernels with a bit of added sugar and salt and then , " *first, steam cooked, then partially dried, then pressure rolled into flakes which are then tumble toasted for a few seconds within a rotating*, *zillion(?)-degree oven*."

cereals that haven't been candied-up with nuts, honey, chocolate chips, or "natural" or otherwise sugar glazes. It also doesn't contain "unnatural" preservatives, gluten, "untreated" GMOs, or high fructose corn syrup. Also, unlike most supermarket cereals, in a pinch it could serve as your only foodstuff for a few months without serious consequences. Of course, it's even more nutritious & tasty when either doused with soy or cow's milk plus some sort of sweetener or stirred up with sweetened soymilk yogurt.

Recipe: Mix up one and three fourths cup of homemade corn flour, a third cup of baked soybean flour, 1/2 tsp each super salt and builders' lime, one tbsp molasses, with about 2 cups of water - your goal is to produce a wet, easily spreadable dough/batter which characteristic will depend upon the amount of water added and how finely you've ground your flours. Dump your batter over a lightly oiled/greased "tin" or dry Teflon-coated cookie sheet, shake the pan to spread it out evenly and then oven-bake at 400°F until your sheet of baked wholesome whole grain stuff is dark brown-colored, cracked, & brittle. Take the pan out of the oven, let it cool a bit , peel off the cereal sheet, put it into a big ziplock bag, and then smash it up into pieces - if they're big, you are making "flakes", if small, "nuts". Keep them in your refrigerator within the ziplock bag, sealed jar, or Tupperware-type container.

An equally good tasting, even easier to make (you don't have to grind the soybeans), and maybe even "healthier" (more protein) version of this culinary masterpiece can be made by mixing a cup each of DIY whole-corn flour and soybean meal with water, molasses, super salt, and mason's lime as described above and then baking/breaking it up in the same fashion.

Greatest ever cheap granola

A recently inherited[311] remainder of a box of old-fashioned Quaker oatmeal and some rather stale-smelling, 2-3 year old, sunflower seeds inspired me to combine them with some "big" chunks, kitchen strainer sifted, out my sack of soybean meal to make some granola. The following recipe worked like a charm - a great snack either by itself or added to some other sort of breakfast cereal.

Spread 30 grams of soybean oil mixed with 135 grams of SBM "chunks" over one end of big cookie sheet, spread the sunflower seeds (also 135 grams) on its other end & popped it into a 300°F oven. The remainder of the oatmeal (140 grams) was spread over a second cookie sheet and it was put into the oven as well. While they were both baking, I added 1/2 cup of water to 60 grams of white sugar in a saucepan, put it onto the stove & heated it with stirring until the stuff had turned into a medium viscosity syrup. After the SBM/oil, oatmeal, and sunflower seed had finished baking for ~thirty minutes, both cookie sheets were removed from the oven, the toasted oatmeal dumped onto the stuff on the other sheet, a half tsp of salt scattered over the

[311] When her husband was diagnosed with celiac disease, my wife's sister decided to clean out of her cupboards of anything that may have ever been exposed to wheat which meant virtually everything that wasn't hermetically sealed up in an unopened can, jar, or sack. That's how I ended with bits and pieces of lots of food-related goodies that I'd never buy myself.

pile and then the hot sugar syrup was dribbled over while everything was vigorously stirred---the object is to wet everything with the syrup. Finally, the cookie sheet was popped back into the oven for another ten minutes worth of baking.

Super Hi Fiber breakfast cereals

There are lots of other especially nutritious and tasty (roasted nut-like flavor) cold cereal possibilities that are at least as good for you as any of your supermarket's ~$4 to $5/pound "Fiber One" real or cloned cereal offerings.

The first, simplest, & highest fiber example of them is made by adding a bit of salt to the fibrous residue (okara) filtered/squeezed out when you've made yourself a batch of soymilk, spreading it out on a cookie sheet, and baking it for an hour at 300°F. Done!

Frankly I love that stuff because it's tasty, super nutritious[312], easily/quickly made, and not particularly "fartlich" because the raw soybeans' RFOs ended up in its milk, not its okara.

The second is made by stirring in the same weight of DIY corn flour as that of the dry soybeans that had gone into making the soymilk, adding a half teaspoon each of super salt and mason's lime per cup of corn flour, enough water to make a batter that's easily spread over a lightly EVBG-greased cookie sheet, baking it for an hour (or a bit more), cooling & then breaking the cereal slab sheet into nuts and/or flakes in the same manner described for "Iowa's DIY super healthy whole grain flake/nut cereal". The FDA's composition data combined with the fact that okara typically accounts for ~20% of the weight of the soybeans going into it, suggests that 100 grams (3.5 ounces or 2 ½ of the often recommended, dry cereal serving size) contains about 27 g protein, 16 g fat, 12 g digestible carbohydrate, 51g of "edible fiber" (indigestible carbohydrate(s)), and 293 kcal which makes it an exceptionally nutritious, low calorie, super high fiber, breakfast treat.

[312] Generally, okara contains about 50% dietary fiber, 25% protein, 10% lipid, 4% low molecular weight carbohydrates and 4% mineral ash (listed composition figures vary substantially because it's made from a variety of soybean subspecies by different people utilizing differing techniques Isolation and Structural Characterisation of Okara Polysaccharides - PMC (nih.gov)).

Figure 55 Baked 100% okara (no corn flour or molassas) breakfast cereal

If you find even this version to be a bit too "healthy" tasting (too dry/fibrous[313]),   dilute the okara with more corn flour/molasses/ builders' lime/super salt and water before baking & breaking - it'll still be cheap, tasty, unusually nutritious as well as easier to convince your loved ones to consume lots of it.

Corn breads[314]

US style main dish Chicken & Corn bread "stuffing"

This masterpiece consists of chunks of corn bread mixed with spices, canned or fresh chicken meat, celery, onions, carrots, super salt, and water mixed-up and then baked together

First, let's make its cornbread (59 g protein, 1980 kcal). Put 1.5 cups each home ground corn flour and general-purpose wheat flour, ½ tsp super salt, 1/3 cup sugar, 1 egg, 3 tbsp. EVBG, 2 tsp of general-purpose baking powder and about one cup of milk into a pan or bowl & mix for about one minute   (you want to end up with a fairly thick, pancake-like batter). Pour it into a well-EVBG-greased, shallow baking pan or dish, and then bake in a 400°F oven until its surface just begins to brown up. Remove it from the pan, cool it, and break it up into roughly one-half

313 It may be possible to overdo "natural fiber" consumption. Rumor has it that twig-eating is likely what killed two of the 1960's most famous health food gurus, Adelle Davis and Euell Gibbons.

314 To learn everything that you need to know about southern cooking, see https://www.lanascooking.com/

inch size pieces, add a big (roughly one pound) onion's worth of chopped onion, 2-3 chopped carrots, 2-3 chopped celery stalks, a .tbsp. each of thyme and sage, one tsp of pepper plus another half tsp (or more if you wish) super salt. *Gently* (don't scramble your corn bread back into corn meal) stir in a pint jar of your canned chicken plus enough water to thoroughly moisten everything. Regrease your shallow baking pan or dish, dump in your dressing-chicken mixture, and then bake it for about a half hour at 400°F or until its top begins to brown up a bit.

(The same stuffing mix sans the added chicken works fine as a roast whole-chicken/duck/ goose/turkey stuffing. In that case you might want to double-up on your corn bread batch and bake half of it in muffin tins to serve separately with butter, EVBG, gravy, margarine, or whatever else sounds great.

Corn pone

Corn pone is another variation on cornbread made without eggs or as much sugar and either baked-or fried as individual-serving-sized biscuits. Expert foodies insist that they must be made of a special cornmeal that's difficult to find outside of some of the South's richer metro areas. If you want to get it anywhere else, Amazon's shareholders will be delighted to have its employees send you ten pounds of " *Homestead Gristmill Stone Ground White Cornmeal - Non-GMO, Chemical-Free Finely Ground Corn Meal- Long Shelf Life - Made in The USA* "- for *only* $24.89 plus S&H (~100 times what it would cost you to make yourself from feed store-purchased corn kernels). Its main difference from a standard yellow supermarket cornmeal is that it's made of a finer-ground white corn - basically the same mix of corn flour and corn meal you would get by hand-grinding your own corn except not-so- nutritious because the commercial stuff was almost surely made of <u>degermed</u> white corn kernels.

Old fashioned corn dodgers

Corn dodgers are another low cost traditional Southern-USA foodstuff.

An internet search will unearth lots of recipes for them, the majority of which describe fried or baked corn biscuits, but the most original being boiled cornmeal dumplings served with some sort of "greens" usually turnip tops & stems cooked together in the same pot. To make that sort of dogers start by boiling up your greens with plenty of salt and a healthy dollop of EVBG. About 45 minutes before serving, make your corn dodgers with…

❒1 cup finely ground white cornmeal

❒1 teaspoon salt

❒¼ teaspoon ground black pepper

❒2 tablespoons finely chopped green onion or one tbsp of onion granules

❒4 cups of "pot likker" - the liquid that you've boiled your greens or whatever else you decide to fix in

Mix the cornmeal, salt, pepper, and onion in a medium-sized bowl. Add your pot likker, starting with about 3/4 cup to make a dough that's stiff enough to easily hold together. It should be a bit thicker/stiffer than corn pone dough and much thicker/stiffer than a typical corn bread batter (any boiled dough should be moist throughout, not "soupy").

Roll 2 tablespoon chunks of the dough into pieces about twice as long as they are wide.

Bring 3 cups of your pot likker (veggie or whatever other sort of broth you happen to have) to a boil over medium high heat in a saucepan, drop in your dodgers and lower the heat to a simmer. Cook slowly until they're done through, about 30 minutes, turning them over a few times.

True Grit's fabulous corn dodgers[315]

The heroes and heroine of those greatest of all "western movies" (*True Grit*), Rooster Cogburn, Mattie Ross, and Texas Ranger LaBoeuf, fed themselves with 175 of these calorific little gems while chasing down Ned Pepper & and his gang of thieves and murderers.

To make 'em, flatten out the same little wads of dodger dough described above but deep fat fry them in EVBG or soybean oil rather than boil them.

"Open face sandwich corn slabs"

(how's that for a catchy name?) ~200 kcal/6 g protein each

Since I'm a lover of open face-type sandwiches, for the sake of both this book and variety, I decided to come up with a corn-based replacement for the wheat-based buns, muffins, biscuits, or breads that I usually make my sandwiches with. This recipe makes seven ~4-inch diameter, ~7/16 inch thick tasty/crispy corn bread-like slabs (pones?) just tough enough to serve that noble purpose - regular corn bread isn't. Cook up a mixture of 280 grams (two cups) of your homemade corn flour with a teaspoon of lime and ~310 grams (1 1/2 cups) water in a tared (preweighed) covered double boiler pan for about one-half hour. Remove that pan from its "steamer", let it cool a bit, put it back onto your kitchen scale, add 90 grams of white flour (about 2/3rds of a cup), two teaspoons of baking powder, one teaspoon of salt and enough water to bring the pan's content's weight up to ~700 grams. Stir that dough up together and then press ~100-gram lumps of it into seven roughly 3/8" thick, four-inch diameter, "cookies" onto an EVBG-greased cookie sheet. Put that cookie sheet into your oven, set it to 400°F and 25 minutes, and then go find something else to do while perfection is happening.

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[315] According to some of the internet's recipes, lots of people these days might be referring to these little gems as "Johnnycakes" rather than "dodgers". In that case you should serve them up with butter and maple syrup instead of sweat & saddlebag dirt.

Panfish cookery

Frying

Figure 15 depicts the most popular way of cooking Iowa's ultra-cheap high protein panfish - mostly some sort of "bluegill", the most plentiful of which around here are "green sunfish" . Just "bread" your scaled/beheaded/degutted victims with wheat and/or corn flour (some folks prefer "straight" corn meal or corn starch) plus super salt and put them into your smoking hot, heavily EVBG-lubed, deep-dished frying pan and cook 'til golden brown on both sides. Do not fillet them[316] or cut their fins off[317].

Figure 56 The traditional & darn good way of cooking Iowa's panfish

Incidentally, during the summer, I do most of my frying with an electric frying pan out on my patio because doing so simplifies cleanup and keeps the heat & smells outside. The first footnote accompanying Figure 39 gives a downside of doing that here in DesMoines having to do with its least fussy nocternal food critics.

Boiled panfish cookery

(19 g protein and 100 kcal per 100 grams boiled fish meat) Several other excellent ways of preparing them involve first boiling them and then removing their bones and fins. To do so bring a quart (or liter) water to a boil in a good-sized saucepan, add 3 to 6 (~400 g total)

[316] I usually don't fillet panfish - especially small, flat-configured, ones like bluegills or crappies because it's too meat-wasteful - rather like killing a buffalo just to eat its tongue.

[317] One reason for not removing a panfish's dorsal, ventral, and tail fins while "cleaning" it is that they are more easily removed along with their underlying, sharper & potentially more dangerous internal spines after it's been cooked which, in turn , renders eating them less "risky". The other is that like almost anything else that's been breaded, salted, & deep-fat-fried, fish fins are crispy, tasty, and loaded with "energy" (calories).

panfish (bluegill, perch, crappie, bass, or catfish, etc.), and then cook them for 3 or 4 minutes (a “quick boil”) after the water has begun to boil again. To debone them, dump the fish into a strainer perched over a big bowl or another pan[318], flood the pan with cold water, pick one of the fish up, dig the tip of your index finger into its back behind its dorsal (top) fin/spines and then scoop forward to remove them. Repeat

Figure 57 plateful of quick-boiled, deboned “Iowa lobster”

with its bottom/belly/ventral fin/spine combo, and then peel the meat off both sides of its spinal column and ribs (see Figure 42). Once you get the hang of it, deboning a sunfish this way is quick (under 30 seconds), simple, & easy.

Iowan “Lobster”:

This stuff is the quick-boiled bluegill (or crappie or perch or smallish bass) described above. Pick up a forkful, dip it into melted butter, fry sauce, or mix of ketchup and tabasco and/or horseradish and/or soy sauce and/or either “Miracle Whip” or this book’s “Miraculous WIPP”, close your eyes & think “lobster” before scarfing. It tastes about the same, is equally nutritious, and doesn’t impact the environment or your pocketbook like consuming a real “water bug” does.

Bluegill Burgers & Nuggets

This experiment/recipe was inspired by a desire to make something that my grandniece who seems to want nothing but chicken nuggets & ketchup might like. These thingies are

[318] The purpose served by this step is to isolate/save the bone/scale-free fish-boil-water (”stock”) for subsequent use in chowder – if you aren’t going to so-use it, just put your fish boiling pan into the sink and flood it with cold water.

Figure 58 bluegill burgers/nuggets 1st recipe (left), 2nd recipe (right)

different-sized (little =-"nuggets", big = "burgers"),- deep-fat- fried, patties consisting of Figure 57's boiled, deboned, bluegill meat mashed up with an egg binder, super salt, and pepper, breaded with a mixture of corn and wheat flours and then deep fat fried.

This first recipe makes six "quarter pounders": mash together ~425 g deboned boiled panfish meat, 50 g flour, one large egg, 1 tsp each of super salt & black pepper . Dump ~88-gram gobs (~one sixth) of it onto a plate containing a mix of 40 g each all-purpose flour and homemade corn flour with 1 tsp each super salt/black pepper[319]. Squash 'em down to form ~4" diameter patties, flip 'em over to bread both sides, scoop them up with your spatula, and then deep fat fry in smoking hot EVBG and/or soybean oil 'till golden brown. Sandwiched within a toasted homemade "English muffin" (see Figs. 24-25) & spiced up with ketchup or Fig 31's "Miraculous Wipp" and/or a few slices of pickled anything (see Figure 44) – these fish burgers will be the "*best you've ever had*".

Second Recipe: A downside of the above-detailed recipe is that its burger/nugget mixtures are "fragile" meaning that a good deal of their binder flour detaches during deep fat frying and therefore quickly gums up your precious fry grease with black particles. Consequently, I now make them by 1) adding 1% as much super salt, 10% as much corn flour and & 20% as much all-purpose wheat flour to the fish and then kneading everything together into a stiff dough by hand. Eighty-gram gobs of it are rolled in a mixture of all-purpose wheat flour, super salt, and an andouille spice mix (e.g., equal amounts of red pepper and powdered garlic), flattened out to form 4-inch diameter patties, and then pan fried in smoking hot EVBG and/r soybean oil. Taste-wise they're a close *second best you've ever had* but more than make up for it by being a heck of lot less messy to make and less sinfully calorific to consume because they won't absorb nearly as much fry-grease (a typical batch made with 400 g of deboned blue gill meat graced

[319] To most grownups, the same andouille spice/salt mix used for "blackened bluegills" is even better tasting.

me with seven, 80 g crispy-cooked burgers each of which provided ~20 grams of protein, ~17 grams of carbohydrate, ~5.8 grams of fat, and ~220 kcal…see right side of Figure 58.

Both recipes would work well with virtually any kind of fish you might catch and generate goodies that are simple to bag up/freeze for later consumption.

Blackened Bluegill

Recently, it seems that the best way to convince anyone that the strange-looking meat dish that you've prepared for them is "special" would be to append the word "blackened" to whatever you've decided to call it. What "blackened" should, but doesn't always mean is that a boneless chunk of meat has been dredged in some sort of tasty grease (usually melted butter), its top, bottom and sides heavily sprinkled with a mixture of salt and "hot" spices, and then fried to near-blackness (very much "done") in a smoking-hot frying pan.

Figure 59 Blackened bluegill

Of course, to me up until recently[320], that translated to making it with bluegill fillets, EVBG, super salt, and whatever spice combination happened to sound good at that time. Figure 59 is what I ended up using a homemade "andouille" spice mix comprised of a half teaspoon each of super salt, powdered black pepper, thyme, red pepper, garlic, and cumin scattered over two medium sized EVBG-wiped bluegill fillets weighing a total of 89 grams.

These little gems tasted as good as they looked (excellent!) and provided both me & my guest victims with ~19 g of well-balanced protein but also, of course, with 2-3 times as much "food energy" (calories) as the same tiny slabs would have if boiled or steamed instead.

Fish Chowders

Another way to prepare my easiest/funnest-to-shop-for Iowan commodity is to make some sort of chowder out of them.

[320] I've recently learned how to clean, catch, and cook "corn belt tuna" (the common carp) which has rendered "blackened" fish preparation a heck of a lot easier to do.

Chowder #1:

Add 1 cup corn flour nixtamalized with 1 tsp lime/1 cup water for ten minutes & then blended with the deboned fish, filtered fish-bstock boil water, and two stalks of celery, two carrots & one- half onion chopped up together. Bring to a boil and simmer for another ten minutes, add 1 tsp super salt and 1 tbsp black pepper (options: add 1 tsp powdered garlic, cumin, and/or thyme).

Chowder #2: same deboned fish in filtered fish boil-stock to which 2 medium-sized (about 275g) potatoes chopped with 2 stalks celery onion is added combo is then thickened with corn flour, salt & pepper (optional: add some butter or EVBG if you want it to taste better and don't need to worry about your waistline).

Chowder #3:

Same fish & filtered fish stock, combined with two potatoes one of which has been chunked, the other blenderized-up with milk, and two stalks of celery chopped up along with half and onion. Season with I tsp salt & 1 tbsp pepper (adding a dollop of butter or EVBG makes it even better.

Chowder #4:

Same deboned fish added to 3 tbsp flour that's been caramelized (fried 'till brown) along with a small, chopped onion in 3 tbsp EVBG, plus the filtered fish boil stock & 1-2 cups milk along with 2 medium-sized potatoes finely chopped up with celery & two carrots - same salt & pepper.

Chowder #5 (first of the corn versions):

(101 g protein 1400 kcal) Nixatamalize one and one-half cups of field corn kernels. Coarse-grind them and put them back into the saucepan, cover with water, bring to a boil , cover & let simmer for at least another half hour. While that's happening, quick boil and debone 3 or 4 bluegills (~400 g) and

FIGURE 60 Chowder number 3 (number 1 through 4 are similar)

chop up a medium-sized onion and two celery stalks. Add the water that the fish had been boiled in (run it in through a strainer to catch any stray scales or bones) along with the chopped potato/celery, and deboned fish to the boiled/coarse-ground corn. After another five minutes of simmering, add a heaping tsp each of super salt and black pepper – done!

Chowder #6:

This brainstorm came about when I was sadly looking at a big pile of the raw blue gill residue generated by filleting ten of them to make enough boneless raw meat to prepare an order of pickled panfish for my wife's sister (see next recipe). Since raw panfish filleting is so wasteful[321], on a hunch I scissored off my victims' skeletons & top/bottom and tailfins leaving/discarding their gut & head/pectoral fin combo, put the former – about 350 grams altogether -into a pot of water, brought it to a boil, and then simmered everything together for about 45 minutes. I then dumped it all into a screen perched over another saucepan and mashed the by-then softened and fully detached bluegill meat through it. This created a boneless and especially nutritious (meaty) if rather "fishy" tasting fish stock (a fish's fins are "fishier" than its meat) which was then added along with 40 grams of blender-powdered soybeans to a freshly made batch of nixtamalized field corn kernels generated from one cup of field corn, and then everything slow-cook-simmered together for three hours. That noble experiment was completed by adding a couple of small, chopped-up onions and one heaping

[321] Lots of meat will stick to an uncooked fish's bones – especially its ribs – if/when you attempt to remove (fillet) it. That same meat slides right off if the fish has been boiled, baked, or fried.

teaspoon each of super salt, powdered cumin, thyme, and black pepper and cooking for another ten minutes. It was almost the best I ever had.

Chowder # 7

Like many of humanity's other great inventions, my best-ever chowder came together by coincidence. Almost a week earlier, my wife's sister, Hollie, had contributed some store-bought hash browned potatoes to our weekly summertime around-the-swimming pool-people-feeding orgy, most of which (about two cups) were still in our refrigerator when I'd decided to boil up another batch of Iowan Lobster (Figure 57) for breakfast. Since I had noticed those spud chunks while retrieving my bluegills, when the latter were finished cooking, I dumped them into a strainer perched over another saucepan to recover its ~three cups worth of "stock". Next, I dehulled a cup (180 g) of field corn via a 15 minute, baked-out sodium bicarbonate/mason's lime/water boil down, dumped the kernels into my blender's pitcher, added the fish stock, and blended them together for about twenty seconds. That's enough blending to break up the kernels, but not pastify them. The stuff was then dumped into **Error! Reference source not found.**'s improvised double boiler, a half teaspoon of builder's/mason's lime added, and everything cooked together for about 45 minutes to soften, nixtamalize, and cook the corn. Finally, about one half of the peeled-off fish meat (I'd eaten the rest with cocktail sauce), a couple of coarsely chopped, smallish, fresh-from-my garden onions, the hashbrowns, and a teaspoon each of black pepper, super salt, and thyme were stirred in, and the combo cooked together for another ten minutes. Done!

Pickled Panfish

Pickling is another surprisingly tasty way of preparing panfish. From my point of view, its only downsides are that because the fish must be "mechanically" deboned (filleted), it's considerably more difficult to prepare than are most of this book's other panfish fixing suggestions and also wastes more of your hard(?)-earned fish meat - only ~32% of your as-caught victims will end up in the pickle jar compared to the approximately 45% you'll get if you fry or chowder them[322].

- Scale your fish (most of its skin will stay with the meat).
- Run your knife down through its back along its spinal fins/column starting at its head-end peeling the meat and skin off its rib and dorsal/ventral fin ones.

[322] For several weeks during the Spring of 2022 I converted the heads, fins, guts, and partially meat-stripped skeletons of my bluegill/crappie victims to food-for-food insecure felines by putting the stuff into a stainless steel bowl, putting that into my pressure cooker, pressure cooking for an hour, blenderizing everything to a "thin" paste, dumping everything back into the cook pan, stirring in some EVBG and all-purpose flour, reheating for a few additional minutes in the pressure-cooker, pouring it into a bread pan and then refrigerating it. It set up to a stiff, sliceable "pudding" that my neighborhood's stray momcat and her latest batch of kittens seemed to prefer over "*Meow Mix*" kitty kibble.

Your goal is to maximize recovery of two slabs of boneless meat from each fish while leaving its head, guts, fins etc. on the cutting board.

- When you've accumulated about 600 grams of boneless fish slabs, cut them into bite sized pieces, put them into a strainer & rinse with lots of cold water
- Put them into a quart jar or handy-sized plastic container, add enough cold water to just barely cover them, stir in ~¼ cup of salt, cover/cap the container, & then set it aside in your refrigerator for at least four hours.
- Dump them into back into your strainer & run cold tap water over them while gently stirring to rinse/wash away most of the salt (don't get carried away with rinsing – pickled anything is supposed to be somewhat salty).
- Dump your fish chunks back into a quart jar, add ½ cup of white sugar, ¾ cup of any sort of vinegar, two tsp of pepper corns and five tsp of pickling spice (a mixture of allspice, cinnamon, bay (laurel) leaf, coriander, powdered mustard, and dill), stir everything up together, cap/cover the jar and put it into your refrigerator.

This masterpiece will be ready to eat within a few hours and will safely keep for at least three weeks when refrigerated. Because vinegar renders anything pickled with it mildly acidic, it's reasonable to expect that it could be safely stored indefinitely at room temperature if hot pack-canned the same way that you would tomatoes.

"Corn belt tuna" (common carp) cookery

"The term "bottom feeder" has negative connotations, but carp taken from clean water are safer to eat than most gamefish because their omnivorous diet of mollusks, insects and vegetation results in lower concentrations of toxins than similarly sized carnivorous fish like bass, pike, walleyes, trout, salmon, etc..

Fried carp fillets[323]. Soak your fillets with fresh water for a half hour or so & then pat or skake "dry". To fry one of them, first score it across from end-to-end, at 3/16" intervals almost completely through to "open it up" so that more breading can adhere and everything including its Y bone fragments will cook more quickly (if your fillet retains its skin, score it from the flesh side down to the skin). For the sake of experimentation, I cut one such fillet in half after which one piece was plastic-grocery-sack "dredged" (shaken up with a powder) in a 3:1 by volume mixture of corn meal and corn starch spiced up with a Cajun-seasoned salt. The other piece was

[323] Filet and fillet both refer to a strip of boneless meat. Fillet is the more general term, while filet is usually reserved for French-derived dishes like filet mignon.

smeared with yellow mustard and then similarly dredged. After being deep fat fried to a golden-brown both were equally delicious and not at all "fishy" tasting, their fried skin & fragmented Y bone fragments contributing additional fried-breading-type tastiness[324].

Figure 61 Top & bottom views of pan-fried-with-skin carp fillets along with some soy-based ranch dressing fish-dip

Blackened corn belt tuna

These culinary delights are prepared as described immediately above except that before they are fried, the heavily/deeply scored fillets are dipped into melted EVBG and then heavily spiced with the same homemade "andouille" spice mixture that I'd dreamed up for blackening bluegill fillets.

Corn belt tuna burger…Because fresh carp fillets neither smell nor taste "fishy," finely ground carp fillets are an excellent substitute for ground turkey, chicken, or pork. To assure that their Y bones are rendered harmless I generally run them through my little grinder twice. The resulting burger (left side of Figure 61) looks like lean ground pork and sticks together so well that it can be readily molded into durable/cookable meatballs, burgers, patties,

[324] Thick, crunchy, spicy, deep fat fried-"breading" is what makes French fried (or "blooming") -onions, Kentucky Fried chicken, and Iowa's justifiably famous "pork tenderloins" so special.

or "bacon" or "jerky" strips – no eggs ,wheat flour gluten, or any other sort of binder is required.

Figure 62 (left) freshly ground carp burger and (right) pan fried, corn meal breaded, "corn belt tuna tenderloin"

"Corn belt tuna sausage"

My first batch of what (to-me) has recently become-a-staple foodstuff was made by spicing up 550 g of fine ground carp burger with a blender-powdered mixture of two tbsp (~37 g) of brown sugar[325], 1½ tsp of super salt (9.8 g), 5 bay leaves (0.7 g)[326], ¼ tsp each of thyme (0.54 g), garlic (1.5 g), black pepper (1.6 g) and 1/8 tsp each of ground cloves (0.3 g) & red pepper (0.6 g). It turned out to be "perfect" for making meat balls, sausage burgers, DIY "egg/sausage McMuffins", etc.

For example, the right side of Figure 62 depicts a pan-fried corn belt tuna sausage patty made by scattering some coarsely ground corn flour on a plate and then flattening two ounces of that sausage out to a four and one-half inch diameter, one quarter inch thick, "pancake" onto it. These things are every bit as good tasting as Iowa's famous "pork tenderloins", equally nutritious, and don't require the murder of a fellow mammal.

[325] A ten to one mix of white sugar and blackstrap molasses is a good substitute for brown sugar.

[326] In that case, I powdered up some bay leaves because I'd run out of sage – both work great. If you want to make "Italian" sausage, add some fennel seeds.

Canned corn belt tuna

To make a good tasting, equally nutritious, and much cheaper substitute for the “chicken of the sea” that your mom used to feed you, tightly stuff some half pint glass canning jars with chunks of carp fillets, add one tablespoon of vinegar, a quarter teaspoon of ground black pepper, and ~3/4ths teaspoon of super salt to each jar and then pressure can them at 10-15 psi for ~100 minutes. It’s great tasting because as is also the case with many other fish, canning carp imparts a tuna-like flavor to them. To me it’s most notable virtue is that it’s one of two of my culinary achievements that my worst/toughest critic, has asked for “seconds” of[327].

Corn belt tuna jerky

Figure 63’s tough, chewy, and great tasting jerky Figure 63 by adding a bit more black pepper & a half tsp of Wright's smoke to 300 g of my corn belt tuna sausage, splitting it into

Figure 63 Carp sausage jerky

~30 g meat balls, squashing each out to form a ~4.5-inch diameter, ~0.1 inch thick "tortilla" 'by sandwiching/pressing between a plywood board, lightly greased plastic grocery bag halves, and my kitchen’s countertop, drying them for three hours at 155°F in my electric food drier and then cutting them into ~one inch wide strips with pinking shears (scissors that cut fabric with a zigzag edge to prevent fraying)

Pickled corn belt tuna (or any other fish)

Add 2 tbsps. of salt per pound of bite size pieces/strips of water-rinsed carp fillets within a non-stick surface coated saucepan and cover with enough water to cover the fish a half inch or so deep. Stir everything together, bring its temperature up to a near boil on your stove, shut

[327] She (DeeBee Kittycat) occasionally requests another chunk of my nuke-cooked chicken quarter.

off the heat, and then let cool for a few minutes. Dump everything into a strainer perched over your sink, briefly water rinse off most of the salt along with all of the "slime ", fill a batch size-appropriate number[328] of pint-sized (16 oz) canning jars ~two thirds full with those chunks, add a teaspoon of pickling spice[329], one (or more) packet(s) of SPLENDA , a teaspoonful of pepper corns, a half cup of vinegar, and just barely enough water to bring the liquid level up to within about one inch of each jar's rim[330]. If refrigerated, it'll keep for several more weeks. It's also "safe" to water pack-can (i.e., boiling water temperature process) fish prepared in this fashion because botulism toxin-producing bacteria can't withstand acidic conditions).

Chicken cookery

Canned whole Chicken

"Whole" means that everything that you have purchased–meat, skin, and bones[331]- becomes people food. Any chicken parts or whole carcasses will serve equally well – get whatever is cheapest. In the following example, the chicken's's bones remain intact but possess a texture akin to fresh (crisp) celery, taste great, and are good for you. A straightforward way to do it would be to…

- hack the chicken(s) bones and all into pieces that can be tightly crammed into your pint-sized canning jars leaving an inch of space at the top
- add one tbsp of vinegar (any kind) and just enough water to fill the jars to within about two inches below their rims
- add a tablespoon of sage and/or thyme plus one-half tsp each of fine ground super salt and black pepper.
- put the jar lids on, screw their rings down snug but not tight[332], and put the jars along with about 3/4 inch of water into your canner. Put the lid on the canner leaving the weights off or its vent opened. Bring it to a boil and watch for steam to start coming out the lid's vent.
- Allow steam to 'vent' for about five minutes and then shut the canner's vent valve or put the canner's weights on if it's so equipped. That's when its pressure will start to build.

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[328] About 12 ounces of fish will go into each 16 ounce (pint) jar.

[329] Typical pickling spice mixture: ¼ ounce bay leaves, 2 tablespoons allspice, 2 tablespoons mustard seed,1 tablespoon whole cloves, 1 tablespoon ground pepper, and 1-2 tablespoons of ground/dried "red" pepper. r

[330] For safety's sake, the volumetric ratio of standard strength (5%) vinegar-to-water ratio must exceed 1.0)

[331] Because bones contain most of any animal's calcium and phosphorous & and young chicken bones are easily converted to a great tasting broth/stock useful for lots of things, that's what I usually do with them.

[332] Just "snug" because you want to enable the canning jars' headspace air to escape while the canner is heating up. Upon cooldown, condensation of the steam replacing that air it will suck the lid down affecting a good seal.

- Heat the canner to ~15 psi for about three hours, turn off the heat, and let it cool down naturally (this means slowly – when pressure canning anything, don't speed cooling by squirting water over the canner's top or setting it out into a snow drift[333])
- Undo the lid, remove the jars, and check their lids for good seals.

Potted chicken bone "Spam"

This tasty sandwich filling/cracker spread/gravy-making/hominy nutrition balancing food stuff (lots of "complete" protein, phosphorous, and calcium) consists of every part of the chicken you've purchased except the bulk (not all) of its flesh and loose fat[334] consolidated to a spicy/delicious/nutritious paste - it's a meat-type "whole food". The way that I make it is to cut off most of a ten-pound bag of leg/thigh quarters or a couple of whole chickens' "easy" meat, put whatever's left into my pressure cooker, add two tablespoons of water* and then pressure-cook at 10-15 psi for at least 2 ½ hours. I then rapidly cool the cooker by running water over its lid, and run everything within it (meat, bones & liquid) through my meat grinder's finest-holed

Figure 64 bone stuff grinding & the finished product

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[333] Too rapid cooldown will prevent canning jar lids from sealing because the liquid within the jars will become sufficiently hotter than their surroundings to boil & thereby push up the lids.

[334] I usually microwave-nuke any easy to remove chunks of chicken fat & add the resulting liquified/purified oil to my EVBG stash. If my wife has decided that that it's time to replenish our "suet" bird feeder & I've got enough to spare, I boil some EVBG up with cracked corn, corn flour, and a little water and then cast inch-thick layers of it into greased bread pans. When it's cooled, the resulting cake-like solid masses are cut into squares that fit our backyard's suet feeder.

Cutting plate. After adding a tablespoon (usually) each of super salt, ground black, pepper, sage, garlic powder, fennel, anise, thyme and/or anything else that sounds good - be adventurous.

The simplest way to store this stuff is to pour it into a smoothly tapered plastic cottage cheese (or sour cream) container in which, upon cooling, the mixture will set up to form a sliceable, Spam-like solid "chunk of heaven". Other ways of saving it include pressure cooker-canning or freezing cup-sized (~ 8 ounce) gobs within snack-sized ziplock bags.

A ten-pound sack of last year's-priced WALMART's chicken quarters ($5.34) supplied me with 11 snack/cup-sized (half pound) ziplock bags of chicken sausage, nine such-sized bags of super nutritious "Chicken Spam", and another ~3 ounces of ersatz EVBG.

A typical batch of this stuff contained 58% water meaning that an eight- ounce bag (cup) of it will supply you/yours with about 80 grams of protein and 400 kcal.

Ersatz "Braunschweiger"

This stuff is basically the same chicken-based, bone paste "Spam" described above along with its liver, heart, gizzard and all, not just some of its fat – don't separate it.

Chicken Sausage

As far as your chickens' not-bony parts are concerned, I usually either bag their meat up in sandwich-sized ziplock freezer bags or coarse-grind it with salt, sage, coriander, pepper, anise, thyme, and/or whatever else sounds good at the time to make really fine-tasting sausage[335].

Chicken-soy "hamburger" patties

(makes 4-6 burgers containing a total of 1352 kcal & 162 g protein

Dehull/cook 1 cup dry soybeans as described in this book's unit ops section. Drain & then grind the still-wet soybeans with your grain or meat grinder to produce a coarse paste (the object is making a granular - not creamy-smooth - paste). Add one pint of your canned whole chicken, 1 tbsp. each powdered flax, thyme, & sage, 1 tsp each super salt & red pepper (and/or anything else you like), split into 4-6 portions, flatten to about 3/8 inch thick, and then fry in hot-but-not smoking EVBG (or lard, or veggie oil, chicken fat, or….).

Nuked chicken quarters

This is about the quickest, simplest, but nevertheless almost-greatest tasting way of fixing "chicken for one". Slash your chicken chunk(s) , sprinkle it/them with salt and black pepper, wrap with Saran Wrap or put it/them into a covered microwave pan and nuke on "hi" for about

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[335] If you plan to keep such stuff frozen for over six months, wrap each gob of it with Saran wrap before stuffing them into ziplock bags (polyethylene plastics are semi permeable to oxygen)

ten minutes per pound. If you try it this way, you'll understand why I equate eating "low on the chicken" with eating "high on the hog".

Homemade faux "pork" (chicken) sausage[336]

The recipe makes 4-5 pounds of finished sausage from 10 pounds of raw chicken (scale up/down for other-sized batches)

Cut off most of everything that's "soft" (meat, fat, & skin) from your chicken quarters, whole chicken or whatever & put it into a good-sized pan or bowl. Put the rest of the carcass(es) aside to process into a meatier & therefore even better) version of the same gelatinized bone broth described in this little books book's "canned whole chicken" recipe.

To one whole chicken's worth of readily recovered "soft stuff" add 2 heaping tbsp. ground sage, thyme, and coriander, one tbsp. each of fennel or anise (this is optional – both impart an "Italian" taste) , cayenne or black or white pepper, and either powdered or granulated garlic plus ~1.5 tbsp. super salt. Coarse grind everything up/together and then freeze ~eight ounce/one cup gobs of it in the cheap (about 2 cents apiece) little "snack" zip lock bags sold in most food and "dollar" stores.

Meaty bone broth

Add about two inches of water to your pressure cooker, dump in your "soft-stuff"-denuded chicken parts, screw its lid down, and cook for about 3 hours at 10 -15 psi, cool, put a couple cups of the broth into your blender– fill with bones & blend them together to a smooth paste, dump it into another big pan and then repeat until all of the bones and broth have been blender pastified up together. Add 2 tbsp, thyme, and onion powder plus one heaping tsp each super salt and ground black pepper, mix and then either use as-is, can, or store in the reefer for up to a week.

Best ever chicken nuggets (makes 8-10 of them)

(total of ~97g protein & 550 kcal)

Heat one inch or more of cooking fat/oil (e.g., EVBG) in a saucepan: roll an 8 oz snack-sack freezer package (one cup) of your homemade chicken sausage into 1" balls, then roll 'em in a mix of about ¾ cup flour & 1 tbsp. each sage, coriander, pepper, & salt plus half tsp baking powder to coat them well & then flatten out to about 3/8 inch thick: add enough "real" milk , buttermilk, or soy milk to the remaining dry mix to generate a pancake-like batter , dip your already-dry- mix-coated sausage patties into that batter to recoat them , & immediately deep fat fry to a dark golden brown - heavenly!

[336] If/when pork ever gets cheap enough, the same recipes/procedures apply to it as well.

Hominy-based main dishes

First, here's what a properly made batch of hominy (fully cooked/hydrated dehulled, nixtamalized whole corn kernels) looks like. It differs from the stuff sold in supermarkets and southern state restaurants in that it's yellow colored, more nutritious (a "whole" food because the kernels have retained their germ), and tastes better.

Figure 65 DIY field corn hominy

There are virtually thousands of things that you can do with it including substituting it for stuff like potatoes, rice, and macaroni when they become too boring or too expensive. Served with milk and sugar/honey it's also a fine tasting & nutritious breakfast cereal.

If you have some veggies on hand, adding some chopped onion or onion powder, and/or thin sliced carrots and/or celery[337] and/or almost any other sort of veggie to this section's concoctions is both fine tasting and nutritionally desirable.

Let's start this section off with …

Corn Belt "macaroni" & cheese

(makes about 2 ¼ quarts, 2300 kcal/72 g protein)

[337] I consider celery to be a condiment, not a veggie, because I add it to improve the taste/texture of a dish, not its nutritive value. Celery has otherwise been defined as that which you reach for whenever you feel the urge to bite into hairy water.

De-hull 2 cups of corn kernels as described in the unit ops section, put them into a >3 quart saucepan, cover them with ~3 inches of water, recover the pan, bring it to a boil, & then let everything simmer away for *at least* 2 more hours – the more the better (you want your hominy to soak up almost all of the water- it'll eventually occupy about four and a half times more space than did the raw corn kernels. Add a heaping tsp of super salt, and a third pound (or more) of any kind of cheese that you have on hand - cheddar is especially nice. Stir until the cheese is melted & well mixed with everything.

Holler "soup's on" & step back out of the way if there're kids in your house. If that's not the case then you might want to spice it up a bit more with whatever sounds good to you and/or your better half (e.g., thin sliced sweet peppers and/or carrots, mushroom, chopped onions, hot dog chunks, etc.)

Hominy, soybean, & Bacon Grease main dish

(~2090 kcal & 66 g protein)

The same hominy combo described immediately above with fine ground or blenderized boiled soybeans (dry basis; 1/2 cup beans to 2 cups corn) and 2-4 tbsp. (you decide how much) EVBG substituted for the cheese constitutes another surprisingly good-tasting and still-quite nutritious main dish. I usually add a heaping tsp of powdered garlic, black pepper, and super salt. It's also dirt cheap: assuming that its main ingredients (2 cups of field corn and one-half cup soybeans) each cost only twice today's bulk commodity price, the whole potful should cost you about twenty US cents plus the cost of the gas/electricity required to cook it (for more on that subject, see APPENDIX I).

Hominy and "soy-mushroom" main dish

If you just happen to have some refrigerator-aged tempeh on hand, this recipe is worth trying - it makes roughly 10 cups of stuff containing 1700 kcal and 67g protein. De-hull 2 cups of corn kernels as described in this tome's unit ops section, put them into a 3 quart-or-bigger saucepan, cover them with ~3 inches of water, recover the pan bring it to a boil, turn down the heat, let it gently simmer for two or more hours, and then add a heaping tbsp of super salt, an eight-ounce (snack-size ziplock bag) of refrigerator-aged tempeh (brown colored & especially "mushroomy"), a thinly sliced carrot, and simmer for at least another hour.

Hominy, hotdog, soymeal, and misc. veggie super stew

This recipe was inspired by a HyVee "special" on its cheapest hotdogs during 2022's food price tsunami – just 77 cents for eight 1.5 ounce hotdogs (12 ounce package). That price rendered them about one third as costly as that market's other hot dog-type sausages or cheapest hamburger (31August2022). According to their package's label each dog provided 100 kcal's worth of food-type energy, 8 grams of fat, three grams each of carbohydrate and protein, and 1.1 grams of table salt (about one fifth of a tsp). Since I love salt, fat , & hotdogs, it seemed to me that several of them would do a fine job of flavoring another of my super nutritious, mostly-hominy/soybean, stew-like concoctions.

To test that idea, I nixtamalized two cups (~360 g) of field corn with baked-out baking soda & builder's lime, added lots of water and another ½ tsp of lime , brought it up to a boil again on my "big" stove & then dumped everything into my slow cooker hominy-maker. After it had been simmered therein for two hours, I added 4 chopped-up hot dogs (170 grams), 25 g of finely chopped carrot, 50 g of chopped onion , 75 grams of soymeal, & let it simmer away for another three hours. I then added a couple handfuls of chopped-up purslane (about 65 grams), one tablespoon each of super salt and pepper, one tbsp of thyme, and let it simmer for another half hour to cook the purslane & finish off swelling/cooking the hominy. Done!

The resulting combination's final volume turned out to be about 1800 cc (~9 cups) and contained a total of about 1640 kcal, 44 grams of fat (3/4ths of which originated in hotdogs), and 81 grams of protein ~one eighth of which was contributed by those dogs. Taste wise it was rather disappointing until liberally sprinkled with WALMART's cheapest soy sauce after which I couldn't leave it alone (it's been tough to remain slim & beautiful while "researching" this book).

Hominy & Ham

This is another delicious way to make good use of everything within a package of ham or "smoked shoulder"[338]. Most as-purchased chunks of smoked pork are accompanied by a substantial amount of bone on the inside and tough but tasty skin on the outside. Like those containing chickens and turkeys, their plastic film packaging often contains a good deal of "juice" which should be added to whatever dish(s) you are putting the rest of their contents into. Cut the skin and most of its underlying fat off the meat, slice most of the fat off that skin and set it aside to nuke-render (microwave) into EVBG[339]. Remove the bone and put it along with the mostly defatted skin into the pot with your two cups (dry kernels) worth of dehulled corn, add water up about the two and one-half quart level, cover, bring it to a boil and then simmer for an hour or so. Pull the skin pieces out along with about two cups of the liquid, blenderize them together it for a few seconds and add the resulting paste back to the hominy pot. Continue simmering for a total of at least three hours which will totally gelatinize the skin & fully cook/swell-up the hominy. Scrape any meat still adhering to the bone into the pot, remove/discard that bone, stir in a tsp of black pepper & serve.

[338] Pork - especially smoked ham & "shoulder" -occasionally becomes quite cheap. Take advantage of those occasions, buy lots, & stuff your freezer and/or can it. Almost anything that can be done to/with chicken can be done equally or better with pork. Since first "discovering" this tasty concoction, I've learned that substituting soybean meal for about one half of the ham/shoulder makes it taste even better, increases its nutritional value (more protein), & of course lets you make about twice as much of it per dollar.

[339] Spread pieces of ham fat onto your microwave oven bacon-cooking dish & nuke them to brown crisps. Serve the crisps as if they were bacon bits and add the resulting delicious smoky/salty grease to your ESBG stash.

Hominy & chicken "super natural health stews"

When doing any the following hominy-chicken stewing exercises, you might want to add a half cup's (original dry basis) worth of sprouted soybeans ~15 minutes before you take the pot off the stove - it will significantly enhance your offering's vitamin content (esp. vitamin C). Another option that always works out well is adding an half cup's worth (dry basis) of dehulled/boiled soybeans to your pot along with the chicken.

- ***First option***: Dehull 2 cups of field corn, cover the thusly treated kernels with about three times their volume of water, bring it to a boil and then simmer for at least three hours. if you didn't decide to coarse chop/grind them up. Add soybean sprouts made with a half cup of a couple of dry soybeans, a couple of thin-sliced carrots, some - see Figure 66 - half of a chopped-up medium-sized onion and/or celery stalk r a heaping tbsp. of dried onion powder/granules,[340] a heaping tbsp. each of dried sage & thyme powders, a heaping tsp of super salt , and a half pint of the canned gelatinized meaty chicken bone paste ("broth") described elsewhere. Mix and cook for another 10-15 minutes. Done!
- ***Second option***: dehull 2 cups corn and one half cup of soy beans put both into a 3 quart (or bigger boil pot) add one 8 oz pkg of your homemade faux pork (chicken) sausage, or bone paste 1 heaping tsp. salt, 2 tbsp. onion powder & one chopped -up medium-sized carrot, put about one third of it into your blender's pitcher, add two cups of water, blenderize it, return to the pan and add enough water to cover everything ~two inches deep. Cover, bring to a boil, turn down the heat and simmer it for at least 2 ½ hours. Done!
- ***Third (simplest but not quickest) option***: After nixtamalizing two cups of raw field corn, add the kernels plus 4-5 cups of water and one raw chicken quarter to your "big" saucepan. Bring it to a boil, turn down the burner, cover the pan & simmer for at least two more hours. Add a chopped-up medium-sized onion along with its white/ green stems if you have them and a couple of similarly chopped carrots and celery sticks and then simmer for another half hour or so. Finish by adding a level tbsp each of thyme, super salt, and black pepper plus whatever other spice sounds good to you before serving.

[340] This is a wintertime-type stew – if fresh veggies are plentiful and cheap, add more of them.

Figure 66 Hominy, soy sprout, & chicken DeLite...

- ***Fourth & final option***: The day after I'd invented my own "liquid smoke", I Saran-wrapped and microwave-cooked (13 minutes) another chicken quarter for lunch. After consuming most of its meat, I put the residue (skin scraps, bones, & the stuff left on the microwave oven's glass turn table dish - melted fat & juice) into my blender's pitcher, added a cup of hot water and blenderized everything up together for 2-3 minutes. The resulting mess was then added to a pot of hominy I'd previously made with two cups of whole corn kernels by pouring it through a kitchen strainer to retain its biggest bone fragments. A cup of soymeal and another two cups of water were added, and the combination simmered together for another hour (the hominy wasn't yet fully cooked) after which I added a chopped-up medium sized onion, a cup of chopped purslane, a heaping teaspoon of super salt, and a level teaspoon of DIY liquid smoke oil. Finally, another ten minutes of simmering generated yet another especially nutritious example of culinary perfection (about 13 g protein and 220 kcal/cup) .

Iowa's own "shell pasta" & meatballs (makes about 2 quarts, ~2200 kcal, 146 g protein

Prepare your whole food "spherical shell pasta" (hominy) as outlined in the "macaroni" & cheese recipe. A good tasting and nutritious sauce to pour over it can be made of an eight-ounce package of your homemade chicken sausage that's been first fried up along with a large chopped-up onion in a tbsp. of EVBG , and then smothered with two six-ounce cans of tomato sauce and a half cup of vinegar in a saucepan. After your sauce creation has had about ten minutes worth of simmering on the stovetop, add a tsp. more/less of super salt, two heaping tbsp each of oregano and basil and a dash (or as much as you feel is advisable) of cayenne pepper or paprika. Add some ~¾ inch diameter meatballs made/rolled from another eight oz. package of chicken sausage mixed with a raw egg (or not if you don't have any), and simmer everything together for another half hour or so. Pour your "pasta" into a sieve or colander to drain off the water, dump it back into the hominy pot and pour your sauce/meatball combo over it. Done.

Optimally Proportioned Soymeal/Hominy Vegan Stew

(13 g protein and 197 kcal per two-cup, 5 cent, serving)

Figure 67 depicts my first "perfectly proportioned" corn/soymeal vegan concoction (the ratio of raw soymeal to corn (146 g/355 g) that went into it match those appropriate for APPENDIX XII's 20-year-old, 70-kilogram food consumer). The absolute amounts of both were scaled up by 30% so that I'd end with ~5 quarts (ten servings) of people-food. Its fabrication involved…

- Dehulling 355 grams of field corn as described in "unit ops"
- Adding about two quarts of water to the cleaned-off corn kernels, putting that pot back onto the stove, turning its heating element up to "high", & bringing the pot's corn/water contents back up to boil.
- Bringing another 2½ quarts of water to a boil in another saucepan
- Turning my slow cooker/crockpot to its "low" (or "keep warm") setting, dump 190 grams of SBM, one teaspoon of slaked lime, and the pot and saucepan contents into it.
- Stretching a plastic bag or SARAN WRAP over the top of the slow cooker/crockpot, readding its lid, and then covering/insulating it with a towel.
- Letting it simmer overnight, removing the towel, lid, and plastic bag/SARAN WRAP, add one or more finely chopped-up carrot(s), one chopped up celery stalk, giving it a quick stir, replacing the lid, and then letting everything marry-up together for another ten minutes.
- Done.

Figure 67 Perfectly proportioned vegan stew

Spice-wise, anything goes. I like it with just a bit of super salt, black pepper, plus a few drops of either commercial or this book's DIY liquid smoke scattered over & stirred into each bowlful. A tablespoon of DIY soy butter or any kind of peanut butter along with some salt per serving is also great. Sprinkling a few crunchy soynuts over it renders it even better tasting.

If you want something that's more "Mexican", add some chili pepper(s) and/or powdered/granulated onion or garlic and/or powdered cumin, and/or jalapeños, and/or thyme, and/or shredded cheese and/or crumbled-up taco chips …whatever. Be creative.

Another 100% veggie stew

Procedure: Dehull 2 cups of field corn and ¾ cup of soybeans as outlined in this book's ops section. Put the corn into your hominy pot, cover with two inches of water, bring to a boil, cover, turn down the heat, and simmer for at least two hours. While that's going on, drain your soybeans, add two tsp. of super salt & swirl them to mix everything together. Dump them onto an EVBG greased cooking sheet, spread 'em out, put the sheet into your oven & then bake/broil your soy nut halves (cotyledons) until hey are brown but not black. Dump them into the hominy pot along with the corn, add one medium sized chopped up onion, one thinly sliced carrot, a heaping tbsp. of curry powder, two or three tablespoons of blackstrap molasses, and two or three medium sized thin sliced or chopped potatoes, recover with water and simmer for another half hour or so. Done! (this stuff is especially nice served with cornbread muffins).

Cold hominy/soybean salad

This recipe assumes that you've already sprouted a half cup's worth of soybeans.

Dehull 2 cups of corn and put it into a >3-quart boil pot saucepan**,** add a heaping tbsp. of flax seeds and cover with two inches of water, put the lid on, bring it to a boil and then simmer for at least 2 ½ hours. While it's still hot, blenderize about one third of it and then add it back to the pan along with your soybean sprouts, two thin sliced medium sized carrots, a fine chopped medium sized onion, two or three chopped celery stalks (or a tbsp. of celery seed), a fine chopped sweet pepper, ⅔ cup of vinegar, a heaping tsp of super salt and three tbsp. of sugar or packages of low-cal sugar substitute. Serve cold with lots of salt-roasted soy nuts.

Hominy & salt roasted peanuts (2270 kcal, 70 g protein)

A super simple, nutritious, & surprisingly tasty way of serving hominy is to boil up hominy made with two cups of corn with about 1 heaping tsp. of super salt and ~ ¾ cup of shelled, roasted, peanuts. To give it a nice creamy texture, dump about one third of that concoction into your blender, blend it to a paste & mix it back into the rest.

If peanut butter happens to be cheaper than whole peanuts as it often is for some mysterious reason, make that substitution. Alternatively, peanut butter can simply be added to a dish of pre-prepared hominy & that combo nuked for a minute or two.

Hominy & salt-roasted soybeans (soy nuts) 1820 kcal/66 g protein)

(assumes hominy made from 2 cups (~360 g) of field corn)

The surprisingly tasty results of my hominy roasted peanuts/peanut butter adventure prompted a test of the same combo with salt-roasted soybeans substituted for peanuts. Adding boiled soybeans that haven't been roasted first creates a dish that, to me anyway, requires the addition of something else to make it more interesting.

Try out one of the following - you'll probably like it - both create a somewhat higher protein/lower fat analog of my hominy/peanut combo.

Anyway, to create this culinary adventure you can either …

Option one Boil/dehull one half cup dry soybeans as outlined in "unit ops". If they aren't fully hydrated yet (i.e., the centers of each bean-half still look darker than its surroundings), boil them for a few more minutes.   Dump your still wet dehulled beans into a strainer or colander to drain, add about one tsp of super salt, & swirl to distribute it evenly

Spread them over an EVBG-lubricated cookie sheet & then bake at 350°F until brown but not black (check frequently and stir 'em around each time youdo).

Dump them along with about one third of your boiled-up hominy along with the water it was boiled in into your blender's pitcher & then blenderize it for a few seconds. Dump it back into the hominy pot, cover everything with water, bring it back up to a boil again and simmer for another 15 minutes or so.

or

Option two (quicker/simpler)

(This makes a two-quart 1850 kcal, 66 g protein, main dish-sized batch - scale up/down as needed)

Nixtamalize two cups (~360 g) of field corn as described in this book "unit ops" section, add two quarts of water and another teaspoon of builder's (slaked lime) to the corn's cleaned-off kernels, cover the pot and put it back onto the stove to simmer for at least three more hours if you hadn't decided to coarse grind 'em, two hours if you did.   While that corn is being turned (simmered) into hominy, put one half cup of clean, dry, whole soybeans and a tbsp of EVBG into a saucepan and stovetop-heat them until the beans have taken on a distinctly brownish "cooked" color (typ. 3-4 minutes). After they have cooled off a bit, dump them into your blender's pitcher, rinse the saucepan with ~¾th cup of water and dump it into the blender too. Give it 10-20 seconds worth of chopping/blending and then set aside while you chop one big carrot[341] into smallish slices. When the corn is about done, add your blended-together pan fried/roasted bean-water paste and carrot chunks to the hominy pot along with two tsp super salt and one tsp ground black pepper. After another 15 minutes or so's worth of stovetop simmering you are done!

[341] This is a 'winter' recipe assuming that veggies are too expensive & that you haven't bothered to sprout some soybeans – you can also add as much of anything else you wish to these sorts of concoctions.

Option three (quickest/easiest)

Stir 8-10 tablespoons of Ersatz peanut butter into hominy made from two cups of field corm.

Incidentally: any of these combos are especially good tasting with some homemade salsa dumped onto them.

Hominy and "Tempeh Ham" stew (`1800 kcal/66 g protein

This recipe assumes that you've already made some chopped-kernel hominy from two cups of corn kernels and tempeh made with one half cup of soybeans (that's a single snack-sized ziplock bag of tempeh). Break the tempeh up into individual bean cotyledon-sized pieces over a small microwave oven-compatible plastic or glass bowl, sprinkle 1 tsp salt, one half tsp ground black pepper, and two tbsp. of liquid smoke over it, nuke it for about a minute to speed up "soaking" and then set it aside for at least 15 minutes (the longer the better).   Dump the spiced-up tempeh along with a chopped-up medium onion and two each, celery stalks and carrots into your hominy pot & boil/simmer for at least another ten minutes. Add salt & pepper to taste & you're done. (If you like smoother/creamier stews, blenderize about one third of it and then add it back to the pot. If you'd like a "hammier" taste add a big dollop of EVBG and a few drops of "liquid smoke"- doing so improves the taste of almost everything and assures that you & yours won't become too skinny.

If you don't really care about emulating "ham" (willing to settle for just a slightly piggy taste), simply add a broken-up snack bag of tempeh to your boiled chopped-kernel hominy, cook/simmer them together for an hour, add the chopped-up onion and celery stalks and carrot, a tsp of super salt & DIY "liquid smoke" to taste,   & then boil/simmer for at least another ten minutes. Done.

Chili opportunities for excellence

Low cal/low fat/high protein super tasty Hollie chili clone

Last year my wife's sister, Hollie's prize- winning "real" chili had come in 2nd place in an open-to-all-comers DesMoines chili cookoff losing out to a male (of course) "cheater" who'd substituted chunks of a local restaurant's barbecued rib meat for the ground beef within her and every other "honest" contestant's entries. Hers of course included lots of nice, tasty/greasy ground beef (hamburger), soft boiled red kidney beans, onions, boiled-down tomato juice, salt plus the usual array of chili-type spices (mostly cumin & red pepper) plus a hint of something new to me in that context – cinnamon with just a trace of chocolate. Delicious. .

The following describes my attempt to emulate her prize-winner in a manner consistent with this book's themes – low saturated fat, relatively low calorie, high protein, <u>and</u> super CHEAP provided that the beans and corn going into it don't cost over twice what US farmers were paid for producing them.

It differs in one key respect from most of this book's other bean/corn recipes in in that both the corn and soybeans are pressure-cooked, not just boiled, to render my imitation masterpiece's bean/corn lumps as soft as were the kidney-type people-food beans in Hollie's real-world masterpiece.

I started off by sodium carbonate/lime nixtamalizing 1 cup of field corn kernels in the bottom half of a stainless-steel double boiler –one half cup of soybeans along with and a cup and a half water were added to the top pan. After about 45 minutes' worth of stovetop simmering, the corn kernels and beans were dehulled - repeatedly mashed/settled/washed/rinsed off, more water added to each & another half tsp of builder's lime added to the corn/water[342], the double boiler reassembled, put into my 15 quart All American no-gasket pressure canner along with another cup of water, its lid clamped down, and the whole assembly put back on the stove & brought up to/maintained at ~15 psi (about 250ºF) for about one hour. Upon canner cool-down the hulls and cooking water in the upper double boiler pan containing the now fully cooked/hydrated beans were discarded[343], the fresh water rinsed , the beans dumped into a tared bowl, weighed (223 grams) and then combined with the corn along with one cup of Hollie's leftover& volunteered Campbell's tomato juice (240 g, 50 kcal).

Figure 68 Ersatz Hollie chili

[342] Lime added in this manner is totally neutralized by subsequent cooking reactions with corn, beans, wheat flour etc. Its purpose is to enhance your offering's calcium content which likely also frees-up trace nutrients such as Cu, Zn, Mn, Fe and Ca that would be otherwise complexed by any remaining phytic acid.

[343] Water in which whole beans have been pressure cooked contains everything originally within them that's apt to generate toxic (according to wives) gases within the lower intestinal tracts of male humans – don't "save" it unless you are female, live alone, and/or need some cheap "washable glue".

About one half of this bean/corn/tomato juice combination was dumped into my blender's pitcher, "chopped" for about 2 seconds , and then mixed back in with the rest of it[344]. Then I stirred in one, finely chopped up, celery stalk, 2 tbsp of "white" (distilled) vinegar (28g), 49 g of blackstrap molasses, 2 tbsp each of Walmart's "liquid smoke" & dried onion granules (13 g), 2 tsp powdered cumin (8 g), 1 tsp each of powdered red pepper (8 g), garlic (3 g), cinnamon (4 g), & super salt (12 g). After ten minutes worth of further stovetop simmering, the resulting/final ~6.7 cups of chili looked, smelled, and tasted like Hollie's but is rather "healthier" (contains about the same amount of protein but far fewer fat-calories (7.4 g protein, 187 kcal, and 3.4 g of fat none of which is "saturated") as well as cheaper.

Competition style vegan chili

This recipe was inspired by Hollie's (my wife's sister) mention at one of our family get togethers that she's going to win this year's chili cookoff with something even more special than her last year's entry. Since I'd already had a beer or two, I volunteered to also enter that contest to ensure that that she would claim victory over at least one additional male entrant[345]. Because I'd already invented my own version of "liquid smoke" and had also decided to stretch my remaining whole soybeans with soymeal until my wife's family's 2022 season farm's crop came in, I added some of both to this batch. Composition-wise, it's rather like my last year's ersatz Hollie chili clone but considerably easier/quicker to make.

Dehull two cups of whole corn, dump it into your slow cooker, add ½ tsp of builder's/mason's lime, 6 cups of water, cover it & simmer/cook its contents for at least five hours (or overnight). Then blenderize about three cups of your now-hominy-type corn and add it along with one cup of soymeal back to the hominy- remaining within the cooker. Add a chopped-up-together home grown, medium sized, onion and two or three medium sized, similarly sourced, tomatoes and one medium sized jalapeno pepper along with ¼ cup each of vinegar and blackstrap molasses, two tbsp each of powdered cumin and DIY liquid smoke, one tbsp each of powdered red pepper super salt, and powdered thyme, plus one tsp each of powdered garlic and "mulling spice"[346], recover the cooker & continue to cook everything together for at least another half hour.

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[344] The purpose of pastifying part of the corn/bean combo is to give it a thick creamy texture to enhance mouth feel.

[345] US cooking contest judging doesn't consider nerdly characteristics like "cheap" or "nutritious".

[346] "Mulling spice" usually refers to a commercial mix of coarse chunks of cinnamon, black pepper, cardamon, anise, cloves, and allspice – for this sort of application, I powder it with my coffee mill. It's also non-conventional and might therefore not be something that your judges consider desirable – use your judgment & don't forget that judges are bribable (I'd suggest lessons-learned focaccia & home-brewed beer.)

The resulting ~8-cup batch of what was to-me anyway[347], great-tasting chili contained ~2500 kcal and ~114 grams of protein.

Especially Low Greenhouse Gas Emission[348] Chicken-Chili

First version: This procedure generates about 2½ quarts of a fine tasting chili that is less apt to generate an awkward moments than a "regular bean" chili.

Dehull 2 cups of field corn and ½ cup of soybeans as outlined in the unit op section. Put one 8 oz package (4 oz of it would also be Ok) of your chicken sausage, one medium sized[349] chopped up onion, one thinly sliced carrot , and 2 tbsp. of EVBG into a good sized (>3 quart) saucepan & fry them up together until the onions become transparent . Then dump in the dehulled corn & soybeans plus enough water to cover everything about an inch and a half deep, cover, bring it up to a boil, and simmer for at least one hour (if the hominy swells up to the point that here's no longer any free water over it, add more). Finally, add 2 six oz cans of tomato sauce or ~4 oz (half cup) of tomato paste or ketchup, ¼ cup of vinegar, a heaping tsp each of super salt and garlic powder (optional), and two tbsp each of powdered cumin and dried red pepper powder (if it's cayenne pepper you may want to start off with just 1 tbsp.)[350]. Pour/scoop about one third of it into your blender's jar, blenderize it for a few seconds, recombine with the stuff left in the pot, stir, cover, & simmer for at least another hour (longer is fine too).

Second version:

This chili recipe makes about two quarts of chili and is quicker to put together because its corn is coarse ground which speeds cooking.

Begin by nixtamalizing/dehulling two cups of field corn. After decanting the "goop" and rinsing the kernels off, grind them with your food grinder's coarsest plate, put the resulting granular paste back into the cooking pot, add about one and one-half quarts of water, and one 8 oz/one cup package of either your homemade chicken sausage or chicken bone paste, bring it to a boil, cover, and simmer for about 45 minutes. While that's going on, chop up a medium-sized

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[347]Contest- wise, the same "cheater" won again as far as taste is concerned, this time with two entries one of which was an admittedly delicious white chicken gravy-like concoction that didn't even pretend to be a "real" chili. Hollie ended up in third place and I had to settle for an almost-honorable mention.

[348] Greenhouse gasses (GHGs) dumped into the atmosphere increase retention of the heat generated when sunlight absorbed by ground or water is degraded to heat reemitted as infrared radiation. The CO_2, methane, and organosulfides in mammalian burps & farts represent a significant fraction of total anthropogenic GHG emissions. APPENDIX contains more information about human physiology's contribution to that issue. Incidentally, we oligosaccharide and fiber (bean & grain)-eating humans are every bit as much mammals as an Iowan CAFO's pigs.

[349] For the purposes of this pamphlet/book, a medium-sized onion is ~3" in diameter and weighs a bit under a half pound (~190 g).

[350] If so-disposed (I am), you might also add ¼ cup of blackstrap molasses to your chili. That same molasses is the key ingredient of this book's tasty gingersnap cookie-wafers that should follow your chili feast. .

onion, two or three carrots, two or three celery stalks,   several small tomatoes, and an ounce of two of small "hot" peppers if you've got 'em[351]. Dump that veggie combo into the corn/chicken cook pot, add one rounded tsp each of super salt and powdered garlic, and two rounded tbsps. of powered/ground cumin – boil/cook for another ten minutes - done![352].

Recycled Chicken & Veggie Egg Noodle Environment Saver

Why "recycled? At one of my family's dinner get-togethers, my niece's fabulous tasting chicken, veggie & egg noodle recipe's creator One Hour Chicken Soup - The Amateur Gourmet had dictated that she discard her already thoroughly boiled turnips, parsnips, along with the skin/bones/gristle etc. of ~ten chicken thighs (that were supposed to be and had been boiled for three, not "one", hours), all of which detritus I nobly volunteered to recycle "*in order to help protect the environment*".

Why "environment saver"? DesMoines' municipal dump is already overloaded with discarded food which eventually ends up generating lots of "sneaky" methane-type greenhouse gas emissions apt to cause even more local tornados & derechos because, molecule-for-molecule, methane (aka "natural" or "swamp" gas) is initially ~150 times more impactful greenhouse gas-wise than is carbon dioxide[353].

Here's how I made my concoction's noodles: Mixed/kneaded a dough consisting of one cup (137 g) of all-purpose white flour, two eggs (100 grams), 1 tsp super salt, and 30 grams of gently baked soybean flour for about 4 minutes, broke it up into approximately one inch diameter balls, and then immediately (no dough "rest" period) converted them (first rolled fairly thin & then cut) into a big heap of approximately ¼" wide egg noodles with the Italian-made pasta machine depicted in Figure 50.

Cooking: Those noodles were then immediately but gradually (to keep it boiling)

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[351] a half cup of ketchup or 6 oz can of tomato paste can replace their fresh veggie versions - the tomatoes, dried powdered/granulated onions, and red peppers. Also, if you wish , a premixed chili powder can be substituted for the cumin & red pepper.

[352] This stuff would be even quicker cooking if cracked rather than whole field corn kernels were to be used but that would leave lots of rather "grainy" corn hulls in your chili. However, fiber is supposed to be good for you and the greenhouse gases they're apt to generate would eventually end up in the atmosphere anyway.

[353] "Initially" because methane has a much shorter atmospheric half-life than CO_2. Averaged over the first century, methane's impact is "only" about 20 times worse than carbon dioxide's. Neither are as "nasty" in that respect as is the nitrous oxide (N_2O) generated when farmers over fertilize with nitrogenous fertilizers. It has an estimated atmospheric lifetime of 114 years, compared with ~12 years for methane and its global warming potential/kilogram within the first 100 years is about 300 times that of carbon dioxide Glossary | DataBank (worldbank.org).

Figure 69 Environmentally correct chicken, veggie, and egg noodle main dish

fed into two quarts of boiling water, followed by Libby's recipe's discarded chicken skin, gristle, parsnips, & turnips, a single chopped up celery stalk and carrot[354], two tbsp each of powered sage, thyme, one tbsp dried onion granules, and 1 tsp each black pepper and super salt. Everything was then simmered for about 10 minutes (or all day long if you wish).

"Imitation Meat Food Products" (ha ha)

(This section's title was inspired by the one apparently dreamed up by our government's dairy industry champions for the thin-sliced, yellowish, rubbery stuff next to your supermarket's cheapest hot dogs.)

There's been a tremendous amount of research done to come up with tasty meat substitutes driven mainly by global population growth and "rich consumer" shift towards more sustainable and healthier-sounding diets. If you would like to learn more about that work, here's a not paywalled study comparing the volatile and non-volatile flavor metabolites generated in grilled meat (beef, chicken, and pork) with those of commercially available meat substitutes and traditional high-protein, mostly soybean-based foods (natto, tempeh, and tofu). Flavor and Metabolite Profiles of Meat, Meat Substitutes, and Traditional Plant-Based High-Protein Food Products Available in Australia (nih.gov) .

Anyway, starting with the "best ones", here's what I've come up with so far.

[354] This is a "winter stew" – if fresh veggies are both available and cheap enough, add more of them. DIY soybean sprouts are fine too.

Tofu balogna & braunschweiger

The pinkish sliced "meat" in Figure 70's baloney-based sandwich assemblage was sliced from a cylindrical sausage made with thoroughly pressed (almost dry), tofu curds derived from

Figure 70 (left)Tofu balogna/pickled zucchini stalk/mustard/artisanal bread sandwich makings: (right) same sausage after 3 weeks of "refrigerator curing"

magnesium chloride (driveway deicer) curdled soy milk made with 300 grams of raw Iowan soybeans meat-grinder-mixed with one tablespoon of all-purpose flour, one teaspoon of DIY "liquid smoke", one teaspoon each of super salt, red pepper, cumin, sage, black pepper,

Table 13 Tofu vs "real" braunschweiger & bologna

Lunchmeat Statistics/per 100 grams				
	kilocalories	**fat**	**protein**	**Cost***
WALMART'S ***Bar S*** braunschweiger*	281	22	9	$0.326
Bar S balogna*	328	28	3.3	$0.546
tofu braunschweiger	386	26	25	$0.039
tofu balogna.	330	20	26	$0.035
* PRICES AS OF 24jan 2023				

plus a few drops of red food dye, hand-molded into a sausage-shaped roll & then nuked (microwave cooked) for six minutes to gel-up (solidify) its wheat flour binder's starch (final weight 460 g or ~one pound). "Tofu braunschweiger" is the same thing with the addition of a tablespoon of EVBG and no red food dye. super salt, red pepper, cumin, sage, black pepper,

Table 13's figures demonstrate that making your own sandwich meat is likely worth the money (about 15 cents altogether), time (about 45 minutes), and effort that you put into it.

On the other hand, making this especially nutritious sandwich filler with something like Safeway's $2.99/14 ounce "firm tofu" would cost you far more than would similarly purchased "real" baloney. Incidentally, as is also the case with "real" baloney, reefer aging your little masterpieces (right side, Figure 70) is apt to make them taste even better.

Soymeal-based taco "meat"

While plant-based alternative meats have earned a spot on grocery store shelves, their high price points haven't won over consumers' hearts which has caused that market to drop 20% during FY 2022. The variety/novelty factor that drove their initial growth appears to have worn off. A paper [ACES News - How plant-based burgers stack up against meat burgers in protein quality (illinois.edu)](illinois.edu) recently pointed out that while veggie burger ads often promise protein comparable to their animal-based counterparts, the way that protein is expressed on nutrition labels – a single generic value expressed in grams – is misleading. That's because human metabolism requires sufficient quantities of each of ten "essential" amino acids not just "protein" and both the concentrations and digestibility of amino acids differ between protein sources. To account for those differences, a standard measure of protein quality, the digestible indispensable amino acid score (DIAAS), was developed by the U.N.'s Food and Agriculture Organization (FAO) to specifically focus upon the digestibility of essential amino acids within foodstuffs[355].

Those researchers then revealed the results of research demonstrating that two of today's best regarded veggie burgers, ***Beyond Burger*** and ***Impossible burger***, were "inferior" to real pork or beef burgers because their DIASS scores suggest that we'd have to consume about 17% more of them to meet our bodies' protein needs which, in turn, might exacerbate the terrible problems (type 2 diabetes, heart problems, hypertension, fat shaming , etc.)… that too much high calorie food is causing the free world's rich folks. They also pointed out that…

> *"This is also really important in developing countries where there may be little access to animal-based proteins, particularly for children. In some countries, a majority of children are amino acid deprived. That's extremely serious because, if children don't get enough amino acids, their brain development can suffer. It's especially important in those cases to design a strategy for getting high-quality proteins into diets for children*."

[355] DIAAS is the ratio of the digestible amino acid content in the food (mg/g of protein) to the same amino acid in a reference pattern taken from age-specific amino acid requirements. The lowest value across amino acids is multiplied by 100 to convert the ratio to a percentage. DIAAS may be greater than 100% if a particular protein contains a high amount of essential amino acids.) A protein source's amino acid profile/balance is of secondary importance to ruminants like cattle, sheep, goats, deer and camels, because the bacteria aiding digestion of food in their first stomach (rumen) can build proteins in their cells utilizing simple nitrogen compounds like urea. Further on in their digestive tract, such animals digest those bacteria and thereby produce high-quality protein from a food that might originally have contained poor or no protein. Very young ruminants, such as calves, lambs, and kids, however, need good-quality protein until their rumens develop.

Of course, what that team's spokesperson didn't mention is that those kids' food "affordability" issues would disappear if they were to buy/prepare/serve/consume whole commodity-type soybeans rather than those fractions of them employed to "add value" to a food sector businessperson's product.

For instance, as of 1Dec22 AMAZON will send you a package containing 40, 4 oz *Impossible Burger* patties for $153.22 and its same-sized shipment of *Beyond Burgers* will cost "just" $148.17 (better get your order in soon, there's only two packages of the latter bargain-brand veggie burgers left in stock!)

A 4-ounce *Impossible Burger* patty costing $153.22 /40 contains 9 g of carbohydrates, 8 g fat, and 19 g protein. A little simple math will inform anyone who bothers to think quantitively that the veggie protein within it costs 145 times as much as does that within the ~$14/bushel commodity-type soybeans from which it was likely made. This means that feeding you and your kids 17% more total protein would be a heck of a lot cheaper/easier and therefore more likely to happen if done with whole-food soybeans rather than veggie-based commercial fakeburgers[356].

Anyway, here are two of my "greatest successes" featuring the most affordable form of soybean foodstuff readily obtainable here in DesMoines, "46% protein ECS soybean meal".

#1 Soymeal "fortified" ground beef taco meat[357]

I started out by browning/frying 37 g (about 2 tablespoons) of 20% fat ground beef in a saucepan, added 37 g soymeal, cooked them together for 2-3 minutes, added some water to fully hydrate everything and squirted in 37 g ketchup along with a half teaspoon each of super salt, cumin, red pepper, and garlic, and finally cooked everything together until its consistency approximated cooked oatmeal (i.e., "perfect") which took about three more minutes. Done!

This quick little experiment made enough great tasting "meat" for two, generous-sized, wheat flour tacos both of which I immediately consumed. Later that evening I surreptitiously made a single, bigger, taco (25 g each of hamburger, soybean meal, and ketchup) for my wife which quickly disappeared without detection or complaint (another "great success").

Table 14 depicts this experiment's numbers (total of 300 kcal & 28 g protein) . Note that the soymeal supplying 72, 92, 80, & 33 % of its protein, calcium, phosphorous, and food energy (calories) respectively, contributes only ~five percent of its cost.

Table 14 Soymeal-extended taco meat

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[356] It'd take 9 grams of 36 wt% protein raw soybeans worth 0.46 of one US cent to make up for the Impossible Burger's 17% lower DIASS score. Replacing it with 117% as much "whole food" soybean protein would cost ~2.5 US cents.

[357] Any/all of my recipes featuring SBM can be implemented with either raw or gypsum/water soaked "defartified" SBM – that's another of the decisions that's up to you to make.

nutrient-contributing ingredients	grams	kcal	g protein	g fiber	g digestible carbs	g fat	g Ca	g P	cost
20% fat ground beef	37	93.2	6.3	0	0.0	7.4	0.0067	0.058	$0.41
46% protein (standard) soy meal	37	66.1	17.2	1.85	13.5	0.2	0.074	0.24	$0.03
Great Value ketchup	37	43.5	0.4	0	10.9	0.0	0.0052	0.0093	$0.05
	totals	202.9	23.9	1.85	24.4	7.6	0.081	0.30	$0.49

#2 100% vegan taco "meat"

I consider this to be one of my greatest culinary hits – it's dirt cheap, nutritious, quick/easy to make and my second toughest critic (wife) didn't even catch on to the fact that she had just eaten something mostly comprised of her home state's soybeans. It's also a tasty something to pour over a plate of corn/tortilla chips, hominy, or DIY ramen noodles.

After taring/zeroing my saucepan on the scale, I dumped in 60 grams (one third cup) of soymeal and a cup of water, covered it, brought its contents to a boil and then simmered them for about 4 minutes. I then added ½ tsp each of super salt & powdered garlic, 1 tsp each of powdered red pepper and cumin, 4 tablespoons (65 g) of WALMART's Great Value ketchup, 1 tbsp each of EVBG and 5% vinegar (the usual culinary acetic acid-in-water concentration) and cooked everything down together until their combined weight was 300 grams (total - empty pan weight) which took several additional minutes.

Incidentally, if you decide to use cold tortillas for a project like this, the quickest way to reheat/soften them is to place each of them directly onto your still hot, steaming, "taco meat" for about 30 seconds while it's still in the pan.

Reasonably good tasting fake chicken (vegan) nuggets

Whole soybean version: Dehull/boil up one cup of dry soybeans. Mix the drained beans with 4 tbsp wheat flour, 2 tsp salt, 1 tsp each powdered onions, garlic, and black pepper, and 2 tbsp commercial-type liquid smoke[358] and then run the mixture through your meat grinder's "fine" plate. Knead the resulting granular dough for a couple of minutes to develop the gluten and then roll tablespoon-sized gobs of it into balls. Flatten the balls as described above, dry coat/wet coat with same the flour, sage, coriander, pepper, salt and baking powder mixture and then deep fat fry them.

Tempeh version: Substituting tempeh for unfermented soybeans renders these nuggets a bit better tasting ("meatier") and more nutritious (much better source of vitamin B12).

Soymeal based version: These little gems are easier/quicker to make and at least as good tasting .

I simmered 1/2 cup (93 g) of soymeal in 1 cup of water for about 15 minutes in a covered saucepan, cooled it and then stirred in 1 tsp of "Wright's Smoke", 2 tbsp soy sauce, 4 tbsp all-purpose flour and 1 tsp each of powdered super salt, garlic, fennel, black pepper, and sage. I

[358] At the time that I wrote this recipe, I'd not yet come up with my DIY "liquid smoke"

then fried eleven, ~35 g ,“cookies” of the resulting “dough” in a smoking hot, heavily EVBG-lubricated, frying pan until well-browned.

total of ~44 g protein & ~860 kcal, ~50% of which is due to the grease absorbed during frying)

Figure 71 Soymeal chicken nugget clones

Like almost anything that’s been both breaded and “French fried” these nutritious little gems taste especially great if dipped into ketchup or DIY “Miraculous Wipp” and/or topped-off with any sort of pickled veggie.

Almost Vegan Salami

(1300 kcal, 75 g protein   total weight ~525 grams/18 oz)

This ersatz “salami”(Figure 72) consists of dehulled, boiled/drained soybeans, ground up with white flour, egg, salt, EVBG, ”liquid smoke”, & spices

- 1 cup soybeans (dehulled, boiled & drained)
- 4 tbsp white wheat flour
- one chicken egg
- one tbsp. each liquid smoke and EVBG
- 2 heaping tsp each, super salt, powdered/ground sage, thyme, black pepper, and garlic plus anything else that strikes your fancy: e.g.,   red/white pepper, fennel, anise, etc.

Mix everything up, fine-grind to a coarse paste, roll it up into two “logs”,   wrap them with Saran wrap, put them onto an inverted pan/ platform over boiling water in a saucepan “double boiler”, steam-cook for about 35 minutes, and then refrigerate (see   Figure 72). …

100% Vegan Salami

Same as above but leave out the EVBG & substitute 2 tbsp (~30 g) of water and a tbsp of soy sauce for the egg.

Soy burgers

(~16 g protein & 200 kcal per 100-gram "quarter powder")

1st version (ovo vegetarian & Andouille spiced) Boiled the beans for about 45 minutes before dehulling them (got 392 g from 185 g raw beans). Added one egg, 2 tbsp each soy sauce & white wheat flour, 1 tbsp Andouille spice mix[359], 1 tsp each super salt, garlic, and black pepper and then fine grind up together. makes five ~100 g burger patties. Again, spice selection is a matter of taste. I've made up these burgers with nothing other than salt and black pepper and liked them too.

Figure 72 Salami steamer

2nd version (makes five "quarter pound" soy-stretched chicken burgers[360], ~20 g protein & 250 kcal each). Started off by cooking one cup of soybeans for 45 min before dehulling after which two tbsp of water and one tbsp each of dried onion granules and corn starch were added to the drained beans and then everything stirred and heated up together until the starch had thickened up which rendered it very sticky. After it had cooled, 6 ounces of this book's homemade chicken sausage, one tbsp each of coriander & sage and one tsp each of super salt

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[359] "Andouille" spice is an un-rigorously defined mixture usually containing dried garlic, black pepper, salt, file ("fee lay"- a starch-like thickener with a fennel/anise-like taste), chili powder, red pepper, and cumin – other bayou cooking experts simply mix black and red pepper with garlic. Mine was a 15-year-old commercial mixture of unknown composition that I'd previously never found much use for.

[360] They taste like chicken burgers but only one third of their protein originated from a bird.

& black pepper were added & the resulting mixture then run through the meat grinder. ~110 - gram gobs of the resulting burger" mixture were then squashed into five, four and one half inch diameter patties which were stacked up on a plate interspersed with waxed paper separators & put into the refrigerator.

Figure 73 Pan fried soy burgers with and without cheese

EVBG fried, these patties tasted darned good on toasted DIY bread, muffin, or bun along with ketchup and a couple of pickled squash or onion slices.

3rd simplest/quickest soy meal-based version: (240 kcal, 26 g protein, and 6 g fat per "quarter pounder")

Mix 1 cup of soymeal (~160 g) with one cup of water in a bowl and nuke it for two- and one-half minutes. Let it cool a bit and then stir in a snack sized ziplock bag of this mini-tome's DIY chicken sausage (about 230 g), one egg, one tsp each of super salt & powdered garlic, and 1 tbsp each of powdered sage and coriander. Divide into five lumps, mold/press each to form a four- and one-half inch diameter, "quarter pounder", and then fry them to a dark golden brown in EVBG. These burgers also tasted darned good.

Other DIY Imitation Meat Food Product Possibilities

Both of the following are among my favorite wheat bread sandwich fillings or vegan taco/nacho/pizza toppings.

First: This stuff is fine tasting either spread or poured over hominy, homemade pasta, corn bread, or boiled potatoes. Boil-up one cup of soybeans for at least 30 minutes and then dehull them. Put them into your blender's pitcher along with 200-300 grams of tomatoes, 50-75 g of chopped small "strong" onions (or 1 tbsp dried onion powder), bring to a boil, turn down the heat, boil off most of the juiced-tomato water. Then add ½ cup of vinegar, 1 heaping tsp each super salt and powdered mustard, ¼ cup of black strap molasses) , two tbsp powdered cumin, and one tbsp each of homemade corn flour and "hot" red pepper. Continue cooking until it reaches the consistency of canned baked beans.

Second ("imitation bone paste")(920 kcal, 67 grams of protein) This recipe makes about two cups of a great tasting and super nutritious sandwich spread: Boil/dehull one cup of dry soybeans. Dump them into a bowl and add one tsp each of powdered black pepper and garlic, l/2 tsp of super salt, 2 tsp each of EVBG, powdered coriander, sage, & thyme, liquid “smoke” and Worcestershire sauce. Stir everything together and then food-grinder grind it to a coarse paste.

Goodies

Low-cal soy chocolate slushie

Dry blend 3 tbsp soybeans on “hi” for about one minute, add one cup of warm tap water and blend together for another 30 seconds or so. Let it set for about 5 minutes, reblend for another ~10 sec, wait another 5 min, reblend again and dump everything into a saucepan. Heat to boiling with plenty of stirring and simmer for about 5 minutes (again, be careful – soy milk whether filtered or not tends to suddenly boil over). Let it cool to approx. room temperature (immersing the pan in cold water greatly speeds cooling), dump it back into the blender, add one tsp cocoa powder, a shake of salt, & 4 or 5 packages of a sugar substitute, turn the blender on “ hi” and dribble in about 150 g of crushed ice (or fresh snow if it’s available) while blending for about 30 seconds.

Veggie (soy milk) yogurt

As far as I’m concerned, one of the things that makes converting soybeans to “milk” very much worthwhile is that it’s dead simple to then convert it to a very nice tasting and super nutritious variously flavored, low calorie, yogurts or “soft ice cream” clones.

To do so, add two or three packets of artificial sweetener (e.g., “Equal” .or “aspartame” an eighth tsp of salt, and two tsp of vanilla extract and/or whatever else sounds good (e.g., almond extract, maple extract, powdered nutmeg, cocoa,

Figure 74 Homemade soymilk yogurt

etc.) to a pint jar full of your milk, stir in one or two tablespoon of your favorite store-bought cows-milk-based yogurt [361](e.g., "Yoplait"),   put that jar into the same warm place that you raise/proof your homemade bread, and then leave it alone until it thickens up enough to stand a teaspoon up in (typically about 4 hours- see Figure 74).

Whipped soy cream

This recipe makes about a cup and a half of a very nice tasting cookie/cake/éclair etc. topping/filling that can also be frozen to make an equally nice tasting and super "rich", ice cream[362].

Figure 75 Whipped soy cream

Powder 40 grams of whole raw dry soybeans in your blender for a minute or two, add about one cup (~240 grams) of warm water, and blend them together for another minute. Dump the soymilk/okara slurry into a nutmilk bag (filter) placed within an empty saucepan & squeeze/filter your raw soymilk into it. Add 4 tablespoons (or more/less if you like) of white sugar, a shake of salt, bring it to a boil with constant tirring (again be careful – soymilk loves to boil over) & then set the pan aside to cool off. When that's happened, dump the stuff back into your blender, add a teaspoon of vanilla extract, turn it on "hi", and after about 15 seconds

[361] First time only - you should "seed" your successive batches of yogurt with a tablespoon or two of your last batch. Doing so works faster/better because the "bugs" in it have already acclimated themselves to soymilk.

[362] This confection has about 0.5 g protein and 85 kcal per tablespoon when whipped-up with sugar. Walmart's already whipped cream provides its consumer with zero grams of protein and ~45 kcal per tbsp. Assuming WALMART's's $10/gallon cheapest veggie (soybean) oil, 60 cents/pound sugar, and $4.58/quart dairy-type whipping cream, making "whipped cream" this way would cost you about 1/6th that much.

begin to slowly dribble WALMART'S house brand, cheap, tasteless "vegetable" (soybean) oil into its pitcher's lid opening. Quit adding oil when the stuff in the blender looks like what you see in Figure 75 which generally happens when the amount of oil added is 40 - 45% that of your sweetened/flavored soymilk.

Best-ever corn nuts

These sinfully calorific little snacks comprise well-salted, French-fried, hominy kernels much tastier than WALMART's $8/pound commercial corn nuts. The following recipe assumes that you are starting from scratch and want to make about a cup and a half of them. You will be needing your stove, two saucepans, and a strainer.

Figure 76 Mini batch of corn nuts

Dehull one cup of corn kernels as described in this book's unit ops' section. Cover the dehulled kernels with 3 inches of water, add a half tsp of builder's lime, bring it all to a boil, cover the pan, and simmer them for at least 3 hours (i.e., make hominy). Dump the pan's contents through a strainer into the sink, sprinkle the by-then-much-swollen corn kernels with a teaspoon of super salt and mix it in. Put your other saucepan on your stove, add an inch or more EVBG (or any other cooking oil/grease) & turn it "on". After the kernels in the strainer have drained for a few minutes and the oil/grease has become smoking hot , dump the kernels into the oil/grease, put the strainer over that pan to serve as a grease spatter catcher and "French fry" the kernels until they become dark brown-colored, not just still yellow[363]. Put your strainer over the cleaned/dried other saucepan and dump your corn nuts/French frying grease

[363] If they aren't crunchy enough after they've cooled off, dump them onto your microwave oven's platter and nuke them for 3-5 minutes.

onto it to save the oil for recycle . Finally, sprinkle your “nuts” with another tsp of salt and/or soy sauce and/or DIY “liquid smoke” or anything else that sounds good to you.

Recycled ham glaze cookies

During the two and a half years I’ve lived in DesMoines, Aldie’s has had roughly ten sales on lovely, ~one dollar/pound, sliced hams each of which came with a three ounce (~83 gram) foil package of powdered “honey glaze” that I’d never seen fit to use for that purpose. I recently gathered up those packages, and after looking at their labels, decided that the ”best” thing to do with their contents (a mix of table sugar, fructose, dried honey, gelatin, paprika, and “spices”) would be to make cookies. The following recipe worked like a charm.

Two packages of glaze with a half cup of all-purpose flour, one cup of corn flour, a heaping tablespoon of molasses, a half teaspoon of baking powder, and a half stick (1/8th) pound of softened margarine were put into a mixing bowl, after which ~60 grams of water was dribbled in while I stirred everything together to form a fairly stiff dough.   Heaping teaspoons (15 of them) of it dough were scattered around on an EVBG-greased cookie sheet, baked for 15 minutes in a 350°F oven and then served to my wife whose response suggested that I’d somehow created the best part of an Iowan ham - another “great success”.

Ginger snaps

(78 kcal/1.6 g protein each)

This protocol makes twelve dangerously addictive and only moderately nutritious cookies that taste even better and are more addictive when slathered with whipped soycream. Stir together 1 cup of white flour, one half cup of white sugar, three tbsp each of water and EVBG, 2 tbsp molasses, one tsp baking soda, one half tsp each of super salt, powdered ginger, and cloves. Roll into 12 balls, roll them in a 10:1 by volume mix of granulated sugar and powdered cinnamon, space them out evenly on an EVBG-greased cooking sheet, and squash them down to ~2-inch diameter wafers. Bake for 12-15 minutes in a ~375°F oven - the finished cookies become ~¾ inch larger in diameter and are nice & crunchy.

Tortilla Peanut Pie

(~700 kcal, 26 grams protein) This great tasting (to me) and seriously nutritious desert offering consists of a slightly sweetened corn tortilla crust filled with a mixture of peanuts, sugar, and egg(s). This recipe’s quantities assume a double serving-sized (small), five-inch diameter pie pan (Figure 77   next page. A nine-inch diameter pie would require three times as much of everything.

Tortilla/crust: steam a mixture of ¼ cup each of fine ground corn flour, 1 tsp sugar, ¼ tsp calcium hydroxide (builder’s lime) and 1/8 tsp ground cinnamon for at least ten minutes. Press the resulting rubbery nixtamalized corn flour dough into a big tortilla ~two inches greater in diameter than is the pie pan. Grease that pan with EVBG, press your tortilla down into it & trim off any excess above the pan’s upper rim.

Filling: thoroughly mix 2 tbsp white (or brown) sugar, 2 tbsp peanut butter (~40 g), 1 tbsp corn flour and one egg. Pour it into your tortilla crust, sprinkle it with ~2 tbsp of roasted/salted peanuts (~20 grams), and then bake for about 20 minutes in a 400°F oven.

Figure 77 Tortilla peanut pie

Churros

Churros are often called "Mexican donuts". They are generally pencil-sized (7-11 mm diameter) flour/water/sugar/salt/egg dough "ropes" deep fat fried until crunchy-brown and then sprinkled with sugar & cinnamon. A "real" churro's surfaces are ridged due to its dough having been extruded from a syringe-like gadget featuring a star-shaped nozzle to increase its surface area thereby letting it absorb more EVBG and therefore become crunchier and even more sinfully tasty. Since I don't have that gadget, am already sufficiently rotund, & don't like to buy/store more specialized kitchen gadgetry than I absolutely must, I just make them like "funnel cakes" instead - here's how:

Put an inch or two's worth of EVBG (or lard, or veggie oil, or Crisco, or…) into a saucepan, put it on the stove & get it heating up. While that's happening, mix up 1/2 cup of wheat flour, ¼ cup corn flour, 4 tbsp. sugar, 1 tbsp. (15 grams) EVBG, 1 tsp. (5 grams) baking powder, 1 tsp. of vanilla, one egg, a shake of salt, and 3 tbsp. of milk. Open a snack-sized (~8 fluid oz) ziplock plastic bag, put it still-sealed side down, into a teacup and spoon your batter into it. Squeeze out the excess air, & zip the bag shut. When your oil/grease is nearly smoking hot, cut a quarter- inch diameter tip off one of the bag's bottom corners & squeeze a "rope" of the batter out through it into the hot grease moving your hands/bag around over the top of the saucepan so that the batter/dough doesn't pile up in just one place. Your coils of "dough rope" will immediately begin to brown up nicely. After a minute or so flip it over with a long-handled slotted spoon or toothed pasta fork/server to brown its other side. When your lovely dough rope is uniformly darkish brown, remove it from the hot oil/grease & dump onto a paper towel or wire rack to cool. Squeeze another rope of batter/dough into the hot oil/grease & repeat etc., until everything has been squeezed out & nicely cooked. Heavily dust your tasty/crispy "rope pile" with a half-cup of sugar, coffee-grinder or blender mixed with a heaping tsp. of powdered cinnamon. Done!

Soy Nut Brickle Candy

(4 g protein & 135 kcal per one ounce "serving") This is another first-shot-out-of-the box success. It's basically a clone of peanut brickle with soy nuts replacing the peanuts and EVBG replacing the butter.

Start off by making soy nuts with one cup of soybeans – add plenty of salt to your dehulled beans before roasting them to a nice brown color. Put one cup of sugar and a third cup each of EVBG (in a pinch, margarine or butter can be substituted for it) and water into a saucepan and cook with stirring until the water's almost entirely gone and the resulting syrup has turned light golden brown. Immediately pour it onto a similarly greased, good sized cookie sheet and

Figure 78 Soynut brickle

immediately sprinkle your soy nuts over the top. When it's cooled off, break it up into handy sized pieces. If there's any left after you and your wife's family have "tasted" it, put the remainder into a ziplock bag or plastic storage container & store in your refrigerator.

Option: if you really want to please your troupe and hangers on, you can pour on some melted milk chocolate or even better (worse?), the same fudge frosting detailed in this book's " Most special of occasions " chocolate cake recipe.

Soymilk Ice creams

A few days ago (11jul22), I saw an ad on DesMoines "Local Now" TV show lauding the purportedly "world's most 'decadent'" , low calorie, high protein, keto friendly, ice cream clone. Even better, it cost "*under $10 per pint*"! Mr. GOOGLE then informed me That Halo Top's 47 different-flavored frozen confections are locally made[364] and have become the world's best-selling frozen-dessert-type confections available throughout the United States, Canada, Mexico, New Zealand, Australia, and several European countries.

Halo Top's ice cream clones consist of a mix of natural and organic ingredients including dairy products from conventionally raised cows and "organic" cane sugar. According to an independent reviewer, they have about half the calories of "regular" ice creams[365] and under a third that of a premium ice cream because they contain less cream and "natural" sweeteners replace some of the sugar(s) in conventional ice creams. Another plus is that a half-cup (~64-gram) serving of Halo Top provides ~5 grams of protein - not much, but nevertheless over twice that within a same-sized, mini serving of regular ice cream.

Most of its offerings are compounded with skim milk, erythritol, eggs, "prebiotic" soluble corn fiber, cream, organic cane sugar, vegetable-derived glycerin, and organic stevia leaf extract (which other than cane sugar is its most "natural" sweetener). Other ingredients vary depending upon the flavor. For example, "vanilla" includes milk protein concentrate, sea salt, vanilla beans, other natural flavorings, organic carob gum, and organic guar gum.

However nice tasting, organic, and wholesome HaloTop's synfoodtreats might be, they're far too expensive (typically about $5/pint) for either a poor person or rich old tightwad like me to purchase. Consequently, I've put some effort into trying to come up with my own reasonably good-tasting ice cream clones.

Last summer after one of my wife's family's Sunday afternoon get-together-around the swimming pool people-feeding orgies, I couldn't get to sleep without first trying out my nephew-in-law's state-of-the art Cuisinart ice cream freezing gadget[366]. Consequently, I

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[364] Halo Top is owned by a DesMoines (Iowa) -based company founded ten years ago.

[365] Because the USA's ice creams are sold by volume, not weight, its "regular", *relatively* but not absolutely, "cheap", ice creams are invariably foamed up with lots of air or nitrogen. A nerdly evaluation of the information at Halo Top Review: A Dietitian's Take on Taste and Nutrition (healthline.com) (~26 grams of dry ingredients per each half-cup, ~64 gram, serving) suggests that Halo Top's products mostly consist of air (nitrogen?) plus water.

[366] I can't recommend Cuisinart's little gadget because it's too expensive (~$70) and doesn't have enough freezing capacity to make more than a pint of frozen anything at a time. Since Walmart sells another motor-powered ice cream freezer for one third that much that's capable of freezing six times as much stuff per batch, I bought one. Its main drawback is that you must feed its freezing bucket's reservoir with a gallon or two of small ice cubes (or snow) along with a cup (~15 cents worth) of coarse water softener salt granules when you use it – not simply put its "can" into your freezer the day before it's used.

froze up an already-on-hand pint of soymilk yogurt mixed with another packet of "Splenda"(total of three packets per pint) and a heaping tbsp of cocoa.

It was pretty decent-tasting but a bit 'sourer' it could/should be mostly because I had let my yogurt "ferment" too long. Yogurt-making's "bugs" generate an acid (lactic acid) that clots up soy or any other sort of milk's proteins thereby turning it into a nice, thick, yogurt. Ideally you should periodically check your batch & transfer it to the refrigerator when it's just barely thickened up enough. I'd let that batch "over ferment" for about 16 hours . However, when it was spooned into plastic molds ($4.99 at AMAZON) and refrozen, it turned into fairly nice-tasting , low calorie, low fat, and super nutritious fudgesicles - see Figure 79.

Figure 79 Low cal/fat soymilk fudgesicles

My next experiment started off with another 24 ounces of room temperature soymilk made from three quarter cup of dry soybeans to which was stirred in one tablespoon of Yoplait-brand yogurt after which it was set aside to "proof" in my kitchen's high-tech oven until it had turned into yogurt (about 4 hours). To it I added 4 packets of Splenda, 3 level tablespoons of Fairway's (a local supermarket) cheapest "gluten free" veggie oil (no natural oil contains gluten or any other protein), 1 tsp of vanilla extract, an eighth tsp of salt, and two-level tbsp of cocoa powder. Cuisinart's freezer gadget converted it to a definitely-better-tasting imitation ice cream than I'd gotten with my first attempt.

However, I then *almost* hit the jackpot with my next batch by adding an egg, another tsp of vanilla, another tbsp of veggie oil, and substituting one-half cup of white sugar for the Splenda in the above-detailed, yogurt-based, ice cream experiment.

My next-to-final "demonstration" skipped the intermediate yogurt-making step – I just froze up the soymilk, veggie oil, sugar, egg, etc. mix as is. The result was every bit as good-tasting and nicely textured as was the yogurt-based stuff and, of course, considerably quicker/simpler to make.

Figure 80 Soymilk ice cream (Cuisinart's freezer)

Finally, I really hit the jackpot by putting my freshly filtered "raw" soymilk back into the blender jar, adding enough veggie oil to raise the mixture's fat concentration up to ~15% (about the same as that of a typical dairy-type "half & half" coffee cream), & then blenderizing everything together for ~1 minute. After that combo had then been carefully brought to a boil while stirring like mad & then allowed to cool, the extra oil stayed put - didn't separate (what's likely happening is that the soy's lecithin serves the same purpose (emulsifier) as does egg yolk in DIY mayonnaise-making[367]).

I then made a nearly perfect ***"Iowa Soybean Ice Cream"*** as follows***. I started*** that off (milk-making) with a cup of dry soybeans (~180 g) to which was added 150 g veggie oil, one cup of

[367] Because they can mix with both water and fat, emulsifiers (i.e., "detergents") can keep oil and water mixed by dispersing tiny oil droplets throughout the water. Lecithin—one of the phospholipids representing about 2% of raw/crude (not "degummed") soybean oil is often used as a food emulsifier.

sugar (~210 g)[368], 2 tbsp each of ersatz vanilla extract and cocoa powder, and ¼ tsp salt, plus enough additional water (no egg(s) that time around) to the freshly-filtered raw soymilk to bring its total mass/weight up to ~1050 grams (volume wise – that's just over a quart), brought that mixture to a boil, & then dumped it into my brand-new WALMART motorized ice cream freezer's huge aluminum "can", surrounded/immersed it within a 1:4 volume-wise mix of water softener salt & 100% gluten free Iowa snow & let it crank away out on my patio for a half hour.

An optimally sized-for-me "serving" (i.e., 1.1 quart or 1050 grams) of that lovely but admittedly sinful stuff endows its consumer(s) with ~2900 kcal's worth of sweet & fatty food energy plus 65 grams of protein which, in principle anyway, also renders it "healthy".

Finally I then made up an almost as tasty, more nutritious, and much lower calorie (7 g protein/135 kcal per half cup) ice cream, by making the soymilk with 200 g soybeans powdered/leached/rinsed with a total of 5 cups of water, boiled it, cooled it, and then blenderized it with 110 g sugar (1/2 cup), 55 g soybean oil (1/4 cup), 1/8 tsp salt, 1/2 tsp each of xanthan gum and dry vanillin powder, after which it was frozen with a half bucketful of snow mixed with one cup of "salt free"(?) magnesium chloride ice melter in my el cheapo WALMART ice cream freezer.

However, to be consistent with this book's "cheap & simple" theme, here's something that someone who either doesn't have the right sort of relatives, not inherited his/her grandma's old fashioned, wooden-bucketed, tin-plated, hand-cranked ice cream churn, or would simply rather spend his/her money and storage space on food than on another specialized Chinese-made cooking gadget.

It's a "planet funhouse" video featuring a mom-directed/photographed, dad teaching its viewers and their two little boys [How To Make Homemade Ice Cream With A Plastic Bag - Bing video.] His/their recipes consist of ½ cup of commercial half & half cow's milk/cream, 1 tbsp sugar, ¼ tsp vanilla either with or without 2 tsp cocoa plus another tsp of sugar - which is put into a small plastic ziplock bag, its headspace air squeezed out, & the bag zipped shut. That bag (or bags if you are making several batches) is put into a gallon-sized plastic ziplock bag half-filled with ice cubes and 1/3 cup of coarsely granulated water softener salt, and then shaken, kneaded, rocked & rolled for ~15-20 minutes to freeze the stuff in the little bag(s) into "ice cream"[369].

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368 Sugar (sucrose) is what gives non-industrialized ice cream formulations the "right" mouth feel as well as some or all of their sweetness. Sugar prevents the formation of big, gritty, ice crystals, by lowering the freezing point of the water in them. The makers of industrialized ice creams often substitute high fructose corn syrup for sucrose because it's sweeter and cheaper to them but not to us.

369 Martha Stuart subsequently published a more "technical" but not so fun to watch youTube video about DIY ice cream-making this way too [You Can Make Ice Cream Using a Plastic Bag!? - Martha Stewart - YouTube].) The stuff will eventually freeze because any water-soluble substance lowers the melting/freezing point of ice/snow.

I've tried-out the above-detailed freezing technique and did eventually succeed but came away feeling that there must be a not-so-messy/laborious way to freeze my ersatz ice cream formulations (identical to that video's 'cept for substituting soy-based "half and half" for the dairy's stuff).

I discovered a "best" and much simpler way to freeze these thingies: do the same things that the above-featured video's dad and kids did but freeze your bag(s) of mix in your refrigerator's freezing compartment instead of a big ziplocked bag of snow/ice/salt slush - just put 'em into your freezer and occasionally (every 10 minutes or so) take it/them back out and knead for a few seconds to break up lumps & evenly distribute the "cold" until everything hardens up sufficiently.

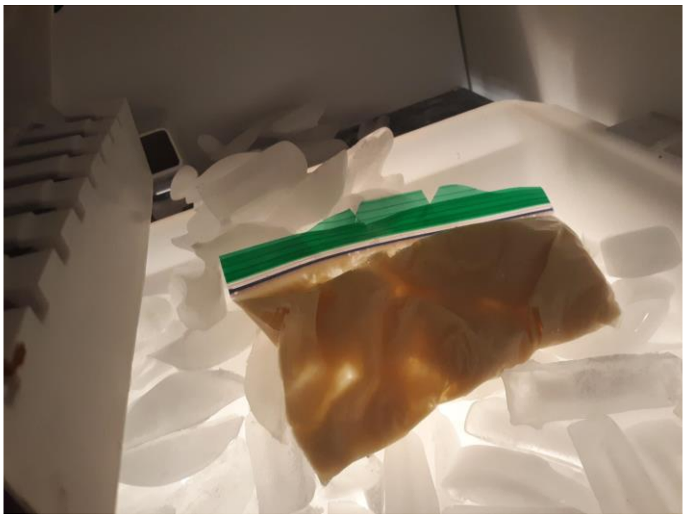

Figure 81 The "best" way to freeze a single normal-human-sized serving of ice cream

This approach's primary downside is that you can't freeze a male Siemer-sized single serving[370] (1.1 quart) of ice cream in a snack-size ziplock bag. However, it should be possible to do so with a big-enough bag or lots of little ones - the patent on this/my brilliant suggestion is pending (I hope) but anyone who's been wise enough to read this book is permitted to use it without paying me a royalty – a tearful "thanks" will do. If I have any soybeans left by then, I'll be trying it out as soon as I can get through "testing" (eating) the stuff I've already made.

[370] That is anything but a mint-flavored and thereby polluted "chocolate" ice cream. I can't choke down more than a cup or two of that stuff at any one time. That's probably the reason why my wife buys and then pretends to like it.

Post scriptum

I'd thought that my ice cream experiments were over & done with up until I learned about "***Halo Top***" a few days ago (11Jul22). Since its ~$5/pint ice cream clones apparently provide their consumers with only ~70 kcal per half-cup serving[371], I decided to come up with something that's just as Iowan, much cheaper, apt to taste at least as good, and provides its consumer with far more energy-type "nutrition" per serving. That turned out to be dead simple because I'd been dieting and therefore still had most of my last batch of vanilla-flavored DIY whipped soycream in the reefer. Simply stirring 8 grams (2 tsp) of cocoa powder

Figure 82 Another especially "poofy" value added food product

into 133 grams of it and then freezer compartment-freezing it produced a delightful substitute that my wife deemed "fine tasting" (therefore another "great success") and provided its consumers with a much more generous ~530 kcal per half-cup serving. The reason for this is that it's about 50% WALMART's "Great Value", 9 kcal/gram, soybean oil (fat) which along with its almost zero "overrun" (the ice cream industry's air (N_2?) diluent/ingredient), see Figure 82 for another example of that principle) made it much "richer" than are any of the super-premium/super pricy ice creams you'll find at the mall.

If Figure 41's renaissance era artist could have made this stuff, he wouldn't have had to invent focaccia.

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[371] According to [Halo Top Review: A Dietitian's Take on Taste and Nutrition (healthline.com)] that half-cup serving contains a total of ~21 grams of fat+sugar+fiber+protein+artificial sweeteners etc. Since a cup of water, cream, or veggie oil weighs *about* 230 grams, those figures tell me that the purchasers of a pint of the stuff are getting a heavily foamed-up ("overran") combination of about 3 ounces of solid food-type ingredients along with about 9 ounces of water for their "*under ten dollars*".

Iowa state fair-inspired “Corn/soy/potato Oles”

Many of the “best” things about Iowa are food related. Ginormous “Pork Tenderloins” and “Potato Oles” are two of the things that have rendered many of its citizens especially well nourished[372]

The former typically comprise ~6 to 10-ounce slabs of boneless pork meat that have been heavily coated with a mildly spiced, salty, wheat-flour-based “breading”, pounded flat, and then deep fat fried. The latter are salty/mildly spicy, ~3 cm diameter, 1.5 cm thick flattened “potato tots” that are also French fried and then usually dipped in/eaten with a mayonnaise-based “fry sauce”[373].

Good tasting/nutritious whole food Iowan “tenderloins” can be made with any of the ersatz burger/nugget recipes mentioned in this book including those made with boiled panfish. The following corn/potato/soymeal combo makes great tasting and more genuinely nutritious “oles” to eat with them.

(700 kcal, 30 g protein) This recipe makes ten ~25 g “oles’, scale up/down as needed – none of the suggested quantities are critical.

Shred chunks of a whole (with skin) medium sized potato (mine weighed 225 g) a small onion (mine weighed 26 g) with a manual grater or food processor, dump the shredded veggies into a saucepan and stir in 50 grams of corn flour, 25 grams of soymeal, one teaspoon of powdered red pepper and a half teaspoon of super salt. Put the pan onto one of your stove’s “burners’ & heat it with stirring until a stiff “dough” forms. Take the pan off the stove, let the dough cool down a bit, break it up into ten portions and mold/flatten each into a 5 cm (2 inch) diameter, 0.8 cm thick patty. Finally, deep fat fry, cool, and then eat them with any sort of dip, salsa, dressing (e.g., Miraculous Wipp), or sauce that sounds good to you.

Technical nerd dieting

Being too-much overweight is unsightly, uncomfortable, and unhealthy. However, weight loss is simultaneously simple (don’t eat so much) and difficult because we’ve become accustomed to never letting ourselves become genuinely hungry and most of today’s jobs neither physically tax our bodies nor challenge our minds enough to forget about eating. Here in the First World, “prosperous” folks’ refrigerators are always stocked with a variety of tasty treat type foods to

[372] About one third of Iowa’s citizens are clinically obese – almost three times more than was the case circa 1990 A New Year’s resolution: Reduce childhood Obesity in Iowa (desmoinesregister.com) . However, we are considerably slimmer than some of our southern neighbors, especially most of Mississippi’s denizens and apparently almost all of the Uvalde TX’s police department’s personnel.

[373] fry sauce is a combination of ketchup and mayonnaise plus a dash of anything that sounds good to the cook - Worcestershire sauce, pickle juice, black pepper, cayenne pepper, garlic, horseradish, etc.. I generally substitute this book’s “Miraculous WIPP” for the mayonnaise.

please everyone in the household and taste-optimized fast foods are available almost everywhere else we go too. Temptation is everywhere and I've always been a sucker for it.

A few months ago (5May2022) , I had my first visit with one of the medical doctors working for my new Medicare Part C's "health care provider" (a local hospital chain) because I needed another permission slip to buy more of the same cheap ($10/90 day's-worth at WALMART) hypertension drug combo that I'd been taking for the last decade. Apparently, the great fun I'd recently been having doing kitchen experiments, eating their outcomes[374], writing, and sitting around the house not exposing myself to Covid-19 had fattened (not muscled) me up to a gross 175 pounds!

That called for action which boiled down to discovering as have many before that not eating until genuinely hungry is both possible and effective. Consequently, I upped my "Iowan lobster" (pan fish) and weed-green shopping/cooking/eating and didn't consume any of my other cooking demonstrations' too-tempting and sometimes too-high-calorie bread/corn/soybean concoctions until experiencing genuine hunger pangs[375]. Within the next two months that along with thirty flight's worth of basement-to-first-floor stair climbing almost every day reduced my body weight to its current ~159 pounds[376] and my blood pressure to today's "normal" range (under 130/90) most of the times that I've recently measured it. By mid-July I decided to resume eating normally again (which means again eating most of the stuff that my experiments were making) and I haven't been hungry since. On 2Sep2022 I tipped the scale at 157 pounds which supports my contention that it is indeed possible to be an old "corn fed" Iowan and not too fat.

Lowering your blood pressure and/or addressing today's most feared pseudo medical condition, "prediabetes", requires the same sort of thinking and actions that learning how to properly feed yourself does, not rocket science, magic drugs, or the counsel of white coated health care professionals, drug salesmen, and/or overly enthusiastic healthful cooking/living blogsters.

Deciding to lose some weight & the fact that my little garden was then beginning to provide me with more low-cal opportunities for excellence inspired the following low-calorie, whole food, cooking experimentation.

All-veggie diet spaghetti

Since I'd trained my one and only spaghetti squash plant's vines to climb up and over a board fence that "global warming" subsequently rendered too hot for it/them, I had to come up with

[374] By then I had already eaten halfway through my third 50-pound sack of "deer" corn.

[375] One way to determine how "genuine" your emptiness is, is to ask yourself if boiled/steamed panfish sounds good. If "yes", catch/prepare/eat some because a dieter's diet -especially that of an old dieter- should include a higher proportion of protein than that required at equilibrium i.e., "middle age" 25 to 55 years old).

[376] At my height (67 inches, 1.70 meters), 159 pounds (72.3 kg) translates to a Body Mass Index (BMI = mass/height^2) of 24.9 which is just barely within that criterion's "desirable weight" range.

something to do with the three still-not-quite-ripe squashy orphans that it had produced before succumbing to heat-trauma. Like its relative, the cucumber, spaghetti-type ("summer") squashes have virtually no calories so I could eat as much of them as I wished if I could just devise something "nutritious" to spice 'em up enough to render them not blah tasting. Since my not-so-heat sensitive tomato plants were beginning to produce lots of nutritious little red thingies and I also had some fresh-from-the-garden onions (see the text accompanying Figure 85), I came up with the lovely stuff dumped onto my nuked spaghetti squash depicted in the left side of Figure 83.

Figure 83 Super nutritious 100% veggie spaghetti

Recipe: (It was darn good tasting even though its proportions were instinctually determined & likely non-optimal.)

- Added 200 g of water to 50 grams of soybean meal & then saucepan-boiled/simmered it for about ten minutes while …
- In another saucepan, I browned ~100 grams of chopped onions in one tbsp (~14 g) of EVBG and then….
- Added 100 grams each of ketchup, onion, and tomatoes, 2 tbsp each of vinegar, ground thyme, oregano, and one-half tsp each of super salt, powdered garlic, powdered red pepper that had all been stirred up together in my blender's pitcher for ~5 seconds…
- Dumped the by-then fully hydrated/cooked soymeal into the ketchup/onion/etc. - bearing saucepan, stirred them together, and then…
- Simmered everything together for another five minutes - done!

Pouring about a third of it over some nuke-cooked (500 g/4 minutes) spaghetti squash rendered the combo "low cal" (about 100 kcal total), delicious, nutritious, gluten-free, chock full of wholesome home-grown organic stuff, and of course dirt cheap.

The right side of that figure depicts another batch prepared for a ~one kilogram-gram example of my 2023 garden's much better/bigger spaghetti squash crop . Because it had also yielded lots of tomatoes and both "hot" and not-so-hot peppers but only a few onions, it was made as follows (no ketchup):

- Chop up about 300 grams of ripe/red tomatoes and about 100 grams of several different fresh peppers.
- Brown a heaping tablespoon of granulated dry chopped onions in one tbsp (~14 g) of EVBG in a saucepan, (with dried onions this happens very quickly)
- Dump your chopped tomatoes and pepper into that pan and then stir 3/4ths of a cup of soybean meal, one tsp each of dry powdered garlic, super salt, and thyme, one tablespoon each of blackstrap molasses and cumin or corriander, and two tablespoons of vinegar.
- Stir in enough water to fully hydrate the soybean meal and then simmer everything together for another five minutes or so. Done!

Give this or something like it a tryout – it's good for you & works equally well as a sandwich filling, or pasta/hominy balancer.

Low cal. creamy soybean & veg stew

The goal sought/achieved by these combos was to come up with some elegant-sounding, low calorie, simple to make, nutritious single serving "diet meals" that could be prepared when the panfish weren't biting and my garden wasn't growing. Because they are "diet" dishes, their proportion of soybeans to energy foodstuff (corn or wheat) is much higher than is the case with most of this book's recipes.

SPUD VERSION (407 kcal, 28 g. protein, 32 g carbohydrate, 14 g. fat, 540 mg Ca, 540 mg P and 28 mg Vitamin C)

It's comprised of just two easily stored staple veggie foods, potatoes[377] and two-day sprouted soybeans both of which should be cheap

Put 90 grams of 2-3 day sprouted soybeans into your saucepan, add a half cup of water, a quarter teaspoon of mason's/builder's lime, cover the pan, put it onto your stoves' burners , bring it up to a boil, and then back down to a simmer. Dice or thinly slice up a smallish potato (e.g., 120 grams) and add the chunks to your sprout-boil pan. Blenderize/pastify another 90 grams of soybean sprouts with two cups of water for ~60 seconds, add it to your whole sprout/spud boil pan, recover it and bring back up a boil and then simmer for another five

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[377] This recipe's potatoes were cheap because I'd purchased 50 pounds of them the previous Fall (2022) when several local retail outlets had radically reduced their prices for the remainder of 2021's crop, e.g., five pound sacks for 99 cents.

minutes. Stir in some super salt along with whatever spices sound good to you (e.g., a teaspoon each of powdered garlic, black pepper, & cumin.) and you are done!

HOMINY VERSION (427 kcal, 27 g. protein, 47 g carbohydrate, 14 g. fat, 390 mg Ca, 540 mg P and 4.2 mg Vitamin C[378])

This is basically the same thing with hominy substituting for the potato. While 100 grams of soybean sprouts were being brought up to a boil with a cup of water, another 80 grams of them were blended up with another two cups of warm tap water and a quarter tsp of Type S lime for ~45 seconds (timing isn't critical). That water/sprout paste along with a cup of pre-prepared hominy was added to the cookpot, brought up to boil, simmered together for ten minutes after which a teaspoon each of super salt, powdered garlic, black pepper, & two tsp of cumin was added).

Low calorie soybutter

Since there's no way that even I could rationalize eating any sort of conventionally compounded "nut butter" - even soy nut butter - while trying to shed some of my own mammalian lard, I made myself a batch of "low cal soybutter" as follows:

Powder 200 grams of raw dry soybeans with your blender, put the stuff into a frying pan and heat with constantly stirring/scraping until it becomes medium dark brown-colored, let it cool off, and then fine-grind with your grain grinder (the finer the better). Make up a little batch of soymilk with another 80 grams of blender-powdered soybeans extracting their soluble matter into a total of about 300 grams of "rich" milk. After it's cooled off, stir it along with a heaping teaspoon of super salt into your roasted soybean powder. Done

[378] These figures are based upon the FDA's food composition figures FoodData Central (usda.gov) and my observations having to do with the volume/weight changes when corn kernels are converted to hominy (~180 grams/236 cc of dry corn makes ~4.8*236 cc or about 1030 cc of hominy and that one gram of dry soybeans makes about 2.8 grams of 2 -3 day sprouted soybeans)

Figure 84 Low cal soy butter

Figure 84's "Low cal soy butter" is *almost* as good tasting[379] and much lower in calories than is this book's soybean oil/roasted soy meal "butter" - each tablespoon of it (18 grams) provides ~42 rather than ~100 kilocalories along with about 3.4 grams rather than 6.2 grams of protein. For folks especially concerned about such things, it's also gluten, high fructose corn syrup, BHT/BHT, asbestos, nano plastic, and plutonium-free!

[379] It's "different" tasting though – I've found that the addition of a few drops of mapleine extract along with a packet of SPLENDA improves it. Another batch made with a bit of my wife's dairy type half-and-half tea creamer rather than "soy cream" was definitely tastier (46kcal & 3g protein/tbsp)

Figure 85 Typical veggie feast

Iowan Garden Veggie Feasts

Most of Figure 85's one-of-many-veggie-feast possibilities' components were tiny veggies along with one of the killer weeds that had choked them out in 2022's poor little and sadly neglected, backyard garden[380]. It comprised 52 grams of soybeans pre-boiled/simmered in water for 30 minutes to which was then added 35 grams each of thin sliced mini carrots and one inch diameter onions, 82 grams of thin sliced mini potatoes along with 30 grams of one of those weed's leaves (amaranth) plus some of their smaller, still tender, stems and then boiled/simmered up together for another ten minutes.

It was delicious, gluten free, chock full of nutritious protein, antioxidants, minerals, & vitamins, and exceptionally low-calorie(19 g protein, 335 kcal) - a real "fat incinerator".

Super Nutritious Hominy-Soymeal Diet Delite

A few days after Christmas 2022 and ~6 months after I'd successfully delarded myself, I woke up to find myself weighing over 161 pounds again - disgusting.

Since the "catching" part of Iowa's all year long fishing season had become a pleasant memory by then, I decided to see if I could come up with a season-optimized diet-dish consistent with this book's principles. Since I still had a half potful (about 3 quarts) of leftover hominy/soymeal/misc. veggie stew in the refrigerator, I stirred some water, 50 grams of soybean meal (SBM), a small (~50 gram) finely chopped up carrot, ½ tsp powdered garlic, 1 tsp soy sauce, and ¼ tsp of mason's lime into one cup of it and then nuked (microwave-boiled) it for three minutes.

The resulting combo supplied me with about 295 kcal, 27 grams of well-balanced protein, 350 mg of calcium, …etc., etc., and therefore represents a good-tasting, low cost, something that could provide me or anyone else) with everything needed to remain healthy[381] with <1000 kcal/day's-worth of food energy input.

The stuff making up the stew to which that morning's additions were made, included 3 cups of subsequently dehulled corn kernels, 3/4 cup of SBM, two big carrots, a heaping tablespoon of dried onion flakes, a teaspoon of super salt, a dash of DIY liquid smoke, and sufficient water to bring its fully cooked volume up to about 5.5 quarts.

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[380] 2022's most genuinely harmful garden weed to me was "Hairy Quack Grass" because by the time that I finally got around to trying to weed my little garden patch, its roots had already created a tough sod "net" that dragged up and out my poor little carrots and onions too. Another characteristic rendering it especially nuisanceful (isata word?) is that unlike a "good" weed like purslane, it's inedible.

[381] Unfortunately, in this context, "healthy" meant that my otherwise fine hominy/corn stew combo now contained enough soymeal to render it objectionably "gaseous" even to me. That led to several days' worth of research into what I or anyone else consuming lots of SBM could do about it.

Wife Chow

(This will probably be this book's shortest chapter because offering my better half[382] anything containing any sort of bean or corn has been expressly prohibited.)

Breakfast

Two (three if thin-sliced, one if "dieting") 10 to 12-inch-long pieces of genuine thick-sliced Iowa bacon. Cut into ~1" long pieces, spread over your microwave oven's bacon-cooker (rimmed, loosely covered, high temp-type plastic pan with a ridged bottom to let the grease drain away) & then nuke on "max" for 2-4 minutes, put the so-formed crusty little morsels onto one end of a 6 by 12-inch piece of paper towel, carefully fold the other end over them & serve with a 18.5 oz. pot of English Breakfast tea, a box of cow milk-based half & half coffee creamer (no soy based substitutes! I tried it once), and a freshly rinsed-out porcelain teacup (don't forget to add her offering's bacon grease to your EVBG stash)

Lunch

Don't bother – that's why God's given us (her anyway) high fructose corn syrup sweetened, mint-flavored chocolate kisses, chocolate-glazed doughnuts, any kind of fudge, and/or chocolate-covered, SPI fortified, "health food" candy bars[383].

Dinner

Wheat bread dough based thingies

Most of my better-received offerings consist of yeast leavened, thick wheat flour-based tortilla-like "thingies" of which there are three types.

1st or British/ Italian meat pie-type thingy (tougher/longer to make but a bit better tasting--recipe makes a single rather large offering).

Add 1/3 cup lukewarm water, 1 tbsp. sugar & a half tsp of active dry powdered yeast to a pan or bowl, stir for a few seconds, let set for a couple of minutes and then stir in about ¾ cup of all-purpose wheat flour[384]. Sprinkle some more flour onto a nice smooth surface (a big-tiled (e.g., >11 inch) ceramic, granite, or Formica countertop works great). Knead the dough into a ball flatten it out & roll it out to form a big ~9 by 11" oval-shaped wheat flour yeasty "tortilla", sprinkle a bit of super salt over it, then add about one half cup of shredded cheese (any type except "cottage") over a ~2" by ~6" area towards one end of your tortilla along with some

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[382] aka "Pookins", "Sweetie", "My little passion fruit", "Shelly", or "Sir" depending upon the situation.

[383] Healthy because the manufacturers of such things usually include a few especially wholesome & organic mystery-nut fragments.)

[384] Volume-wise proportion of water to flour should be about 7/3 – again, weighing your ingredients into the mixing bowl is both quicker and more accurate.

sort of thin sliced or ground, spicy sausage-like meat (pepperoni is her favorite, though I have occasionally sneaked in some of my faux chicken sausage, spiced-up beef burger, finely chopped onion, etc. (a sliced-up hot dog was immediately detected/rejected) . Next, fold your yeast/flour tortilla's other end up & over the top of the cheese, meat, etc. & pinch its edges together to securely seal everything up[385]. Flatten its top a bit, add additional shredded cheese and a bit more ground/sliced sausage meat or pieces of bacon, sprinkle on some oregano and/or thyme and/or rosemary, etc., along with another spritz of super salt. Let it sit in a warm place until its yeast-leavened wheat flour "tortilla" has puffed up nicely & then bake in a ~400°F oven until it's perfect-looking (somewhat browned, about 15 minutes) [386].

2nd wheat bread dough thingy (quicker/more convenient)

Add a tbsp. of sugar and one half tsp of active dry yeast to 1 ½ cup of warm water, stir until the yeast is well dispersed (~30 seconds) , add 2 1/3 cup of all-purpose flour plus 2 tbsp. of coffee mill-powdered flax seed[387], & thoroughly mix; put it onto a flour-dusted cutting board & knead for about 2 minutes, (it'll be a wetter/softer dough than I've described above). Grease your hands with EVBG and roll roughly one third cup chunks of it into ~6-8" long breadsticks, & lay them in parallel, about 1.5 inches apart on an EVBG-greased cookie sheet & let them sit in a warm place until they've expanded about 3x volume wise . They'll be flatter by then - maybe one inch high and 2-3" wide. Sprinkle some super salt on them, turn your oven up to 400°F and bake until "perfect" (typically about 20 minutes). Take 'em out, paint them with EVBG with an artist's-type fan brush or whatever else that's handy, & then let them cool. If you can't resist spreading butter or EVBG plus salt on one (or two) of them & immediately scarfing, go ahead and enjoy.

To make a single wife-dinner thingy, split one of them lengthwise, pop it into a 400°F oven or toaster to reheat, sprinkle plenty of shredded cheese over each halve, add some sort of spicy sausage-like thin sliced pepperoni (a wifely favorite) or real pork sausage, but spiced up hamburger, faux pork (chicken or carp) sausage (me only), a sliced hotdog (me only), or bacon is every bit as tasty, pop back into the oven for ~5 minutes or ~1 minute in your microwave oven until it's reattained perfection. Assuming an already-made bread thingy, your offering shouldn't take more than about 10 minutes to prepare, start-to-finish.

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[385] Never add veggies to wife chow without first obtaining permission/guidance.

[386]Back in my Idaho Falls digs, I usually used its old-fashioned electric oven's "preheat setting" to bake stuff. The reason for this was that its thermostat then cycled both its top & bottom heating elements on/off to regulate its temperature thereby rendering it both quicker heating & better at browning the top of whatever I was fixing. My new house's microprocessor-equipped super stove doesn't seem to allow any such protocol breaches.

[387] The flaxseed is "nice" but unnecessary.

Figure 77 Artisanal bread thingies

3rd Artisanal bread based thingies

If you've baked your offering's substrate in this fashion, it's about the quickest/easiest way to satisfy a wifely food craving.

Slice some chunks of your loaf so that they'll fit your toaster, toast 'em 'till brownish, sprinkle with any sort of shredded, meltable (full fat), dairy-type cheese, cover it with thin sliced pepperoni, sprinkle on more cheese, 'nuke just long enough to melt the cheese's & pepperoni's fat (typically 45 seconds), & serve with a paper napkin while alluding to having had to slave away for many hours.

"Lessons Learned Focaccia"

Figure 86 (below) depicts the remnants/survivors of a wife-attacked   focaccia #2 (Figure 40) - one of my greatest triumphs. With that specimen I was very liberal with the EVBG & super salt which suggests a negative correlation between "healthy" and "tasty"

Figure 86 Surviving remnants of wife-attacked, “lessons-learned focaccia”

in US-performed foodstuff evaluations. I’ve noted the same tendency with my own occasionally strictly honest, other people’s creations critiquing efforts.

One wife-serving sized (little) Pizza

(approximately 880 kcal, 44 g protein 43 g fat 100 g carbohydrate)

Dissolve ¼ tsp yeast in 75 grams of warm water, stir in 110 grams of all-purpose flour and a quarter tsp of super salt, knead the dough for about 30seconds and then squash it down into a well-greased 8-inch diameter cake pan rolling its edge up a bit along the sides.

Figure 87 veggie pizzas

As far as what to pile onto your pizza offering's surface is concerned almost anything goes consistent with your customer's wishes. However, if it's to represent what most wives expect in "pizza", it should include a tomato-based sauce containing a little vinegar, chopped onions spiced up with oregano, salt, pepper/peppers, garlic, misc. spices , plenty of shredded cheese, and lots of chunks or slices of some sort of spicy, fatty, salty meat - pork/chicken sausage, pepperoni, and/or bacon have proven to be acceptable to everyone except my toughest critic.

To approximate my creations, assume 76 grams of ketchup, 2 grams each of garlic and onion flakes, 1 g each thyme & oregano, 76 g ketchup, 20 g of thins sliced red bell pepper, 40 g of finely shredded cheddar cheese , and 21 g (13 slices) of thin sliced pepperoni. Let it rise in a warm proofing spot until the naked dough surrounding the toppings has become poofy, if it's not already there put the pan into your oven, set its temperature to 400°F and its time to 30 minutes, and then go find something else to do until its bell rings (don't bother to preheat the oven- doing so just wastes time & electricity).

However, because I'm old, ornery, and nerdly, Figure 87 depicts a pair of my ovolactovegetarian (no meat but animal-based anything else is OK) pizza experiments made with one of this book's "imitation meat food products" rather than a tomato-based sauce. The one on the left is Mexican-themed featuring a bit more chili powder (mix of cumin & red pepper), extra salt, and covered with a yellow-colored shredded cow cheese: the one on the right is Italian-themed and therefore primarily spiced with oregano, thyme, garlic, thin sliced red bell pepper, chopped onion, and covered with a shredded white (mozzarella-type) cow cheese. Most of my victims considered both to be reasonably palatable.

Finally, Figure 88 depicts two of three, ready-to-bake, gluten-free "personal pizzas".

Figure 88 Gluten-free individual pizzas

Each consisted of a roughly 9" diameter, tortilla "crust" made with the same in situ lime-nixtamalized corn flour dough discussed elsewhere (100% corn (traditional) tortillas): One cup each of corn flour & water was double- boile, batch-steamed together for ~10 minutes, split into three ~115 g dough lumps, which were stomped into ~9 inch diameter tortillas (see Figure 48), which were then cookie-sheet- baked at ~400°F for about five minutes. They were then, first, heavily "painted" with a sauce consisting of a half cup each of tomato ketchup and water, 2 tbsp of dried onion flakes 2 tbsp each of ground oregano and thyme, and 1 tsp each of super salt and powdered garlic, and then scattered with a thinly sliced, ~one-half ounce , pepperoni stick followed with about one ounce of shredded cheddar cheese, and finally baked again at 400°F until "perfect enough looking" (another 7-10 minutes.).

Wife-wise they proved to be successful, but DeeBee Kittycat (Figure 39) still thought that they were not good enough - "*where's the tuna*"?

Oh well.

Semi-sneaky Ham & scalloped potatoes

This stuff is sneaky because the "cream" rendering its "sauce" both nice and creamy and especially nutritious consisted of 65 grams of 3-day-sprouted soybeans (~150 g "wet" weight) blended up with three cups of water.

Manufacture involved disjointing the bone within an 89 cent/pound ham that I'd bought about 6 months earlier and adding both bone chunks along with ~75 grams of adhering meat & gristle, 700 grams of thinly-sliced whole (not peeled) potatoes, enough water to cover everything, plus the above-described sprouted soybean/water paste to a to a big saucepan, bringing everything to a boil & then simmering for about two hours. I then added one half of a finely chopped green bell pepper, a teaspoon each of super salt and coarse ground black pepper, simmered everything together for another ten minutes & then served. It worked great - she liked it & didn't detect my misdeeds - another great success!

"Real" Spaghetti & Meatballs

Make up the same sauce/meatball combo described in my "Iowa 'Macaroni' & Cheese" recipe leaving out the soybeans and serve it over boiled commercial spaghetti (or macaroni, or whatever other special-shaped durum wheat pasta or ramen-type noodles etc. have been purchased for the occasion (given my druthers among those options, I'd take the ramen.)

Olympics inspired Chinese Dumplings

"Dumplings" are another of China's deservedly famous culinary treats. They consist of little crescent-shaped, pastry dough-filled-with-something-nice, ravioli-like bags boiled up in some sort of tasty broth. My first (9Feb22) attempt to emulate them is depicted in Figure 89.

Figure 89 First attempt Chinese dumpling

dough-bags were made of a two-minute kneaded ramen-type dough lump comprised of 100 g of all-purpose flour, 50 grams of water, and a half teaspoon of super salt. It was broken up into fifteen ~11-gram sub-lumps each of which was then rolling-pin rolled out to form roughly 6-cm-diameter mini tortillas. Those were then filled with a mix of 100 grams of homemade, Italian-type, chicken sausage, about 25 g of fine-chopped celery, a full tsp of granulated dried onion and a half tsp each of super salt, black pepper, & sage. Then, after their edges were pinched together, they were saucepan-boiled in a bouillon made with the flavoring packet within a 3 oz (standard sized) package of pork-flavored Maruchen™-brand Ramen.

Wife-wise these morsels turned out to be just another "OK" offering - "too doughy".

My next lessons-learned attempt produced smaller, thinner-walled, dumplings featuring just 5 grams of fat-free ramen dough each, filled with a heaping tsp of spiced-up "chicken bone paste" and then simmered for ~five minutes in broth made by dispersing another tablespoon of that paste in a cup of hot water. That batch disappeared in toto very quickly – another great success.

I recommend that Iowa's foodies give them a try even if there's no soybeans or corn in them. Only God & Walmart knows where my chicken came from but there's a good chance that it didn't have to be shipped very far to end up in my dumplings.

Most special of occasions[388] chocolate fudge filled & frosted chocolate cake recipe

Inspired by a genuine food artist's impressive accomplishment (see Figure 90) I came up with the following recipe's peace offering. Nutrition-wise, it's pretty hopeless too except that it's about the only way that I can get my better half to eat milk & eggs.

Figure 90 Professionally created breakfast offering

Dump one egg, 3 tbsp veggie oil (40 g) , 260 g white sugar, 2 tbsp cocoa, 185 g all-purpose flour, 50 grams of corn or potato starch, 2 tsp baking powder, and 275 grams of milk into a mixing bowl and eggbeater it together for about one minute. Pour the resulting rather sloppy batter into two well-greased 8" or 9-inch diameter cake pans and bake in a preheated 350°F oven for ~25 minutes or until a toothpick inserted into the top center of the cakes doesn't come back out "wet" and then for another 2 or 3 minutes .

Since I think that fudge frostings taste better than do those made with powdered sugar, here are two ways I've made its filling/frosting:

1. **Classic fudge frosting** (very tasty but sets up hard/brittle/crystalline – to fix that, see #2 below): mix 3 cups of sugar, 3/4th cup milk, ¼ cup cocoa & a shake of salt in a sauce pan, bring to a boil on your stove top & stir until it reaches the "soft ball" stage[389] (~234°F/112°C), remove from the stovetop, add a 3/4s stick (or 85 grams or three ounces or 3/16th pound) of butter or margarine, and two tsp of artificial vanilla

[388] For instance, when it's time to celebrate your wife's …ty-sixth-and-five-eighths birthday.

[389] When some of the goo is dripped into a cup of cold water- it should immediately form a soft, neither brittle nor "runny", ball. If brittle, it's overcooked which means that you should carefully (slowly) dribble 2-3 tbsp of water into the pot & reheat it with lots of stirring & more drip testing until you get it right.

extract[390], & resume stirring until it begins to thicken. Quickly spread about a third of it over one of your cake halves, perch the other half on top & then spread the rest of your fudge frosting over its top & sides.

2. **Second, even nicer, version** (Figure 91) Proceed as above but add a quarter cup of either real or DIY[391] corn syrup to the sugar, milk , cocoa, etc. mixture. Corn syrup mostly consists of "little" (single ring) glucose and maltose molecules that interfere with the formation/growth of the big sucrose crystals that often render boiled-type fudges and frostings overly crunchy/brittle.

Figure 91 Properly proportioned[392] peace offering (FUDGE≈CAKE)

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[390] Artificial vanilla costs ~one tenth as much as does "real" vanilla and, to me anyway, imparts the same flavor to whatever it's added (I'm not sensitive enough to detect the difference between either real/fake vanillas or "good" vs "bad" wines.) After running through a half dozen bottles of WALMART'S cheapest artificial extract, I decided to order a 200 gram pouch of the pure powder – enough to make a gallon of "extract" – from EBAY for $8.61 https://www.epicurious.com/expert-advice/real-vanilla-extract-versus-imitation-vanilla-extract-baking-cookies-article) With respect to wines, to me any brand of "cold duck", from Andres $5.99 to Meier's $73/750 cc stuff is better than any other sort of wine regardless of how "old "it is, where it came from, or how much it cost.

[391] If you don't happen to have corn syrup on hand, you can make a passable substitute (mixture of fructose and glucose) in situ by adding *two* tablespoons of water and one teaspoon of lemon juice or vinegar, or a pea-sized lump of cream of tartar (tartaric acid) to ¼ cup of white sugar and boiling/cooking it down in a saucepan until the syrup just begins to caramelize. Then go ahead and add the rest of your fudge recipe's sugar, milk, cocoa, etc. and get on with the rest of the procedure.

[392] The cake's layers primarily serve as support structures for fudge. Nutrition wise, their cocoa, sugar, flour, etc. served to support/disguise its milk and egg.

3. **New, improved, & somewhat nutritious[393] fudge cake filling** (patent pending?): Powder one quarter cup of soybeans in your blender, add 3/4 cup of warm water & blend again for another 45-60 seconds. Pour the paste into your filter bag & squeeze the milk out into a tared (weighed) saucepan. Add 75 grams (~one half cup) of white sugar, a shake of salt, one level tbsp each of corn starch, and cocoa powder and then put the pan onto your "hot" stove & boil it down with vigorous stirring until the pan's contents (total weight – pan tare weight) weigh about 160 grams . Add one tsp of vanilla and two teaspoons of margarine or butter to the saucepan & stir them in too. Spread over the lower half of your layer cake , perch the upper half onto it & then spread /fill with one of the frostings described above.

Figure 92 Soy fudge cake filling

[393] "nutritious" because it adds about 15 grams of protein to your offering.

Conclusions

I don't know what else to do about most of the issues that have inspired me to write this little cookbook other than unambiguously characterize them and point out reasonable ways to address them. Because I'm politically autistic and don't gladly suffer deliberately ignorant fools, I'm not holding my breath until my country's decision makers decide to give my suggestions an honest try. The leaders of a country claiming to be the "greatest ever" shouldn't be ignoring both uncomfortable truths and the golden rule to continue supporting business models that have been gradually whittling away at their country's "greatness" while China's policy driven actions were making it genuinely great again.

Development of the low RFO-high protein soybean varieties s that should be readily available/affordable to US citizens was done over thirty years ago via traditional breeding techniques. That would permit non-GMO certification and unrestricted use in both local and export markets including those that are excessively "conservative" (both risk averse and politics driven) like the EU. Seeds for such "food grade" soybeans are still readily available from outfits like Benson Hill Seeds (Minnesota) and Brushvale Seed Inc.(IA) but see little demand because no one who's "important enough" seems to care that excessive farting impacts the bottom line of 100% of the USA's food related business sectors [394].

Be that as it may, I've learned a lot and had lots of fun writing this thing and my readers will similarly benefit if they follow up on its suggestions – they certainly should be able to feel more confident about being able to handle anything technical that life throws at them.

Finally, since a local feed store has decided to sell 50-pound sacks of "Peanuts – Medium Runner (Raw)" for $65.83[395] and I've gotten used to paying more than that for its "Deluxe wild bird seed mix" containing only ~20% peanuts, I'll probably buy a sack of them & share 'em with next winter's local wildlife. Stay tuned for more recipes featuring them as well.

I've decided to save the best for last which happens to be something that I didn't write myself – it's the last 198 words of a brilliant Proteus article written by the President and CEO of Iowa's Food Bank, Michelle Book.

> "*What I learned from my research is that it is not market forces or individual effort which determine who succeeds and prospers and who remains impoverished and excluded in the United States, but government policy and deep-seated cultural and social mores.*

[394] Farting is fueled by indigestible sugars and therefore represents wasted energy - not pork, milk, eggs, chicken nuggets, or broilers.

[395] That's $1.31/pound. Today's "US Peanuts Price Received" (what farmers are paid) for their stock peanuts is 24.1 cents/pound.

Poverty in the United States is a choice. Stagnant middle-class incomes are a choice. Technology-fueled mass unemployment is a choice. Racism is a choice. The patriarchy is a choice. These are our choices. A paradigm shift will be required to ensure a stable economy, one in which everyone benefits fairly, and no one is left behind.

There could be dire consequences of ignoring the plight of the poor in our very own backyard. I will close with a quote from General Ulysses S. Grant from a speech he delivered to Civil War veterans in September 1875 in Des Moines, in which he described the dynamics and climate which could lead to a second civil war.

'*If we are to have another contest in the future of our national existence, I predict that the dividing line will not be Mason and Dixon but between patriotism and intelligence on one side and superstition, ambition, and ignorance on the other*'."

APPENDIX I   Miscellaneous data, conversion factors, and shopping/cooking math examples

Misc. data

The Smithsonian Channel's "Inside the Factory" food education program's historians have taught me that food sciences' most fundamental units are "fresh", "old", "hot", "cold", "some", "lots", "a little", and "a pinch". However, most of today's cookbooks and certainly mine utilize units that render reproducing its recipes' results easier for people who weren't born with the right instincts.

The most comprehensive compilation of data about how the USA's food-type commodities are characterized, measured, and sold (e.g., bushel, bale, pound, kilogram, gallon, ton, metric tonne, ounce, serving, etc.) I've discovered so far is [Weights, Measures, and Conversion Factors for Agricultural Commodities and Their Products (usda.gov)].

Common conversion factors

A bushel (abbreviation: bsh. or bu.) is an imperial and US customary unit of volume based upon earlier measures of dry capacity. In modern usage, the volume is nominal, with bushels denoting a mass defined differently for each commodity. One "Winchester bushel" (bu) = 35.24 liters, 35240 cubic centimeters (cc) = 0.3524 hectoliters = 0.03524 m^3 = 3.524e-11 km^3 = 38.8 dry quarts = 45.1 liquid quarts , or 9.8 US gallons or 7.2 Imperial gallons

one gram ≈ 1/454 pound ≈1/28.3 avoirdupois ounce ≈ one cubic centimeter (cc or cm^3) of water[396]

1 teaspoon (tsp) of any dilute aqueous solution (e.g., water, vinegar, or cow's milk) ≈ 5 cubic centimeters (cc) and weighs ~5 grams.

[396] This is not an accident – the "metric system" was devised ~two hundred years ago by "revolutionary" French technical nerds willing/able to challenge customs for the sake of simplicity, efficiency, & clarity. It's based upon the properties of the same liquid water that makes the Earth we live on "special"; e.g., its density in that set of units is 1 g/cc , its heat capacity is 1 calorie (not kilocalorie) per Centigrade degree per gram, and it freezes at 0 and boils at 100 degrees Centigrade. Because the USA's decision makers insist upon refusing to mandate the use of those "foreigners" more logical system, doing "technical" things here such as figuring out how to build our houses or fix our cars is much more difficult/complicated/expensive than it should be. It's good for business though because we must buy at least two sets of tools and a calculator/computer to do "technical" things like that. Things are even worse in the energy distribution business. Recently I had to warn another old technical PhD ZOOM buddy that I'd been able to figure out how his hometown's (Austin, Texas) gas company was expressing its customer's (his) gas consumption figures ("Ccf") & that he should therefore advise them to switch to "Standard Grassfed Texas Hereford Belch Hours" (SGTHBH's) instead. He was happily paying over five times more for his gas than what it's worth to that region's "big buyers".

one tablespoon of any dilute aqueous solution is 15 cc & weighs ~15 grams or 0.53 (15/28.3) ounce.

one cup of anything is ~16 tablespoons or ~45 teaspoons or 236 cubic centimeters (cc)= 0.236 liters = 0.25 quart

one cup of most aqueous (water-like) solutions occupies ~236 cc & weighs ~236 grams (about one half pound) & its bulk density (or specific gravity) is close to 1.00 (236/236).

My observations

1 cup of a typical scooped/leveled but neither packed nor sifted wheat flour weighs about 134 grams (4.73 Oz or 0.295 pound) & its bulk density ≈0.568 g/cc (134/236).

1 cup of scooped (not packed) corn flour weighs about 140 grams (4.94 Oz or 0.308 pound) & its bulk density is about 0.62.

One teaspoon of slaked calcined dolomitic (mason's or type S) lime weighs ~3.5 grams and contains ~1.05 grams of calcium and ~0.65 grams of magnesium.

1 teaspoon of sodium bicarbonate weighed 7.35 grams

1 teaspoon of "Instant Power Crystal 100% " Lye Drain Opener sodium hydroxide (NaOH) weighed 8.1 grams

1 cup of "scooped" (not packed) table sugar weighs *about* 200 grams.

1 cup of my current stash of EVBG (bacon grease) weighs about 212 grams (it like most food-type fats/oils is just a bit lighter than an equal volume of water); one tablespoon of any edible oil or grease weighs about 14 grams.

1 "scooped" (roughly level, not tightly settled or packed) cup of most of the commodity-type raw grain kernels including corn and soybeans weighs about 180 grams.

1 cup of dry raw soybeans will produce *about* 2.5 cups of boiled, dehulled, soybeans.

One gram (or pound) of dry raw soybeans will produce *about* 2.2 grams (or pounds) of boiled, dehulled, soybeans.

One gram of dry soybeans makes *about* 2.8 grams of 2 to 3 day sprouted soybeans – it varies because the longer that a kernel is sprouted, the more water it'll absorb, and the heavier it becomes.

One cup (180 grams/236 cc) of dry corn kernels makes *about* 4.8 cups or 1000 cc of hominy

3 tbsp of granulated onion (plus some water) = 1 three-inch diameter onion: 1 tbsp granulated onion= one 2" diameter onion.

Some of my own measured weight vs volume factors

WHATEVER	~g/tsp(5 cc)*	WHATEVER	~g/tsp(5 cc)*
red pepper	3	fennel	2.5
black pepper	2.4	oregano	1.7
cumin	2.6	dry yeast	3.4
thyme	1.4	xanthan gum	4.4
sage	1.4	baking powder	4.2
cinnamon	3.7	super salt	5.6
allspice	2.6	type S lime	3.5
onion	3.8	Mrs Wage's lime (CAL)	3.3
garlic	3.3	sodium bicarbonate	6.7
corrieander	2.3	crystalline NaOH	8.1
*the bulk density of ground/powdered things vary considerably			
because it depends upon their degree of compaction -			

Common energy/power units:

Joule = the International System of Units' (SI's) unit of work or energy. In mechanical terms, it is equal to the work done by a force of one newton acting through a distance of one meter (m), where a "newton" (force) equals the mass of one kilogram (kg) accelerated at a rate of one meter/second , or in other words, $J = kg*m^2/s^2$. In electrical terms, one joule is the energy generated by a current of one amp driven by force of one volt during one second.

one calorie = 4.19 Joule (J) = heat energy required to increase the temperature of one gram (1 cubic centimeter (cc)) of water one Centigrade degree or 9/5 Fahrenheit degree

[Food-type "calories" are really kilocalories (kcal)– one kcal = 1000 calories = 4190 Joules. Your body's "burning" of one gram of dry protein or digestible carbohydrate (e.g., starch or sugar) generates ~4 kcal whereas its burning one gram of any edible fat/oil generates 9 kcal.]

One electron volt (eV) =1.6E-19 J (the energy generated by burning one atom of carbon (coal) is about 4 eV. The energy generated by the fissioning of one atom of uranium is ~200 million eV).

One Watt = energy/time = rate= power= one joule per second=1/4.19 calorie per second = 1/42900 kcal/s = one volt (electrical force)*one amp (electrical current)

One horsepower =747 watts

One therm (US natural gas energy billing unit) = 1.055E+8 joules ≈100 cubic ft of natural gas

One kWh (electrical energy billing unit) = 3.6E+6 Watt-seconds =3.6E+6 J

Anyone trying to either check this book's examples or come up with one of their own would find it much easier/simpler to do if the USA's supposedly powers-that-be (e.g., its National Institute of Standards and Technology or " NIST") insisted that everyone use a single set of energy, power, volume, and length units. It seems that most of the USA's businesses have been allowed to establish their own way of expressing such things (e.g., feet, inches, Mils, cups, quarts, teaspoons, liters, Joules, calories, BOE, electron volt, horsepower hours, short tons, metric tons, both normal and “Sears-type” horsepower, MBTU etc.) which fact causes almost everything we try to do/use/build here to be unnecessarily complicated/expensive/inefficient/difficult which in turn may and sometimes does cause disastrous mistakes. The only people benefiting from this are the businesspersons selling the often-superfluous goods and services that the absence of standardization and dearth of independent consumer-friendly information render necessary.

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US food labeling

By law a US food manufacturer must list everything except water and “air” going into its concoctions in order of concentration but doesn’t have to reveal absolute amounts of any of its ingredients. Likewise, it must inform buyers of the number of grams of protein, carbohydrate, & fat per “serving”. However, manufacturers are generally free to define “serving”’ and report their numbers to just one significant figure (e.g., 1 not 1.1 or 1.11) and also round them off to the nearest whole number. For example, a single four-biscuit “serving” of toasted (dry) five gram “mini wheat biscuits” made of a whole wheat flour containing 10 grams of fat and 62 grams of protein per pound, would contain 0.44 grams of fat and 2.7 grams of protein, but its manufacturer could “legally” claim zero fat and 3 grams of protein per serving.

Here's an example of what this might lead to: After “learning” that what’s he’s just bought doesn’t contain any fat but does contain protein, a “dieting” Iowan might decide that it’d be OK to nibble his way through a one-pound bag of “mini wheats” while watching Tucker Carlson’s latest rant. What’s worse as far as I’m concerned is that a technical nerd couldn’t characterize such stuff in his cookbook if he couldn’t find more detailed information elsewhere or determine what he needs to know by applying “first principles” to information that is disclosed.

For example, because the densities of cream, milk, and water are all reasonably close to 1.0 g/cc, a first principle-based calculation tells us that a half cup (~118 cc) serving of “ice cream” weighing 64 grams must contain about 50% air or some other negligible density [397] substance (gas) by volume – that’s the main reason why US ice cream is sold by the pint, not by the pound.

Let’s also say that such a “serving” is supposed to have 14 g of carbohydrate (sugar), 5 g fat, and 2 g of protein in it. To me, that suggests that about 69% {64-(14+5+1))64} of its not-air (or any other gas) ingredients is water, “filtered” or otherwise.

As has the US FDA’s within-the-agency system (thank goodness), the EU’s unified food labeling system does not base a foodstuff container’s calorie/constituent counts on a particular

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[397] At sea level (one atmosphere pressure) and room temperature (68°F or 20°C or 293°K) the density of air is about 0.0012g/cc (that’s its mean molecular weight, 29 grams divided by its volume in cubic centimeters, 22400 cc/gram mole at 0°C and one atmosphere pressure)*293/273).

products suggested "serving size", but instead upon 100-gram (3.5 ounce) portions which policy is both more realistic and increases the label's value.

Pot/pan size estimating

Viewed from the top, most of our pots and pans are round and "straight sided" (the same diameter as their top).

The volume of such a pan 6 ¼" wide and 4 ¾ inches deep would be its…area*depth = radius^2*pi*depth= (6.25/2)^2*3.14*4.75= 145 cubic inches

In liters, that's (2.54 cm/inch)^3 times its vol in in^3 or 2390 cc or 2.39 liters

In quarts, its volume is its vol in liters times 1.05667 or 2.52 quarts

Slow cookers are generally elliptical so their areas = pi*short side diamete/2*long side diameter/2

Consequently ,my WALMART slow cooker's 9 by 11 by 4.5-inch-deep pot's volume is = 3.14*4.5*(9/2)^2*(11/2)^2 = 5.73 liters = 6.06 quarts

"Proportions" math examples

Generic Spreadsheet Example

	what's within the spreadsheet's cells			
0	A	B	C	D
1	**what**	grams	protein	kcal
2	**corn**	whatever	=2B*.094	=2B*3.6
3	**wheat**	whatever	=3B*.13	=3B*3.7
4	**soybean**	whatever	=4C*.37	=4B*4.3
.	**SUM =**	=B2+B3 +B4	=C2+C3+C4	=D2+D3+D4
	kcal/gram=		=D5/B5	
	Results with 5, 3, & 2 gram inputs			
0	A	B	C	D
1	**what**	grams	protein/g	kcal
2	**corn**	5	0.47	18
3	**wheat**	3	0.39	7.4
4	**soybean**	2	0.74	8.6
.	**SUM =**	10	1.6	34
	kcal/gram=		3.4	

“whatever” are the values (green font) you put into the yellow shaded , column B, input cells (e.g. 5 g corn, 2 g of soybeans…). The numbers in red are what the spreadsheet displays with this example’s inputs. The equations in its C &D columns utilize fractional composition data (green font) from sources such as FoodData Central (usda.gov) to convert your input guesses to that box’s (aka “cell’s”) totals. Individual boxes may also contain more logic statements or more sophisticated equations.

Oil-in nut butter hand calculation

First, let’s say that we want to make a soybutter (ersatz peanut butter) with the same proportion of fat (oil) as a typical commercial peanut butter (~47 wt%).

That boils down to determining the relative weights of oil (O) and roasted soybeans (B) fed into your grinder.

Assume O is 100% oil & soybeans are 20% oil

1st line (O+0.2*B)/(O+B) = 0.47

2nd ……….O+0.2*B = 0.47*O+0.47*B

3rd O-.47*O = 0.47*B-0.2*B

4th…………0.53*O = 0.27*B

Finally, O/B = 0.27/0.53 = 0.509 = 50.9%

Example: for 360 g of roasted soybeans you would add 183 g oil to make 543 g (360+183) of soybutter

Example: If you want to make exactly one pound (454) of soybutter, add …

454*(0.509/(1+0.509)) =153 g of oil to 301 [454-153] grams of roasted soybeans

Combining food ingredients to match a recommended nutrient level

The main reason that we humans “can’t live by rice (or corn) alone” is that most of our energy-type crops, don’t contain either enough of and/or “properly balanced” protein. Corn (or rice) primarily serves as an energy crop - both fat oil and carbohydrate (mostly starch) -and is relatively low in a protein which is itself especially deficient in the especially important amino acid, lysine.

Because soybeans and most of the things made from them (e.g., the soybean meal (SBM) left over after their fat/oil has been removed) are uniquely high in both total protein and lysine, some combination of it/them with any grain or starchy vegetable can properly nourish almost any sort of animal – cows, pigs, fish, chickens, and, of course, us humans too. The energy, protein, and lysine requirements of all those creatures have been much studied, are already well established, and have been studied particularly rigorously for humans of all ages.

Anyone deciding to embrace this book’s dietary principles will eventually ask him/herself questions like, “*how much of each of the whole foods that I’ve managed to corral should I be putting into my crockpot*?”

Here’s an example of how a technical-nerd-type expert might answer questions like that.

This reference details the [Nutrition and Hydration Requirements In Children and Adults - StatPearls - NCBI Bookshelf (nih.gov)] as a function of a person's age and weight.

Eq 1: **g Lysine need) =0.001*(-age^3*0.0013+0.0158*age^2-1.4253*age+48.777*bodyweight+253.160**

Units: age in years, & weight in kg

Eq. I (above) derived[398] from that report's recommendations spits out his/her lysine needs in terms of kcal per kilogram body weight as a function of age.

While the NIH report also lists caloric recommendations, in my opinion they aren't as useful as those described in Dr. Herman Pontzer's, January 2023 **Scientific American** article, "*New Human Metabolism Research Upends Conventional Wisdom about How We Burn Calories*" , because the NIH doesn't sufficiently discriminate between people possessing very different energy (caloric) requirements. Those differences are largely determined by our age and how fat we are. Muscle, not fat, determines metabolic rate and how physically active we are apt to be.

Figure 93 is a "screenshot" of an[399] EXCEL spreadsheet that combines the NIH's lysine recommendations along with caloric requirements based upon the figures in Dr. Pontzer's SciAM article along with user-INPUTTED (yellow-shaded) person-age/weight figures, the FDA'S food composition data for several each of them, and guessed-at foodstuff quantity inputs (also yellow). It translates also inputted age/size inputs (yellow shaded) to nutritional requirements (green font) and calculates that particular combination's total lysine, methionine, kcal, and protein contents (red font). To come up with a "best" foodstuff formulation mix, you keep changing quantity inputs until you've arrived at a combination that satisfies a person with that age and size's daily nutritional requirements, i.e., provides enough (within reason, more of each nutrient is OK) lysine, methionine, calories, and protein. foodstuffs[400], and user-

[398] That equation was derived by entering peer-reviewed age vs requirement recommendations in a two column EXCEL spreadsheet, least-squares curve-fitting a 3rd order polynomial to XY plots of those numbers, and then having EXCEL print-out its curve's equation. Since the age-numbers plotted to derive my lysine requirement equation only go up to 30, anyone older than that, should pretend that he/she's 30 years old (I do that all the time anyway). Figure 93's caloric requirements were determined with EXCEL lookup Tables based upon the XY plots in Dr. Pontzer's SciAM article's figures .

[399] This exercise considers only three nutritional requirements (energy, two amino acids, and total protein) and five possible foodstuffs. Your diet must also provide sufficient amounts of other things too, including trace elements, vitamins, and essential unsaturated fatty acids (omega 3/6/9), etc. Our society's nutritional experts have often "blindered" themselves by focusing only upon those factors currently considered important and thereby wrongly concluding/advising that it's perfectly OK to do things like degerming the corn going into cornmeal and "polishing" the germ/hulls from rice. Such oversimplification of complex issues may have disastrous consequences, e.g., thousands of children crippled by beriberi or rickets because the grain that they were fed had been so-"improved". That's why we should consume "whole" foods, not just combinations of some of their "purified" components.

[400] "Average" human milk contains much lesser or essentially zero amounts of several key nutrients (e.g., iron, vitamin C, and protein) than does that of most other mammals. To me that suggests that we're supposed to begin feeding our children with something other than breast milk within a few months.

INPUTTED quantities of each of them.

	input slim av or fat	slim			
	input age years	20			
	lean mass kg	54.55	actual wt	150	pounds
	kcal/day=	2500.58			
	age multiplier	1.1			
	fatness multiplier	0.8			
	g foodstuff	**g lysine**	**kcal**	**g protein**	**g methionine**
soybeans	0	0.00	0	0.00	0.000
corn	575	1.15	2127.5	56.35	1.014
peanut	0	0.00	0	0.00	0.000
soybean meal	94	2.82	376	43.24	0.503
human milk	0	0.00	0	0.00	0.000
	sums =	3.97	2503.5	99.59	1.517
	calorie requirement	2501			
	lysine RDR	3.95	grams		
	(infant methionine RDR =	1.53	grams (kg*28 mg/kg))		
	RDR = recommended daily requirement				

Figure 93 Human energy and lysine calculator

Here are some examples of what this sort of spreadsheet can do for you:

Let's start off with Figure 93's spreadsheet screenshot. Its hypothetical 150 kg, 20-year-old, "average" fat-wise, adult human would require ~2501 kcal and 3.95 g lysine/day which needs in turn could be met with 94 g of soybean meal and 575 g corn (2503 kcal/3.97 glycine/99.6 g protein)

More fooling around with different foodstuff inputs revealed that 120 grams of soymeal with 535 grams of corn would also serve that purpose.

More yet revealed that 118 g corn and 363 g of peanuts would do the job.

If only corn were available, it'd take 3.95 kg or ~7300 kcal/day of it to meet the NIH's recommended lysine requirement for him/her. Encouraging/providing that sort of hugely excessive caloric input is how a CAFO owner fattens his lard-hogs.

It also says that a 15-pound, one year old infant would require about 547 kcal and 1.46 g lysine per day which demand could be satisfied with 54 g soybeans and 84 g of corn (or corn syrup) providing 548 kcal/1.48 g lysine/28 g protein. That's almost twice as much total protein as is typically expert-recommended - ~2 g/kg bodyweight or about 13 grams per day.

What surprised me the most is that my example's hypothetical infant must consume almost 4 liters of "average human milk" to get his/her recommended 1.46 g of lysine. That's about 2300 kcal's (four times his/her caloric need) worth of mom-juice per day – it's no wonder that modern moms often don't even try to nurse their babies after their first few weeks.

I've also had my spreadsheet determine a foodstuff mixture's methionine content to compare it to what authorities have declared that an infant should get (28 mg/kg)– contrary to some of their opinions, soybeans could and do supply enough of that amino acid.

Translating one set of technical-sounding, recipe-relevant, size units to different units

Problems like these are almost always best explained/understood with a worked-out example: Let's assume that a world famous but terribly old-fashioned, Middle Eastern foodie-chef insists upon listing his recipe's ingredients in terms of cubic cubits (cc) and your measuring equipment is calibrated in cubic centimeters (also cc), how would you translate his recipe's info into figure that you can use?

Since Mr. GOOGLE tells us that one cubit = 0.4572 meters, that there's 100 cm in one per meter, and volume is proportional to length-cubed….

1 cubic cubit (cc) ='s 100^3*0.4572^3 or 99,569 cubic centimeters (also "cc")

That's simple enough to do but don't you wish that someone in a position of authority (perhaps the boss of our federal government's National Institute of Standards and Technology's (NIST)) were to become empowered to "lay down the law" about the units that <u>everyone</u> should be learning/using to characterize important quantifiable things? I do, but it's apparently too much to ask of rule makers that can't even unanimously agree to support the vaccination of children.

Cooking cost estimates

A. (I'm assuming a more-or-less standard 1200-watt stovetop heating element)

Question: if…

- electricity costs you 11 cents/kWh (1 kWh = 3.6E+6 watt-seconds aka Joules(J))
- If 5 minutes are required to heat your pressure cooker up to 15 psi at your stovetop's heating element's max power setting (1200 J/s) and then 50 minutes to finish cooking your hominy at one third of its maximum setting

What is it going to cost you?

Cooking energy=1200*J/s (Watts)*60 s/min* (5 min*60 +1/3*50) s/min = 1.56E+6 J (that's 1.56 million of most of the civilized world's preferred energy units (Joules) BUT not the USA's

Since one kWh =3.6E+6 J, your cooking cost = 1.56E+6 J/s *$0.11/3.6E+6 J/kwh= $0.047

B. let's instead assume a gas stove & that your natural gas costs what mine did about a year ago; i.e., $258/for 217 "therms"

Utilizing Mr. GOOGLE's conversion factors, that's a $ per Joule (energy) cost of $258/(217*100 ft^3 of nat. gas/therm*1030 BTU/ft^3 gas*1055 Joule/BTU = $1.094E-8/Joule

Gas cooking cost = 1.56E+6 J * 1.094E-8 $/J= $0.017. (Gas is almost always cheaper than electricity for any sort of heating-type application except "heat pumping" during mild (not genuinely cold) winter weather[401].)

C. Finally, since I'd discovered that if I stretch Saran wrap or a plastic grocery bag over the top of my ~ $25 WALMART slow cooker to prevent steam loss, add its lid, and then insulate it with a towel, it can prepare six quarts of super nutritious genuine field corn hominy within about 5 hours (or overnight) with its "low"(cheapest) power setting. I wanted to see what that translated to in terms of cooking energy cost. To do so I measured the resistance of the heating coils activated with each of its power settings[402] with its power control set on "off"

[401] Another fine-sounding scam is to exhort folks to replace their home's old fashioned gas water heater with one utilizing a high-tech heat pump because it'll "*save you money and protect the environment*". It won't do either because 1) they cost too much- several times more than do resistively heated heaters because they're more complicated and require more material to make, 2) during winters, the heat that they pump into your water is sucked out of surroundings likely being heated by your home's furnace, and 3) the electricity powering them was probably generated by gas turbines burning more than twice as much natural gas as would be needed to heat that water and dumping their exhaust into your and everyone else's atmosphere. Yet another is to urge you to power your home with solar panels backed up with lots of batteries for those occasions (typically, most of the time) when the sun isn't shining. A single 13.5kWh Tesla Powerwall battery now costs $12,850 and stores the same amount of energy consumed by my home's 80,000 BTU gas furnace within thirty five minutes How Much Does the Tesla Powerwall Cost? (2023 Guide) (thisoldhouse.com).

[402] Hook the leads of your multimeter to the appliance's power plug's side by side flat pins and record its heating coils' resistance at all of its power/heat settings.

(infinite), “low” (157 ohms), “med”(56 ohms), and “high” (46 ohms) at its power plug. Since power = voltage times current, and current = voltage/resistance, my slow cooker’s power demand/output on is “low” setting is 91 watts (120*120/157). Seven hours-at 91 J/second (watts) multiplies out to 2.92E6 J (91*3600*7) or 0.64 kWh’s (that’s 2.92E+6/3.6E+6) worth of electrical energy which would currently cost me about 7 cents – ~ one-quarter of the feedstore-basis cost of the corn that its heat energy converted to hominy.

C . DIY electrical power

“Dirty” version. Because 1) the USA’s leaders have promised that we’re going to achieve net zero emissions by 2050, 2) implementation of a big-enough sustainable (“renewable”) nuclear power option is still just being “studied”, 3) energy-wise, windmills aren’t much more reliable than solar panels, and 4) batteries big-enough to correct for that unreliability are and likely will remain impossibly expensive, we’re apt to be experiencing a lot more “blackouts” (or “load shedding”) in the future.

That’s the reason I bought a cheap little (800 watt) 2 cycle gas engine-powered generator about fifteen years ago. I only had to use it once back then/there in rural Idaho, but it was in the dead of winter and did keep a few light bulbs and my TV going while powering the fan that enabled my wood stove to heat the whole house.

We “hated” it because it was too noisy & too power limited to run everything, but I did feel pretty good about having spent that $80.

If I were to do it again, I’d order one of EBAY’S ~$215, 4 kW surge/2.5 kW steady, generators instead because it’s powerful enough to run a refrigerator and most of my kitchen’s other gadgets, and has a 4, not 2 cycle gas engine (more efficient & I wouldn’t have to mix oil with its fuel), a ~4 x larger gas tank, and four not just one 120 VAC outlets along with a 12 V output jack for “device” charging.

While its specifications (10 hour run time at 50% max output) indicate that it’s under one half as efficient as is an electrical utility’s gas-fired turbogenerator(s) (~16% vs ~35% heat to electrical energy conversion[403]), it’d still be efficient enough that I wouldn’t have to worry about being beggared by the future’s hopefully ony occasional rolling blackouts.

Greener backup power

Let’s first consider generating our own cooking energy. Based upon what EBAY told me 10March2023, if I were going to “go solar” it’d be with a homemade “plug & play” system designed and sized to save me money, not totally dis/re-place the power company. Each such system consists of one or more solar panels connected to a “grid tied”-type inverter (DC to 120

[403] heat energy = mass * energy/mass = 3.6 gal*3785 cc/gal*0.75 g/cc*45000 J/g = 4.6E+8 J

electrical energy = J/s*s = 4000/2 J/s*10 hrs*3600 s/hr= 7.2E+7 J

Thermal to electric energy conversion efficiency = 7.2E+7/4.6+E+8 = 0.16 = 16%

VAC converter) that's plugged into one of your home's existing electrical outlets. Since most US homes have single phase 240-volt electrical service split down the middle to make two 120 VAC circuits 180 degrees out of phase with each other and I wouldn't want to overload the wires that I'd be connecting the inverter to, I'd purchase two 1000 watt, grid tie converters for ~$100 each, six nominally 327 watt slightly used solar panels @ $100 each from one of EBAY's

input your current cost /kWh–	0.11			
irradiance data Solar Energy & Solar Power in Texas | Solar Energy Local				
	AUSTIN TX assuming 6, 20% efficient panels			
	kWh/m2/da	kwh/day	kwh/mo	$/month savings
Jan	4.29	8.4	256	$28.16
Feb	4.93	9.7	294	$32.36
Tx	5.24	10.3	313	$34.40
Apr	5.54	10.9	331	$36.37
May	5.37	10.5	320	$35.25
Jun	5.45	10.7	325	$35.78
Jul	5.43	10.7	324	$35.65
Aug	5.67	11.1	338	$37.22
Sep	5.93	11.6	354	$38.93
Oct	5.85	11.5	349	$38.40
Nov	5.01	9.8	299	$32.89
Dec	4.56	8.9	272	$29.93
annual sums→		124.1357	3775.795	$415.34

Figure 94 A Texan technical nerd's solar power system

sellers, two $144/each ground racks each capable of supporting 3 panels, a coil of three conductor 14-gauge solid strand insulated copper wire[404], two heavy duty 120 V plugs, and about 25 dollars-worth of MP 4 connectors. Its total cost adds up to about $1200 depending upon how much wire is needed.

Figure 94 is a little spreadsheet I put together for a fellow who lives in Austin TX. Its assumptions include 1) what the USA's National Renewable Energy Laboratory (NREL) says that Austin's solar irradiance is throughout an average year, 2) my-proposal's probable light-to

[404] The reason for using "little" 14-gauge wire is that it's relatively cheap and big enough to do what wires are supposed to do.

According to Mr. Google, a ~320-Watt solar panel is apt to generate its max power at about 35 volts DC.

That's a bit under 10 amps per panel (320/35) meaning that 14-gauge, two conductor ("15 amp") wire could safely connect it to the inverter. The other two panels wired in parallel to the same inverter could/would be using the same sort of wire. If the panels are situated next together on the same rack & each panel's output connector is at its center & the inverter is mounted near the center of the centermost panel, the wires from the "outside" panels would only have to be a bit over one meter long & the one in the middle just a few inches long. The inverter's 9.1 amp (3*320 watt/120 VAC) output could also be safely run to the house via a 14 gauge extension cord.

electricity efficiency (about 20%), and 3) that either he, his wife, or a servant (oops, I meant "essential worker") shifts the panels sideways several times per day to follow the sun. My thought experiment's nominal capacity is 1.96 kW (six times 327 watts) or about one third that of an average-home-sized, professionally installed, southern US-situated, roof mounted solar system. However, since it could and should be moved to roughly follow the sun, it's apt to produce about one half as much power as would a typically 10-15 times more costly professionally installed solar panel power system.

If his regional "service provider's" electricity were to cost 11 cents per kwh (Des Moines IA's current rate), it would pay for itself within about three years.

Such a system's primary "weaknesses" are that it only generates power when the sun is shining whether or not it's needed at that time and won't run your electricity meter backwards. However, it would be cheap to purchase, simple to put together, able to satisfy a hefty fraction of your electricity demand & could be rendered even more useful if you were to also add a few kWh's worth of battery storage.

The "obvious" way to implement such storage would be with a properly designed ("smart") BEV or hybrid battery powered automobile which I'm hoping that Mr. Biden's policy setters will incentivize that industry to provide us with.

Exactly what that vehicle battery might be is still unknown even though the USA's premier electrical engineering news magazine claims that EVs had seized a record 5.8 percent of the United States' new car market in 2022 and could get 11 percent of the global market by the end of 2023 (see The EV Battery Wish List (ieee.org)).

Battery "fueled" cars barely existed when the Tesla Model S was still just a glint in Elon Musk's eye thirteen years ago. The world now (March 2023) has over 20 million EVs and that total is expected to nearly quadruple by 2025.

Although EV demand was anticipated for several years, China was the only country that immediately acted upon it and consequently is now roughly a decade ahead of the rest of the world in both cell production and the sourcing, refining, and processing of EV battery materials.

Its battery constitutes the heart of each such car and is still by far its most expensive component. This has recently set off a worldwide race to "ethically" source battery materials and crank up production to meet demand. The industry's experts are projected to spend $1.2 trillion to develop and produce EVs through 2030 and most of them believe that more and better batteries remain key to their products reaching a market tipping point.

In recent decades, it wouldn't have made sense for a US automaker to also become a materials processing or mining company, but with today's world-wide supply chain and political issues, the winner of its EV sweepstakes will likely have to take the same sort of "drastic" measures that Henry Ford did to render his model T automobile cheap enough for his era's "middle" class workers to purchase.

Tesla's Mr. Musk also got out in front of the world's legacy automakers by thinking in terms of vertical integration, the need to control the entire supply chain, from lithium brine and cobalt mines to final production and recycling.

There are many possibilities that are not currently being given much press here in the US.

More sophisticated chassis and battery design along with a national commitment to implementing charging infrastructure would help us out a lot. Tesla's Superchargers aside, the industry's experts cite the USA's patchwork, notoriously unreliable charging network as a leading roadblock to EV adoption. 2021's U.S. Infrastructure Law is providing $7.5 billion to build a network of 500,000 EV chargers by 2030. But rather than own and operate their own chargers like Tesla is doing, GM, Ford, and others who rightly in my opinion argue that standardized, open-source chargers are critical to convincing more Americans to kick their ICE habit. Those refueling systems must be available everywhere that people live and work and useful to any car brand. It would also help if those chargers were more reliable than today's: A 2022 study concluded that nearly 25 percent of the San Francisco Bay area's public chargers —a mecca for EV ownership—weren't functioning properly. To fill those gaps in public networks, GM is also establishing "uptime guarantees" with its charging collaborators which would allow drivers to see in advance if a charger is operational and to hold them a spot.

Automakers and battery manufacturers are coming up with lots of other possible solutions including more efficient chassis and battery designs that could give renewed life to "lesser" but good-enough battery chemistries that would otherwise be uncompetitive and obsolete — especially the relatively cheap lithium iron phosphate system that has become the hottest thing in batteries around the world.

The two things that still don't seem to be getting much attention here in the USA are Thomas Edison's "battery switching" refueling concept and the far East's adoption of the sorts of smaller/lighter/cheaper commuter-type BEVS that could satisfy 95% of our needs too.

Let's next consider a solar panel-based combined heat and power system. As far as sunlight is concerned, a well- designed solar panel is essentially a black hole which means that it converts almost 100% of the light striking it to some other form of energy – typically 80% heat and 20%

electricity. This translates to “capacities” of about 800 watts/m^3 worth of heating and ~200 watts/m^3 of electricity which means that solar panels situated ***behind*** the windows of a well-insulated shed or home, could serve to both heat and power that home. DIY implementation of this concept combined with my cheap “green sourced’ foamboard insulation brainstorm offers homeowners an affordable way to alleviate their energy-related economic concerns.

Smarter shopping

Here’s a typical example of how much money that becoming willing to think and do for yourself can save you & your family.

Let’s assume you’ve decided to serve your family of four “dieters”, home-baked, skinless, chicken breasts and your local supermarket is advertising a chicken sale. When you get there, it has four different chicken breast offerings “on sale”.

- Individually packaged, already marinated, six- ounce chunks of “organic, free range, skinless/boneless chicken breast” meat for $3.50 each
- Two-pound packages of “organic” boneless & skinless chicken breasts for $7.98 (marked down from $11.98!)
- Boneless half breasts with skin @ $2.98/pound
- Half breasts with both bone & skin for 99 cents/pound

HOMEWORK QUESTION. If each member of your family would like to be served nine, not just six ounces of boneless, skinless, chicken breast meat and the skin of a typical looking 588-gram, whole raw half chicken breast weighed 54 grams & its bones 28 grams (these are all “real” numbers), what would each of those options cost if you’re willing to learn how to debone/deskin a chicken breast? [Answers, top to bottom: $21.00, $8.98, $7.32, & $2.54 the last of which equals 0.99/16*((54+28+588)/588)*(4*9)]

APPENDIX II Relative efficiencies of veganism vs carnivory people feeding

Ideal world comparison

Polyface farm was featured in Michael Pollan's best-seller, The Omnivore's Dilemma, representing exemplary sustainable agriculture. His book favorably contrasts Polyface's approach to raising livestock to today's predominant Confined Animal Feeding Operation (CAFO or "factory farming") practices. That farm's owner/operator raises naturally pastured cattle, pigs, turkeys, rabbits, and both meat-producing & egg-laying chickens, on ~100 acres of optimally/sustainably/organically - managed grassland in the state of Virginia.

Polyface Farm's annual production*		kcal /100 acre	g protein/100 acre
50 beeves	"25,000 lb beef"	3.04E+07	2.27E+06
eggs	30,000 dozen	2.88E+07	2.52E+06
12,000 broilers	typ 2 kg, 71% edible, 121 kcal/100 g	2.06E+07	3.65E+06
250 pigs	"50,000 lb pork"	6.81E+07	4.86E+06
800 turkeys	typical 6 kg, 71% edible	2.93E+06	7.29E+05
500 rabbits	typical 7 lb 50% meat	9.61E+05	1.70E+05
800 stewing hens	typical 6 pounds, 71% edible	2.32E+06	3.31E+05
	sum kcal=	1.54E+08	1.45E+07
	grain only same acreage		
	kcalories per 100 acres of 200 bu/ac corn=	1.86E+09	4.79E+07
	kcal per 100 acres of 47.4 bu/ac soybeans=	5.37E+08	4.34E+07
	kcal/100 acre 4:1 corn/soy	1.59E+09	4.70E+07
*Pollan, Michael (2006), ***The Omnivores Dilemma, p.222,*** The Penguin Press ISBN 978-1-59420-082-3.			

Table 15 Ideally implemented carnivory vs veggie people feeding land use requirements

Table 15's figures are based upon Polyface Farm's production claims assuming the USDA's live animal-to-carcass weight conversions and the FDA's beef-meat, egg, soybean, and corn compositions.

Real world (more likely) land use efficiency comparison

In today's real (not Polyface's) world, that differential would be considerably larger. For example, according to Cattle and Pastures Power Nebraska | Peoples Company the number of acres needed to sustain a cow/calf pair ranges from 18 in far western Nebraska to 5 in the eastern part of that state - that's a total of about 22 million acres of land that could provide, an average of 11.5 acres/cow-calf pair.

If each cow raises one calf that's harvested each year, these numbers translate to producing one, one year old, beef cow or steer per 11.5 acres of "natural land"/year.

An average year-old beef-type cow/steer weighing 1000 pounds generates a carcass weighing around 630 pounds after its head, blood, feet, guts, skin, and offal are removed. That carcass is typically hanged (aged) in a cold room for a week or two (the longer the better, taste/tenderness wise) during which time it loses ~5% of its weight. When then cut up for retail sale, it'll produce about 420 pounds of bone-in or ~360 pounds of 1/8" inch fat trimmed , boneless, "free range beef" How Many Pounds of Meat Can We Expect From A Beef Animal? | UNL Beef.

The FDA's Food Data Composition tables says that 100 g of "*Beef, variety meats and by-products, mechanically separated beef, raw*" (raw beef meat) contains 276 kcal, 23.5 g of fat, and 15 grams of protein. That translates to free range beef-type agriculture producing 3.89E+4 (276 *160000/100/11.5) kcal and 2130 g of protein per acre per year.

This website . Gap growing between irrigated, rain-fed crop yields | Nebraska Today | University of Nebraska–Lincoln (unl.edu) teaches us that an irrigated food grain crop raised in that part of the USA's cow country will produce about one half as much grain per acre as it would if irrigated: in other words we might expect to harvest only ~30 bushels of soybeans/wheat or 100 bushels of corn per acre on such land. If corn, that adds up to 2.39E+5 g protein and 9.28+E+6 kcal per acre, if soybeans, 2.98E+6 g protein and 3.64E+6 kcal/acre, or 1.12E+5 g protein and 3.64E+6 kcal per acre of wheat raised on it.

For corn that translates to producing 115 times as much people food protein and 244 times as many calories if we were to raise/eat that veggie-type foodstuff instead of beef on that land.

The bottom line is that switching to "free range" meat production would further exacerbate the economic disparities responsible for a great deal of the USA's growing social unrest. . Doing so would also significantly reduce our/its environmental impacts (Figure 2).

APPENDIX III Conventional "Organic" farming's downsides

Ideally no more pesticides (herbicides and insecticides) should be used than is necessary because excesses may kill the organisms serving to convert both a product & cover crops' roots/stover to "soil organic carbon". However, Bill Gates was also right[405] when he said, "*genetically modified seeds and chemical herbicides, in the right doses – and not land-intensive organic farming – are crucial to curbing carbon emissions.*" Data, experimentation, and then engineering – in other words, choosing to "follow the science" – could solve most of both

[405] Mr. Gates has been right about lots of things recently including his attitude & actions with respect to developing/implementing a sustainable civilian nuclear fuel cycle - GOOGLE "*Terrapower*".

today's and the future's "wicked" technical problems. Research during the last twenty years has shown that genetically engineered seed crops and pesticides— the organic food industry's favorite bogeymen—have substantially reduced greenhouse gas (GHG) emissions and halted the global expansion of farmland . Those efficiency gains would not have been possible had the world's farmers refused to utilize "biotech's" services and products.

Without reduced tillage, farming's carbon footprint will increase to meet food demand and we'll end up reestablishing the conditions that led to the 1930's Dust Bowl. Glyphosate (a nuisance-plant pesticide) is an integral part of reduced tillage farming because it's often used/required to terminate the winter's cover crop(s). Any as-yet undiscovered genuine risk of glyphosate ("Roundup")must be balanced against the environmental impacts of increased pollution and energy consumption and very real risks of starvation, malnutrition, and (horrors!) disgruntled voters due to reduced production's inevitably higher food costs[406].

Because the customer is king in western world economic systems, activist groups generally attempt to ban pesticides and biotech products via scare tactics & court/legal maneuvers. They've tried but couldn't otherwise convince most growers to eschew the tools rendering today's agricultural business models profitable even though they do "concern" other people and "impact" everyone's environment.

For the last two decades believers in the anti-GMO movement/faith have been claiming that genetic engineered (GE) crops are destroying local food cultures. There's nothing new about such "engineering' because we humans have been enhancing our food crops' productivity for millennia by selecting which of Mother Nature's randomly engineered genetic mutations serves as our next year's seeds. Consequently, Hawaii grows virus-resistant papaya; Bangladesh produces insect-resistant eggplant; Nigeria cultivates cowpeas with that same trait and African researchers are now using modern gene editing to enhance the productivity of that continent's food crops to benefit that continent's food insecure people[407].

Development of the low RFO-high protein soybeans that we here in the USA should render easier/cheaper for ourselves to access was initially done over thirty years ago via traditional breeding techniques, which fact would now allow non-GMO certification and unrestricted use in U.S. and export markets, including even the EU. Seeds for such "food grade" soybeans are readily available to local producer/farmers from outfits like Benson Hill Seeds (Minnesota) and Brushvale Seed Inc.(IA) but see little demand because almost everyone either in or supporting the USA's soybean industry assume that soybean buyers extract oil and convert what's left to

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[406] ***Round up***'s lethal dose is 5600mg/kg. vs caffeine's 170mg/kg. Atrazine, cyanazine, fluazifop, alachlor, and the tortuous short-handled hoe that glyphosate ("Roundup") has largely replaced were all far more toxic than it is.

[407] Our engineering has included seeds improved by traditional slow/laborious backcrossing/selection techniques, genome editing (no introduced DNA), and full-blown Genetic Modification (GMO where snippets of DNA are added. Unfortunately, the European Union's plant scientists are currently baffled/frustrated by a 2018 European Court of Justice decision that departed from the international definition of GMOs to include genome-edited plants. Nonsensically politicized "technical" decisions like this decrease yields, impact biodiversity, and increase both food costs and pesticide/herbicide usage.

domesticated animal - not people - food. No one seems to care about the fact that farting even by animals subtracts from even their businesss' bottom lines408.

According to the Smithsonian's futurists[409], we humans must produce as much food during the next forty years as we did during the last 5000 years. This means that if we don't change how we feed ourselves, essentially all of the world's remaining natural grasslands and forests will be converted to a mix of farmland and deserts within another human lifetime. Achieving the degree of efficiency required to leave at least some of the Earth's habitable surfaces untouched/unpolluted, will require more, not less, genetic as well as other sorts of deliberate "engineering".

An obsession with organic farming has already triggered an eminently predictable economic crisis[410]. Sri Lanka's recent collapse, from one of the fastest growing Asian economies to a political, economic, and humanitarian horror show, seems to have taken most of our most important experts by surprise.

Five years ago, the World Bank was extolling "*how Sri Lanka intends to transition to a more competitive and inclusive upper-middle income country*" (does that sound familiar?). Up to the middle of last year, despite the impact of the COVID-19 pandemic, that country's misery index (inflation plus unemployment) was low and falling but then took quintupling within one year.

The reason was that in April 2021, President Gotabaya Rajapaksa announced that he was banning most pesticides and all synthetic fertilizer, so that his country could become fully "organic". Within months, Sri Lanka's tea exports had halved, specialty crops like cinnamon and cardamom yields tanked, and plummeting rice yields led to an unprecedented need to import its people's primary foodstuff. Staple foods became pest-infested and too expensive which led to widespread hunger.

Because its government became unable to service its debts, Sri Lanka's currency collapsed.

Sri Lanka's government had promised that there would be plenty of additional manure despite the fact that replacing the "synthetic" nitrogen that had been sustaining its agriculture would take at least five times more nitrogen than that country's livestock could produce. However, at last year's much-hyped "Glasgow climate summit" (COP 26) Sri Lanka's president was still boasting that his agricultural policy was "*in sync with nature*" and was of course widely praised causing his country to score 98 out of 100 on the United Nation's "ESG" (environmental, social and governance) international investment rating system.

[408] Farts are fueled by indigestible sugars and therefore represent wasted energy - not pork, milk, eggs, chicken nuggets or "broilers".

[409] I've been watching the Smithsonian TV channel's, "The Age of Humans" program series.

[410] This section is a rewrite of an article written by Matt Ridley 14Jul2022 Eco-extremism has brought Sri Lanka to its knees | Matt Ridley (rationaloptimist.com)

Sri Lanka's much-admired environmentalist, Vandana Shiva, has led relentless criticism of Dr. Borlaug's "Green Revolution which had brought both fertilizers and "engineered" crop varieties to her county, banishing famine for the first time in history as its population continued to increase[411].

Her and others' claims that traditional, organic farming could feed the world more healthily remain wildly popular among environmentalists.

In March 2022 the Breakthrough Institute's Ted Nordhaus said: "The farrago of magical thinking, technocratic hubris, ideological delusion, self-dealing and sheer shortsightedness that produced the crisis in Sri Lanka implicates both the country's political leadership and advocates of so-called sustainable agriculture."

Agricultural scientist Prof Channa Prakash of Alabama's Tuskegee University has opined that "*Sure, organic agriculture is sustainable: it sustains poverty and malnutrition*."

Farming was done "organically" back when millions of people routinely died during famines every year and the absence of "engineered" fertilizers and water-provision systems turned the USA's mid and southwestern farmlands into dustbowls during droughts.

The impact on both nature and human living standards if the world were to abandon factory-made nitrogenous fertilizers would be catastrophic. Today, about one half of the nitrogen atoms within an average person's body was "fixed" by ammonia factories, not by Mother Nature's mechanisms. To feed today's ~eight billion people in the same way that we're now doing it with today's officially "organic" methods would likely put over twice as much land under the plough/cow which would consign the rest of the world's wetlands, nature reserves, and forests to history.

[411] We humans already weigh more than all other land mammals combined other than our domesticated animals.. The declining "average births per woman" figures quoted by people that don't want to believe that there soon won't be far too many of us aren't really all that relevant because the decision to having a large family is religious/cultural. Within a few more generations, most of us are likely to been born to the members of so inclined groups– not to "average" people.

APPENDIX IV Regenerative Agriculture

“ From Day One, the Biden-Harris Administration has prioritized addressing the climate crisis both at home and as a core element of our national security and foreign policy. The climate crisis is reshaping our physical world, with the Earth’s climate changing faster than at any point in modern history and extreme weather events becoming more frequent and severe. In just 2021, wildfires raged across the western United States, throughout the Mediterranean region, and eastern Russia; Europe, China, and India experienced extreme flooding, and the world has suffered unprecedented levels of drought. The scientific community is clear: human activities have directly contributed to climate change. We are already experiencing the devastating impacts that climate has wreaked on almost every aspect of our lives, from food and water insecurity to infrastructure and public health, this crisis is exacerbating inequalities that intersect with gender, race, ethnicity, and economic security. We have reached a point where we cannot reverse some of the changes to the climate system.”

https://www.whitehouse.gov/wp-content/uploads/2021/10/Report-on-the-Impact-of-Climate-Change-on-Migration.pdf

"*It was among the strongest feelings of grief I have ever encountered.*

The contrast between the vicious coldness of space and the warm nurturing of Earth below filled me with overwhelming sadness. Every day, we are confronted with the knowledge of further destruction of Earth at our hands: the extinction of animal species, of flora and fauna . . .things that took five billion years to evolve, and suddenly we will never see them again because of the interference of mankind. It filled me with dread. My trip to space was supposed to be a celebration; instead, it felt like a funeral."

William Shatner after his Blue Origin trip to space

(Figure 95 depicts what had inspired “Captain Kirk’s” soliloquy)

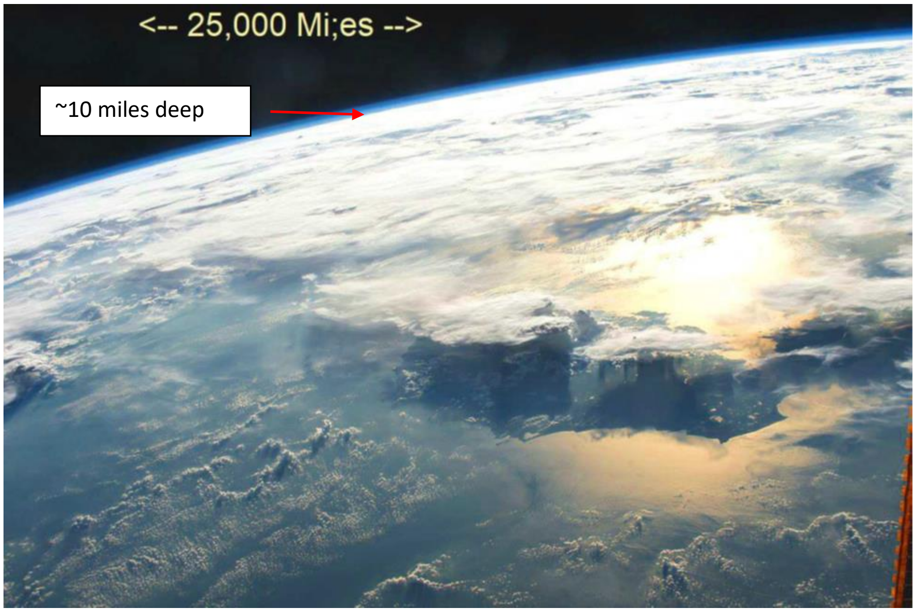

Figure 95 The earth's habitable zone in perspective

"Peak soil" refers to that point in time when we no longer have enough fertile soil to feed ourselves. It's analogous to the other "peaks"– "peak oil", "peak gas", "peak food", "peak patience"[412], etc. that we will inevitably summit within another single human lifetime unless we change our paradigms. As it has typically been implemented, Dr. Borlaug's "Green Revolution" has harmed - sometimes even ruined - agricultural soils. . Addressing "peak soil's" otherwise inevitable mass starvation, migrations, and therefore wars will require changing what we eat and adopting the agricultural suggestions proffered by Hensel 1894, Hamaker 1982, Lal 2001-2019, the Rodale institute 2020, UN 2013, DeMartini 2018, and finally, Beerling et al 2018) in an especially "high-tech", green, but currently non-optimal economic fashion due to inconsistency with current business models.

Researchers from the University of California, San Diego; Colorado State University; Stanford University; and Germany's Max Planck Institute for Meteorology jointly funded by the National Science Foundation, the German Research Foundation, and the Gordon and Betty Moore Foundation have concluded that rising greenhouse gas (GHG) emissions from farming-

[412] "patience" because when enough of this world's people become desperate enough, a third world war is apt to break out that will likely kill a much higher percentage of us than did the 20th century's.

motivated “land-use changes” (e.g., burning off still more of the Amazon’s rain forest) will jeopardize the IPCC Paris Agreement's goals without substantial changes in agricultural practices[413].

They investigated the processes responsible for “climate change” paying particular attention to net CO_2 emissions caused by the “conversion” of forests to farm acreage[414]. Poorer countries in Latin America, Southeast Asia and sub-Saharan Africa are experiencing the most pronounced surge in such-engendered GHG emissions. East Asia, South Asia and the Middle East produced relatively less such pollution, but their total agricultural emissions nevertheless continued to grow as their farmers struggled to keep up with rampant population growth. More affluent North America, Europe and Oceania have recently demonstrated negative land-use change emissions but nevertheless exhibited substantial agriculturally- originated atmospheric pollution.

That report’s authors also concluded that emerging and developed nations can lessen agricultural emission intensities by adopting better soil and livestock waste management technologies, more efficient tilling and harvesting methods, and by reducing food waste.

"*While the situation in low-income countries is critical, mitigation opportunities in these places are large and clear, improving yields on already cultivated land can avoid clearing more carbon-dense forests for cultivation of soybeans, rice, maize and palm oil, thereby drastically reducing land-use emissions in these countries.*"

Dietary changes would also help because while red meat supplies only about one percent of the world’s people-food calories, its production generates about one quarter of our total “land use change” related greenhouse gas emissions. It’s also tremendously wasteful water-wise - producing a single hamburger requires about 600 gallons of fresh water primarily due to the way that feed/fatten cattle.

A German supermarket recently made the news by double pricing some of its offerings, one of which was the price to be paid at the cash register and the other was its ‘true price’ including the social and ecological impacts of its production INSIGHT: Carbon footprint labelling – a growing trend among consumer goods companies | ICIS . The “true” prices of Gouda cheese and CAFO-generated ground beef were 88% and 173% greater than their cash register prices. With fruits and vegetables those differences depended upon where and how they were raised (e.g., in both Germany and the USA, pineapples and bananas *should* cost more than apples because they must be imported, but often don’t). For that market’s “organic” products, price differences were smaller, but even so-labeled ground beef should cost 126% more than what its buyers were to pay for it.

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413 Hong C, Burney JA, Pongratz J, Nabel EMS, Nathaniel D. Mueller ND, Robert B, Jackson RB, and Davis SJ, Global and regional drivers of land-use emissions in 1961–2017. Nature, 2021; 589 (7843): 554 DOI: 10.1038/s41586-020-03138-y

414 The “clearing” of the Earth’s forests is mankind’s single biggest environmental impact.

Another metanalysis performed by agroecologists, environmental modelers and economists from UW-Madison, the University of California, Davis, Kansas State University, and the University of Kentucky recently published in the *Proceedings of the National Academy of Sciences*[415].concluded that the carbon emitted by using farmland to grow corn to feed, first

Figure 96 One of the problems with today's biofuels

breweries & then livestock can negate or even reverse any climate-related benefits reaped by burning corn-derived ethanol instead of gasoline. This confirms what many scientists had already realized: from a climate and environmental standpoint, corn ethanol is neither a good biofuel solution nor a good thing to be making in a world containing nearly a billion "food insecure" people[416].

The bottom line is that as our population continues to increase (see APPENDIX X for another troublemaker's opinion about that) and the world gets hotter, farmers and policymakers

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[415] Tyler J. Lark, Nathan P. Hendricks, Aaron Smith, Nicholas Pates, Seth A. Spawn-Lee, Matthew Bougie, Eric G. Booth, Christopher J. Kucharik, Holly K. Gibbs. **Environmental outcomes of the US Renewable Fuel Standard**. *Proceedings of the National Academy of Sciences*, 2022; 119 (9): e2101084119 DOI: 10.1073/pnas.2101084119

[416] If motor fuel production continues to be one of Iowa's topmost priorities, its farmers ought to be raising a more productive "dry biomass" crop like Giant Miscanthus instead of corn Giant Miscanthus for Biomass Production (iastate.edu). They should also be encouraging its politicians and businesspersons to build enough nuclear power plants to power enough electrolyzers to generate enough hydrogen to convert most of that biomass to hydro-carbonaceous fuels, not ethanol. If that were to happen the same acreage currently devoted to making corn ethanol could generate over four times as much useful energy in the form of the same fuels (gasoline/kerosene/diesel) that real-world engines have been designed to "burn". - see Estimated Cost of Establishment and Production of Miscanthus in Iowa | Ag Decision Maker (iastate.edu) , Iowa Ethanol Plants | Iowa Corn, and C. W. Forsberg, C., B. Dale, D. Jones and L. M. Wendt, *Can a Nuclear-Assisted Biofuels System Enable Liquid Biofuels as the Economic Low-carbon Replacement for All Liquid Fossil Fuels and Hydrocarbon Feedstocks and Enable Negative Carbon Emissions? Workshop Proceedings*, Massachusetts Institute of Technology, MIT-NES-TR-023. 2022. https://canes.mit.edu/download-a-report [Accessed 15 July 2022]

everywhere must strive to implement the "best practices" usually referred to as "regenerative agriculture".

Regenerative agriculture invokes four guiding principles: don't till the soil more than necessary, keep it covered, keep its crops diverse (rotate it through at least three different crops), and, finally, replace the minerals that harvesting removes.

Reduced tillage preserves the pathways forged by the roots of plants, insects, and earthworms. Those pathways comprise the porosity which allows the ground to store water during dry times and soak it up during floods. Deep tilling disrupts/kills the soil biomes that convert its inorganic matter to healthy/fertile soils – in other words, it interferes with Mother Nature's soil-making mechanisms.

For example, when a fungus sticks itself to a rock, it releases organic acids-and chelating (complexing) to extract at whatever inorganic mineral "food" it needs (e.g., iron, potassium, phosphorus, zinc…). Its quickly growing fungal filaments then cut further into the remaining rock breaking up its now-depleted surfaces to expose fresh layers for further consumption.

Cover crops keep the soil in place, enrich it with organic matter, and improve its water retaining capacity by keeping it within vegetation rather than letting it wash away into drainage ditches and rivers. Keeping the soil covered and filled with both fresh and decayed root matter reduces the probability of its being eroded by wind or flooding due to heavy rainfall or too rapid springtime snow melting. Cover cops like alfalfa, rye, vetch, clover, and sorghum are grown first and then killed via herbicide application, macerating, or (best) by "crimping"[417] but left in place when the cash/food crop (e.g., corn, wheat, rice , peanuts, etc.) is planted. In some cases, an easily winter-killed cover crop like oats planted in the fall after cash crop harvesting serves as the cover crop. When with the help of bugs, earthworms etc., both crops' above-ground plant matter along with their roots eventually become part of the soil, their decayed remains ("humus") loosens it up, increases moisture retention, and thereby enhance cash/food crop yields. However, in most US states the degree of cover cropping hovers between only 2 and 5 percent[418]. The USDA's goal is to expand coverage to 30 million acres by 2030 which would effectively double it.

Planting diversely discourages plant pandemics and prevents the nutrient drain occurring when the same crops are grown season after season. Over time, crop rotation also adds a variety of soil nutrients. When necessary, planting drought-resistant crops (e.g., in Africa, cowpeas rather than peanuts) would save water and use what's available more efficiently.

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[417]Next spring, the cash crop's planter's "crimper" breaks the cover crop's (e.g., rye grass) main stem and lays it flat so that the cash crop's seed-shoots can get sufficient sunlight.

[418] Iowa is relatively but not absolutely forward thinking in this respect. In 2022, roughly three of its ~30.6 million acres of farmland was cover cropped. However, most of its cover crops are being killed with herbicides because mechanical means ("crimping")would require the purchase of new/different/expensive equipment.

Of course, the downside of “planting diversely” is that if our nation’s agricultural business model-setters only reward farmers for maximizing production of whatever crops their immediate-customers currently favor (e.g., corn and unnecessarily “fartlich” soybeans), gentle (not mandated), suggestions that crops not so-rewarded be planted instead are apt to be ignored.

A fifth guiding principle should be to replace the shelterbelts that used to line ditches and surround rural fields and homes.

The integration of trees and wildflowers into farmland through “agroforestry” would provide a wealth of benefits to both farmers and local ecosystems. Farmers appreciate their ability to prevent erosion caused by wind, especially during dry periods. USDA helped farmers to use this technique during the Dust Bowl and has tried to expand it ever since. Perhaps one of their most important functions for farmers is providing pollinator habitat. By providing safe havens for bees, birds, and other pollinators to build their homes, trees support these creatures whose behavior enables their crops to grow. Trees also provide other benefits, including carbon sequestration, water quality improvement, and climate change adaptation through modification of the local microclimate.

Finally, another especially timely/significant plus is that ROA would eventually “fix” the Earth’s greenhouse gas polluted atmosphere and thereby address the root cause of anthropogenic climate change by converting excess atmospheric carbon dioxide to “soil organic carbon” (SOC) see Lal et al 2018)[419]. That mechanism represents the single most powerful weapon we possess to address both climate change and the now near future’s more severe food insecurity issues (see APPENDIX III and read ‘‘The carbon sequestration potential of terrestrial ecosystems’, JOURNAL OF SOIL AND WATER CONSERVATION NOV/DEC 2018—VOL. 73, NO. 6. [The carbon sequestration potential of terrestrial ecosystems | Journal of Soil and Water Conservation (jswconline.org)]

Although properly incentivizing “carbon farming” has been floated by the Biden administration would be the most sensible way to implement the “negative emissions” required to meet the Intergovernmental Panel on Climate Change (IPCC)’s climate remediation goals, it doesn’t yet provide a sufficient income stream incentive to US farmers. That must change because Switching to no till farming, cover cropping, and rotation over more than just two cash crops will cost “big” money (different machinery, different/more seeds, and more work/attention) that many of today’s farmers don’t possess. Doing such “noble” things should be tangibly rewarded, not punished because it’s inconsistent with current agricultural business models.

If that’s not a good-enough reason to adopt full-blown regenerative “organic” farming, then ensuring that our great grandchildren will have enough to eat should be. Globally, 750 million people were undernourished in 2019 due to “climate changes” causing a decline in food

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419 Humus (decomposed organic matter) averages about 57 weight % carbon vs raw “biomass’s” ~51 wt% C . See Lal, R et al (14 others), The carbon sequestration potential of terrestrial ecosystems, JOURNAL OF SOIL AND WATER CONSERVATION NOV/DEC 2018—VOL. 73, NO. 6.

production, hikes in food prices, and increased competition for both land and water. Global food insecurity issues have recently become worse due to Putin's war and humanity's response to the Covid 19 pandemic. World crop yields are projected to decrease by 25% within the next 25 years due to climate change while global food production must almost double by 2050 to feed projected human population growth.

As an aside, let's do a ballpark calculation to see how Mankind's succeeding in deliberately increasing the world's SOC concentration would affect its atmosphere.

Here goes:

The earth's land surface (≈30% that of a 4000-mile radius sphere) is ~1.56E+14 m^2.

If half of it is natural grassland and/or forest with soils possessing a bulk density of 1.3 g/cc & containing 3 wt% SOC within its uppermost one-third meter (which depth encompasses most food crop root zones), that works out to 1.01E+18 grams of SOC (1.01E+12 metric tons = 1010 Picograms (Pg) of carbon) or ~ 117% of that (~870 Pg) currently in the earth's atmosphere).

Today's ~421 ppmv[420] atmospheric CO_2 concentration is ~20% above the 350 ppmv figure that many of the world's climate modeling experts consider the absolute upper limit of "safe". It's also ~50% higher than it was in 1900 AD during which time since we've also more than doubled atmospheric methane and N_2O concentrations both of which are much stronger/worse greenhouse gases per molecule than is CO_2.

Those figures correspond to the Earth's atmosphere containing 62/412*867 or 130 Gt of excess carbon which is apparently enough to cause '*heat apocalypses'* in many places unprepared (i.e., too poor) to deal with them.

As I was first writing this section (7/19/2022), a heatwave with temperatures exceeding 40°C (104°F) gripped much of North America, the United Kingdom, Spain, France, and Portugal, as well as much of Asia, killing people, damaging crops, and causing cascades of ecological and environmental issues. Now just five months later (December 2022) , another purportedly "once in a generation" winter storm very much like February 2021's Uri Event that had brought ice, sleet and record cold temperatures across much of the United States, Northern Mexico, and parts of Canada and causing over $200 billion s worth of damage and hundreds of deaths by freezing up gas and water distribution systems and knocking out power plants.

Consequently, the only thing that we the most sapient[421] of all God's creatures, would have to do to "fix" our world's atmosphere is to increase the mean SOC concentration of one half of its land surface by 0.4% (130/1010 billion tonnes), or, let's say, from 3 to 3.4% SOC.

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[420] ppmv = parts per million by volume (≈ molecule-count in a gas mixture like air).

[421] Some individual humans are brilliant but collectively we tend to act as if we're on an intellectual par with yeast - that's the main reason why we go to war so often and so many of our civilizations have collapsed (see Jared Diamond's iconic book, "Collapse"). -

That shouldn't be too difficult for a rich technological civilization's richest, best, and cleverest people to accomplish if they were to be properly incentivized. Afterall, we did manage to put twelve men on the moon and then safely return them over 50 years ago – back when AMERICA hadn't lost both the will and apparently the ability to tackle big but "controversial" technical problems.

The USA's typically $20/year/acre carbon credit for doing what needs to be done, isn't sufficiently "proper"[422].

Considering the threats imposed by anthropogenic climate change, energy/raw material shortages, and still-continuing population growth, the benefits of doing research to boost our farmland's survivability and productivity should be obvious. Consequently, today's agricultural researchers aren't just trying to further enrage/frighten our country's most "concerned" citizens by devising even more "evil" GMOs and pesticides, they are instead studying things like how plants go about producing more salicylic acid in response to environmental stresses and how to render corn less vulnerable to heat stress.

A recent (May 2021) cross-disciplinary research collaboration reported that a majority of U.S. citizens would prefer such natural climate change mitigation strategies over any of the host of high-tech climate engineering schemes that have been proposed (see Sweet et al., [Perceptions of naturalness predict US public support for Soil Carbon Storage as a climate solution - PubAg (usda.gov)](#))

Since continuously harvesting crops eventually removes whatever labile nutritious minerals their soil contained (e.g., N, K, P[423], Fe, Ca, Mg, Zn, etc.), they must be replaced if it is to remain useful/fertile. Recycling everything removed by harvesting via night soil (manure/urine) composting/spreading would and should be a good way to do it. Another would be to "remineralize" such soils with powdered basalt[424]. Basalts are better for that purpose than is either granitic (mostly quartz and feldspar) or limestone-type rocks because: 1) their chemical compositions better match plant requirements (in particular, some basalts contain a good deal of phosphorous[425]); 2) it is more readily/rapidly weathered to form good soil mineral

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[422] "Carbon credit" is a concept involving the selling/buying of carbon units (usually in terms of tonnes of captured/ fixed/sequestered atmospheric carbon dioxide), through privatized middlemen (e.g., Indigo, Agoro Carbon Alliance, etc.) that aggregate contracts from farmers meeting their government's carbon sequestration criteria via implementing some or all of its much-studied conservation practices; A carbon credit is purchased for the same reason that "indulgences" were during the Middle Ages; it's a license allowing you to continue sinning.

[423] Phosphorous is the most critical nutrient mineral – simultaneously necessary, relatively expensive, can't be man-made, and readily rendered useless/unavailable to crops if mismanaged (see APPENDIX XI).

[424] Beerling, D.J., Kantzas, E.P., Lomas, M.R. et al. Potential for large-scale CO_2 removal via enhanced rock weathering with croplands. Nature 583, 242–248 (2020). https://doi.org/10.1038/s41586-020-2448-9.

Cozier, Susan 1sept2021 How Adding Rock Dust to Soil Can Help Get Carbon into the Ground - Yale E360

[425] For example, Idaho's huge flood basalt deposits contain ~0.5 wt% of both K_2O and P_2O_5.

substrates; and 3) basalts are intrinsically basic (more calcium and magnesium & less alumina, iron, & silica) and therefore better at both neutralizing acidic soils and sequestering atmospheric carbon dioxide.

Although only about 1.5% of the USA's farmers have adopted those practices, there's some good news because several food conglomerates -General Mills, Unilever, PepsiCo and Nestle- do recognize the value of increasing nature-based production [The pioneers trying to restore life to America's stressed soils | Reuters Events | Sustainable Business].

General Mills has been particularly vocal, pledging to advance regenerative agriculture on one million acres by 2030, which would represent 25-35% of its worldwide sourcing footprint.

According to its spokesperson over200,000 acres of the USA's Northern Plains, Southern Plains and Great Lakes and south-central Canada are enrolled in the Kansas Department of Health and Environment's "Eco-Harvest" marketing program that GM is supporting ($3 million to date). That program gives credits to wheat, oat, corn and dairy farmers in the U.S. and Canada for "*improved ecosystem services*" achieved by adopting ROA's principles.

General Mills is also partnering with tech firm Regrow Agriculture to monitor 175 million acres of farmland via remote sensing in North America, Europe, and South America. It's also "approached: Brown's consultancy, Understanding Ag, to help teach oat farmers in the USA's Northern Plains region about regenerative practices". General Mills buys from grain terminals, not directly from farmers, but saw the value to its supply chain if it helped educate farmers."

There is also evidence that the USDA is alert to the need to adapt. Earlier this year (2022) it announced a plan to double the country's cover crop plantings to 30 million acres by 2030 and its *Partnerships for Climate-Smart Commodities* program, set out in February, "*will provide up to $1 billion for pilot projects that create market opportunities for commodities produced using climate-smart practices*".

Canada's Trudeau government recently proposed increasing its funding to boost regenerative agriculture, with C$25 million earmarked for its cost-shared "*Resilient Agriculture Landscape Program*". Although sustainable agriculture proponents like Canada's "*Farmers for Climate Solutions*" coalition, had hoped for more, they opined that there were "many positive outcomes" from the new agreement.

"grains are just cute little bundles of energy"

(Ag market analyst Tommy Grisafi's response to Scott Shelladay's question about how gas/oil values correlate with food commodity values (RVD TV 3Jan2023))

Of course, rendering agriculture genuinely sustainable would require changes in how we do other things too, the most fundamental of which would be to implement a sustainable nuclear fuel cycle (today's isn't) at a scale large enough – ~$22*10^{12}$ watts (22 Terawatts) of electrical-type energy - to address the even more "wicked" environmental/resource/social issues caused by also reaching "peaks" in the gas, oil, and coal energy resources currently powering ~80% of our civilization including almost 100% of anything having to do with food production. Batteries big enough to power farm tractors and back up electrical grids are and will likely remain prohibitively expensive and wind/solar power sources will remain too unreliable, too resource intensive, and too environmentally impactful to replace the fossil fuels now posing “existential risks” to Earth’s “higher” life forms.

Much research has also been performed in this arena – in particular, I recommend that my readers start by GOOGLing “M. King Hubbert ” to learn about who he was, who he worked for, and what he had concluded about civilization’s long term energy prospects six decades ago[426]. They should next learn about how nuclear energy could address mankind’s other resource limitation issues from the person who coined the terms “technological fix”, “trans scientific”, and “big science”, longtime Director of Oak Ridge National Laboratory, government consultant, and essayist, Dr. Alvin Weinberg[427] Unfortunately, his and Hubbert’s conclusions/advice don’t jibe with the western world’s most important decision makers’ business models both then and now [428]- that’s why we/they went on dumping greenhouse gases into the atmosphere until it’s

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[426] Hubbert, M. K. (1956), “Nuclear Energy and the Fossil Fuels,” American Petroleum Institute Drilling and Production Practice, Proceedings of Spring Meeting, San Antonio, 1956, pp. 7–25; also published as Shell Development Company Publication 95, June 1956 1956.pdf (energycrisis.com .

[427] Goeller, H. E and Weinberg, A. M. 1976. The Age of Substitutability, Science, 191, 4228: 683, Feb 20, 1976. (paywalled, the original (1974) version is available gratis at http://www.osti.gov/scitech/serv.). In 1971 Weinberg, then long-term Director of the USA’s Oak Ridge National laboratory, used the term "Faustian bargain" to describe nuclear energy: “*We nuclear people have made a Faustian bargain with society. On the one hand we offer—in the catalytic nuclear burner (i.e., the breeder)—an inexhaustible source of energy. Even in the short range, when we use **ordinary** reactors, we offer energy that is cheaper than energy from fossil fuel. Moreover, this source of energy when properly handled is almost nonpolluting. Whereas fossil-fuel burners emit oxides of carbon, nitrogen, and sulfur... there is no intrinsic reason why nuclear systems must emit any pollutant except heat and traces of radioactivity. But the price that we demand of society for this magical source is both a vigilance from and longevity of our social institutions that we are quite unaccustomed to*.” For expressing such an anti-business-as-usual sentiment in a public forum, Nixon’s AEC downsized him in 1973. He went on to serve as the director of the Energy Research and Development Office (ERDO), first in the White House and then as part of the Federal Energy Administration. write eight books, and coin the terms “big science” and “trans scientific”.

[428] The implementation of a breeder reactor-based energy system could satisfy 100% of Mankind’s total energy needs (~22 TWe’s worth) “forever” because it could be fueled with all of the Earth’s natural actinide fuel resources, not just the seven tenths of one percent of its uranium (^{235}U) fissionable in today’s power reactors. The reasons for “forever” are that 1) the Earth’s crust contains more natural actinides (U +Th) than it does fuel-type carbon, i.e., 10-12 ppm U + Th vs ~2.8 ppm C, and 2) fissioning a single actinide atom generates ~64 million times more energy than does burning a single elemental carbon (coal) atom. Uranium/plutonium-based breeder reactors like Russia’s already thoroughly demonstrated BN 800 close coupled to an efficient fuel reprocessing/recycling system could generate ~20 times more energy from one cubic meter of average crustal rock than we’re getting now by burning one tonne of bituminous coal. A thorium-based nuclear fuel cycle could generate ~three times that much energy for us. Full scale implementation of either of those nuclear fuel cycles represents a “renewable” (effectively inexhaustible), clean (no GHG emissions) energy source with far less environmental and esthetic/visual impact than would a sufficiently overbuilt wind/solar/battery-based “renewable” energy system.

now become too late to change things quickly enough to painlessly "save the world" with anything that we/they might eventually agree to do[429].

In a capitalistic society, how do we assign sufficient monetary value to doing something as idealistic as "preserving Nature" or implementing a "save the-world" nuclear renaissance to make them happen? For that to happen, our government's leaders must shift their paradigms because we humans are natural born capitalists (simultaneously competitive and self-serving) which means that in a capitalistic (privatized) society, unless governmental policies sufficiently incentivize individual investors, they'll/we'll collectively continue to destroy the world.

Finally, I should mention that unlike most of his fellow prominent environmentalists, ex US Vice President Gore compensates for the greenhouse gases emitted by his jet-setting around the world to green conferences by practicing regenerative organic farming on his own "family farm".

[429] Even if we were to achieve CO_2 emissions stabilization, it alone would not immediately reverse global warming because CO_2 has a substantial atmospheric 'residence time' the time required for it to be removed via the natural carbon cycle's mechanisms. The length of that time varies—some CO_2 is removed in under less than 5 years while fixation by vegetation, soils and deep ocean cycling can take much longer. If we were to stop emitting CO_2 today, it would take several hundred years before most of our GHG emissions were removed from the atmosphere.

APPENDIX V DIY soymilk & baby formulas:

Here's how pondering this book's technical stuff influenced my opinions about the USA's baby formula business sector .

Soybeans contain all the essential amino acids necessary for human nutrition which fact renders them a safe/suitable nutritional foundation for us, our children, and our livestock. However, many people are nevertheless "concerned" about using them to make their own baby formulas. The USA's recent baby formula "crisis" was caused by the fact that Abbott Laboratories – a drug company that had become the USA's biggest popular baby formula manufacturer, closed a manufacturing facility in Michigan when a federal investigation began into why four of the several million(?) babies being fed with its products had developed bacterial infections, two of whom eventually died.

That rather phony crisis[430] disproportionately hurt poorer families because nearly half of US baby formula is bought under its federal government's (USDA's) WIC program[431] aimed at helping low-income women, infants, and children in a manner consistent with its food and drug sectors' business models. The FDA funds each state to purchase baby formulas for that program, each of which then grants exclusive contract rights to a particular supplier via some sort of secretive bidding process. Abbott is the biggest such business and therefore provides the formula feeding about half of US babies receiving such subsidized food. When its products disappeared in the states that had granted it exclusive supplier contracts, millions of US families both poor and rich were left scrambling to find alternatives because many retailers don't bother to stock products that their state's nutritional leaders hadn't been sufficiently motivated to officially bless.

As far as I am concerned the real issue is stubbornly bull-headed government program managers, its/their official experts, and most of their citizen-consumer "clients". Although synthetic baby foods are compounded of the same cheap, mostly commodity-grain-derived, ingredients comprising most of our supermarkets' other synfoods, baby formulas are both especially and unreasonably expensive.

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[430] It's "phony" because total annual US infant deathrates have hovered around ~5.5 per 1000 live births for quite some time now – that's over a thousand times more impactful than that caused by ABBOT'S blooper U.S. Infant Mortality Rate 1950-2022 | MacroTrends .

[431] In the USA there are significant class, racial, and economic breastfeeding rate disparities. Poor women breast feed at a lower rate than well-to-do mothers, and young mothers (<20 years old) do so at a substantially lower rate than do those over 30 years of age, with non-Hispanic black women having the lowest rate.

A few months ago (July 10, 2022), Walmart wanted $17.46 for a 12.4 ounce can of Enfamil powder – that's 1760 kcal's worth of it or enough to feed a 15-pound infant for about three days[432]. That's cheap compared to the ~$41/500 g retail cost of the especially "hypoallergenic" formula (likely meaning soy-based) that President Biden was then having the US Air Force fly over to us from Germany.

Because baby formula is often an infant's sole nutrition source, its manufacture is strictly regulated by the FDA. That agency requires certain nutrients at certain concentrations meaning that if a manufacturer's product does not contain those components either at/above a minimum level or within a specified range[433], it is deemed "adulterated" which usually triggers process shutdown and a recall. The FDA neither informs, educates, nor empowers parents/caregivers to make up their own "safe" formulas with inexpensive readily available materials. Because its experts also refuse to propose or evaluate DIY infant formulas which therefore may not possess the nutrients that they care most about at their currently recommended levels, parents are therefore left with no officially "acceptable" options, hence "a nightmare".

The USA's recent "terrible" infant formula shortages contrasted with the those experienced elsewhere around the globe. That's largely due to the FDA's delaying approval of otherwise safe infant formula from foreign sources which might have otherwise eased demand tensions in the United States. Like the USA's Department of Energy (DOE) and Nuclear Regulatory Commission (NRC) the FDA has a history of taking "almost forever"—often several years —to make decisions; i.e., approve foods and medications that the EU's notoriously conservative regulators have already deemed perfectly safe for human consumption. This is yet another in a long line of regulatory boondoggles - both the FDA and the Centers for Disease Control and Prevention (CDC) screwed up the early approval process for COVID-19 testing. The root cause of most such nonsense is that the people charged with regulating how things are to be done in this country aren't held responsible for their system's failure – as far as they are concerned, such considerations don't matter.

Here's what should be included in any DIY baby formula along with a recipe that should satisfy any "normal" infant's nutritional requirements (see Infant Nutrition Requirements and Options - StatPearls - NCBI Bookshelf (nih.gov)).

Fat: Fats, our most calorically concentrated energy nutrient, supplies 40% - 50% of the energy consumed by infants when human milk or commercial infant formulas are their only source of nutrients. The energy that fat provides spares protein for tissue synthesis and its caloric

[432] Current Recommended Daily Allowances (RDAs) for infancy energy intakes 108 kcal/kg/day from birth through 6 months of age, and 98 kcal/kg/day for the second half of their first year.

[433] For example, in 2021 baby formula manufacturers in several countries recalled their products because they contained the same amount of iron per calorie as does human breast milk – about 0.05 mg/100 kcal (see Breast milk - Wikipedia) instead of the U.S. Food and Drug Administration's) recommended twenty-times higher 1 mg Fe/100 kcal concentration.

concentration is an asset during periods of rapid growth when energy demands are great. Fat(s) comprise 47 to 49% of the energy content of most commercial formulas and about 52% that of average human milk.

Carbohydrates (sugars): Not all carbs are created equal. While all baby food formulas are required to provide a certain number of carbohydrate-type calories, in the U.S there are few restrictions about the type of sugar that's added to provide them. As such, there is significant debate about the best carb source, and in some cases, whether the type of sugar that is used in formula even matters at all. Let's look at common ingredients used to provide carbohydrates in formulas and discuss why some may be better than others.

When you read about sugar in a formula, it's likely be referring to its carbohydrate source(s) - not to "table sugar." Carbohydrates are characterized by the stoichiometric formula $(CH_2O)n$, where n is the number of carbons in the molecule. Their ratios of carbon to hydrogen to oxygen explain both the origin of the term "carbohydrate: zero valent carbon ("carbo") and the components of water (hence, "hydrate"). The three carbohydrate subtypes are monosaccharides, disaccharides, and polysaccharides, most of which share the suffix "ose" which renders them easily recognizable on a baby food package's ingredient list.

Monosaccharides (mono– = "one"; sacchar– = "sweet") are simple sugars, the most common of which are glucose (blood sugar) and the sweeter fructose (fruit sugar). The number of carbons in monosaccharides ranges from three to seven.

The "sugar" in infant formulas may be any combination of a number of sugars. Pure saccharides that may be used in infant formula include fructose (fruit sugar), lactose (milk sugar), glucose (starch sugar), maltose, and sucrose (cane, beet, or table sugar).

All disaccharides, the most common of which are sucrose ("table sugar"), lactrose ("milk sugar"), and maltose comprise two monosaccharides (glucose and fructose) bonded together in various ways.

Because infant formulas need sugar(s) in some form to mimic the composition of breast milk, both the FDA and European Commission require manufacturers to provide 40% of their products' calories with some sort of readily digested sugar.

The obvious candidate sugar for that purpose is lactose the disaccharide-cousin-to-sucrose comprising most of breast milk's carbohydrate. It is often deemed "best" for infant formulas because almost all babies are born able to make lactase (the enzyme catalyzing its conversion to glucose) meaning that they are born with the ability to digest lactose – a capability that a tiny fraction (1/60,000) of them and most grownup humans don't possess. This is the reason that the notoriously conservative[434] European Commission requires that standard formulas use lactose as their primary carbohydrate source.

[434] For instance, although several of its own nations have demonstrated that nuclear power is non-polluting, reliable, and <u>could</u> be cheap, the EU has deliberately put it itself in harm's way with excessively "precautionary"

That's not necessarily the case elsewhere. US formulas often include lots of corn syrup solids and/or maltodextrin. Unfortunately, both are very rapidly broken down to glucose – blood sugar – resulting in an abrupt glycemic load which may cause a sudden "sugar high" if the infant's pancreas can't raise his/her insulin levels rapidly enough. Another technically phony but "important" issue here in the Western World, is that both of those corn-based substitutes are likely made from genetically modified corn starch and are therefore "evil"[435].

The Glycemic Index (GI) is a relative ranking of carbohydrates in foods according to how they affect blood glucose levels. It is calculated by how quickly 50 g of a foodstuff's carbohydrate increases blood glucose levels. The more quickly a carbohydrate increases blood sugar levels, the more insulin the body must produce to metabolize it. Most infants are physiologically equipped to metabolize lactose which has a GI value of about 50 as opposed to glucose's 100.

Like lactose and maltose, sucrose, (table sugar) is a disaccharide comprised of the same two simple sugars. While "table sugar" sounds awful as a baby formula ingredient, functionally it's a better choice than are glucose, corn syrup solids, or maltodextrin because its GI value is around 65 (well under that of WONDER bread or white potatoes) meaning that our bodies metabolize it more similarly to how they do lactose than they do corn syrup solids or maltodextrin.

Other pluses are that 1) human babies naturally like "sweet" and sucrose is sweeter than lactose, and 2) they are almost never born with or develop "sucrose intolerance" like some of them and most adults are/do with lactose . Lactose intolerance is one of the reasons that so many "special" baby formulas are being made/sold.

Sucrose's primary downside – it promotes tooth decay – is irrelevant in this discussion because babies aren't born with teeth and those that do grow in later will be replaced after the child should have already been consuming the non-cariogenic, low-sugar, "grown up" diets I'm advocating herein.

Proteins: Another rationale for making/selling/buying "special" baby formulas is that a very few infants either can't digest or are allergic to casein – an important component of both dairy

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principled policies that have shut down many of its nuclear plants thereby rendering its member nations unnecessarily dependent upon Mr. Putin's natural gas.

[435]Columbia University's Professor Pamela Koch has reminded me that "*the vast majority of genetically modified seeds currently planted each year are corn and soy (about 95% of corn and soy planted in the U.S.) and these seeds are changed to be resistant to herbicides and that this has contributed to dramatic increases in herbicide use and that there are more superweeds*." This is another reason why the first world's farmers should switch to "regenerative organic agriculture"(see APPENDIX IV) rather than mono-cropping. It turns out that one of those quickly evolving super weeds is the same tasty/nutritious amaranth-type "pig weed" that the USA's corn/soybean farmers are now being counseled to apply three different herbicides, not just one, to suppress. To me, that weed along with purslane represent much welcomed "free" additions to my tiny garden's veggie output. Due to global warming, it's getting too hot back there for stuff like squash, cabbages, broccoli, and even pole beans in the middle of summer – this year all of them took off like a bat out of heck for the first few weeks but then went into near stasis when daytime temperatures routinely began to exceed 90°F.

cow and human-type milks. The most common solution to that problem is to substitute soy-based proteins for animal-sourced proteins. Since a soybean's protein and oil are roughly equivalent nutrition-wise to those derived from animal products but they are relatively deficient in digestible carbohydrates (sugars) and calcium, this book's baby formula recipe includes a good deal of common table sugar along with a bit of builder's lime.

According to The composition of human milk - PubMed (nih.gov) "mature human milk contains 3%--5% fat, 0.8%--0.9% protein, 6.9%--7.2% carbohydrate calculated as lactose, and 0.2% mineral constituents expressed as ash." On the other hand, a recent peer-reviewed Chinese study Amino acid composition of lactating mothers' milk and confinement diet in rural North China - PubMed (nih.gov) of forty of that nation's 4-to-180-day postpartum lactating mothers concluded that the total protein content of their milk was 1.58 g/dL (g/dL ≈ wt%) twice that of "our" human milk, and the most abundant amino acids within it were GLU (16.0%), PRO (10.2%), LEU (8.67%) and the lowest two were MET (methionine at 1.76%) and TRP (0.91%).

Another recent US study concluded that soybean protein contains about 12% GU, 8.9% PRO, 8.0 % LEU, 1.1% MET and 1.65% TRY which, if we were an expert seeking an excuse to rule out soybean-based DIY baby formulas, we'd claim that they are "deficient" in methionine (MET). Methionine is indeed the "limiting" amino acid in most legumes, which means that if our batch of DIY baby formula must contain ~0.85 wt% protein (under one quarter that of cow's milk and apparently one half that of Chinese-human milk) and its proportion of methionine must match that of oriental lady milk, we should add a bit of more or less pure methionine to it. Of course, a more sensible way to address that "issue" would be to simply increase the proportion of soybeans going into your batch of baby formula (or whatever) by 1.76/1.1 which would 1) raise its protein concentration to 1.4 wt% which is still "safely" well under that of most of our other fellow mammals' milk and 2) would add 4.5 cents to its cost[436].

However this paper, Quality of Soybean Products in Terms of Essential Amino Acids Composition - PMC (nih.gov) , says that its study's GM-type soybeans contained 0.633% MET and 36% protein which means that their protein was 1.76% MET- exactly the same as that of the Chinese ladies' milk. In my opinion "worrying" about things like this should be left to the safely tenured people being paid to "study" such things by their employers, not real-world parents or a typical GP-type MD/OD.

Finally, here's another table that I've put together comparing the indispensable amino acid (IAA) concentrations of human milk garnered for two USDA authored reports with another of its reports about soybean proteins.

[436] That's the reason (more protein) that most mammals can grow up much faster than we humans do.

(AA Conc.in mg/g TN)		f in human milk protein				
IAA	USDA *	g/100 tot.	USDA f. tot	g AA/2.9 liters	g/100 g soy**	
His	136.72	0.022	0.024	0.704	no data	
Leu	566.41	0.091	0.101	2.917	2.841	
Lys	410.16	0.066	0.073	2.112	2.363	
Phe	273.44	0.044	0.049	1.408	1.929	
Val	371.09	0.059	0.066	1.911	1.734	
Trp	97.66	0.016	0.017	0.503	no data	
Thr	273.44	0.044	0.049	1.408	1.382	
Met	117.19	0.019	0.021	0.604	0.633	
Ile	332.03	0.053	0.059	1.710	1.709	
	sum=	0.412502	(f of tot P)	13.27845226	g indispensible AA/2.9 liters	
	tot protein required /batch (2.9 liters)=				32.19	grams
	if beans contain 37 % protein need				87	grams/batch
* the USDA data in Table 8 of https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3875913/						
**https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8398613/						

Table 16 Indispensable amino acids (IAAs) in human milk and soybeans

Although this Table's information is derived from totally different reports than those that I'd looked at to come up with my DIY baby formula (see APPENDIX I'S "Combining foo…"), it suports the same conclusion; i.e., roughly 90 grams of soybeans will provide the protein required by 2.9 liters of "safe" baby formula.

APPENDIX VI More examples of Corn Belt foodie faddism

Number one

. A recent edition of DSM Magazine, "*Des Moines' elegant and essential journal of local arts and culture - each issue celebrates the breadth of culture in Central Iowa*" , featured a recipe for especially healthy/tasty "smoothies" made with **Hanna Valley's** locally produced, chocolate-flavored , especially organic,[437]) totally vegan protein powder.

DSM's free "news" blurb didn't mention the stuff's cost other than to assert that its smoothies were "*affordable*".

Hanna Valley's website revealed that its local walk-in customers must pay $36 for "big" two-pound bags of its powder and that each bag's 20 servings contains 20 g of protein.

GOOGLING revealed what a determined shopper who didn't live near its Des Moines retail outlet might expect to pay for it. An outfit named "Nutrifood" apparently sells the same 2-pound bags of the stuff for $77.68 plus $4.50 S&H

First, how much protein is in each bag? That's easy: 20 servings*20 g/serving ='s 400 g. of protein per 908 g (2 pounds) which translates to 44 weight% protein.

That means that Hanna Valley's super protein product has just a bit more protein/g than raw soybean kernels (~ 37%) protein and a bit less than does a typical soybean meal (~46%).

COST COMPARISON

Protein cost/g of Hanna Valley's powder = $36/(20*20)=$0.09/gram

Protein cost whole 37% protein soybeans assuming $13.90/60-pound bushel = 13.90/(606*454*0.36) = $0.00142/g

If locally purchased, Hanna Valley's percentage "value addition" per gram of soy protein = 6300% (~14,000% if mail-ordered)

[437]According to its response to the Iowa Food Cooperative's questionnaire, Hanna Valley's powder's "Certified Organic Ingredients" comprise Organic Hemp Protein, Organic Coconut Sugar, Organic Pumpkin Protein, Organic Flax Seed, and Organic Vanilla Powder". There's no mention of what its "nonorganic" ingredients might be. Hemp Seed Meal is a co-product of THC-free Hemp Seed (Cannabis sativa) after its oil has been extracted. Like peanut and soymeal, it contains protein, high levels of Essential Amino Acids and both soluble and insoluble dietary fiber.

Number two

A front-page article in the 9Jul2021 edition of the Des Moines Register, "*A Farm Without Fields*", provides what to-me is a sad example of how some of our public institutions go about addressing the USA's people-food issues. It describes a "farm" located at Iowa State University's Research Park whose owners are selling aeroponic-grown veggies to Iowa's foodie-type yuppies via an Amazon-like food subscription service. Two "servings" (whatever that means) of their tomatoes cost $5 and a one-pound head of lettuce will set their customers back $11.

Aeroponics is a NASA-developed (paid for) way of growing food within a spaceship. It involves suffusing plants with an air/fertilizer/water mist without embedding their roots in soil or any other sort of solid aggregate medium. Because it doesn't even require sunlight – light emitting diodes or high-pressure sodium lamps often provide the necessary light[438] – plants are stacked up vertically making that "farm's" footprint much smaller than that of an equally productive normal field anywhere else here on Earth – even in California's Central Valley "veggie belt" where/whenever there's enough water to grow anything[439].

Aeroponics probably sounds great to super rich people that refuse to eat anything that wasn't either picked yesterday, "organically" produced, or flown in from another country or hemisphere regardless of what the season happens to be. However, in my opinion, Iowa's biggest "ag school" shouldn't be helping a private business cater to its richest citizens' food fetishes/insecurities while over 10% of its less important citizens are chronically "food insecure" and many more of them don't eat "right" because raw grains, fruits, and vegetables would cost them too much.

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[438] While it is reasonable to assert that my nuke (other) books' ~22 thousand full-size reactor "sustainable nuclear renaissance" could meet our descendants' other energy demands (power their ships, trains, cars, homes, and industries, make fertilizer, & desalinate water), even it could not provide the light required to grow their food. The reasons for this include: 1) demand would be too high - ~2500 kcal/day for 11 billion people (the UN's best guess of the world's population circa 2100 AD), 2) photosynthetic food energy production is too inefficient (~0.25% for Iowa's corn), 3) only about 25% of the energy consumed by our most energy efficient artificial light sources (LEDs) generates photosynthetically useful light, and, 4) no thermal power plant, nuclear or otherwise, is likely to be over ~50% efficient at converting raw heat-type energy to electricity. Overall, these uncomfortable facts tell me that over 2 million "full size" (1 gigawatt electric) power plants would be required to feed everyone via grow light-powered photosynthesis – mankind now has only about 400 such power plants and each new/better reactor (i.e., utilizing a sustainable fuel cycle) would likely cost $3-4 billion even if built by China. Consequently, regardless of what else might happen, our descendants will continue to rely upon sunlight-powered photosynthesis to produce most of their food.

[439] California's Central Valley's veggie belt is apt to become a full-blown desert within another decade. In any case, its Global Warming-caused inability to maintain production is one of the reasons why vegetables now cost us too much.

APPENDIX VII – "Democracy with US characteristics" (governance via fears[440], thoughts, and prayers)

" When one person suffers from a delusion, it is called insanity. When many people suffer from a delusion, it is called a Religion. When that religion is "let's privatize everything and not regulate anything," is it is called Republican. When it's "let's have our favorite experts try to regulate everything, it's called Californication"

(me)

Since the USA's founding fathers (its mothers didn't have much to do with it) over-emphasized their magic new constitution's "checks and balances", our government's law-making branch (Congress) has become incapable of making sensible but politically tough decisions. Their two hundred-and thirty-six-year-old masterpiece also stressed "individual rights" (e.g., the right to own your own assault rifle and refuse to get vaccinated or wear a mask during pandemics) but not individual competence or responsibilities. That's why the COVID 19 pandemic and gun-toting madmen are free to kill far more US citizens than deserve to be so disempowered. That and the fact that most of our lawmakers are both technically clueless and "hired" via a money/bribe-based election system is the reason that its/our government currently spends roughly $176 billion per year to feed its ~38 million food insecure citizens in a manner consistent with its important peoples' business models.

The USA's Constitution is also much like our Holy Bible in that its meanings are open to interpretation which we, of course, must let our leaders do for us because ours is a "representative" democracy.

Unfortunately, almost everyone that we elect to represent us are especially "important" members of four tribes that don't get along with each other and would rather fight than switch:

Far-left democrats ("socialists") many of whom don't behave or think logically (faith-based thinkers)

Moderate democrats that generally do think/behave logically.

Moderate republicans (currently a minority) that generally do behave logically

Right wing republicans who believe/behave much as did Hitler's brownshirts – also faith-based thinkers.

Another of the uncomfortable truths that's been rendering it tougher for some Americans to remain "untroubled" is that regardless of which political party happens to be running the

[440] This is another allusion to the theme of Sagan/Druyan's book: "***The Demon Haunted World: Science as a Candle in the Dark***"

show, our government seems to be working more for the owners of businesses than it does for the people who must purchase things or services from them.

For instance, I'm currently (January 2023) being charged about 4.3 times as much for the natural gas heating my home than what the regulated utility/monopoly serving DesMoines is likely paying for it. That conclusion is based upon the price I'm paying and the Henry's and/or Chicago "gas hubs'" commodity prices which figures are always similar despite there being about 1000 miles between them. That in turn, means that like bulk staple food commodity transport, bulk gas transport/pumping within our country is cheap.

That/my gas bill's markup is comprised of a 2.6 times inflator for what the company claims to be its "energy cost" plus another 1.7 x for several imaginary as far as I am concerned "service" fees.

I've lived in gas-heated houses for about two thirds of my 78 years & have never required any "services" from the gas company other than the gas it's distributing. The gadgetry requiring "services" are inside of our homes & we pay for servicing them, not the gas company. It's true that throttling gas from an interstate gas pipeline's pressure (~1000 psi) down to that distributed within cities (~50 psi) does cool everything but that's easily made up by burning a bit of it & natural gas is uniquely cheap/easy to burn. The results of my ballpark calculations assuming 1000 psi mainline pressure throttled down to a distribution system's, let's say, 50 psi suggest that burning ~1.1% of it would keep everything at ambient temperature[441]. My bitch has to do with DesMoines' nominally regulated gas company's total "service" charge of 430% (not 1.1% or even 100% plus an almost reasonable ~20% S&H charge), most of which markup (260%) is due to business insiders claiming/believing that natural gas should be much more expensive to Polk County's residents than it is to "big" customers like John Deere. The root cause of this aspect of US cost-of living inflation is the same one that's rendered everything having to do with "food insecurity" or nuclear power ridiculously expensive –reflexively compliant consumer/voters being "served" by technically clueless politicians/regulators that have been captured by "Big Business".

This country's electorate needs to elect a fifth and bigger tribe's worth of apolitical, irreverent, technical nerds who think and act like Bill Gates has apparently decided to.

His and his ex-wife's philanthropic foundation's "*mission is to create a world where every person has the opportunity to live a healthy, productive life,*" *and which "works together with businesses, government, and nonprofits, and each partner plays a specific role in accelerating progress*".

Bill Gates often gives talks discussing the work of the foundation and offering his opinions about current events. At a recent (January 2023) meeting at Sydney, Australia 's Lowy Institute,

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441 The heat capacity of methane is about 2.2 J/g/degree, the ratio of its heat capacity at constant pressure to constant volume is 1.32 & the relevant equation is (T2/T1) = (P2/P1)^((1.32-1)/1.32). Solving for T2/T1 & assuming an ambient temperature of 293K, I come up with a temperature differential of 256 centigrade-degrees which when multiplied by 2.2 comes to 607 J/gram or ~1.1% of methane's heat of combustion.

he spoke about the global response to covid and then touched on some of his thoughts about China's relatively recently thriving world economy.

> "*China has gone from in 1980 being incredibly impoverished, poorer than India. I mean literally, with starvation, malnutrition, to being the world's wealthiest middle-income country in the world…" "It's incredible, and it's great for the world.*"

He then compared China with the U.S. and Australia in terms of their relative wealth per capita.

"Countries like Australia, U.S., we have per capita GDPs five times what the Chinese have, so we have a disproportionate share of the world's economy."

He then went on to lament about the unfortunate state of relations between China and the U.S.

"I do think the current mentality of the U.S. to China, and which is reciprocated, is kind of a lose-lose mentality," he suggested. "That if you ask U.S. politicians, 'Hey, would you like the Chinese economy to shrink by 20% or grow by 20%?' I'm afraid they would vote that, 'Yeah, let's immiserate those people,' not understanding that for the global economy, the invention of cancer drugs, the solution of climate change, you know, we're all in this together."

"We're humans, we innovate together and we have to change the modern industrial economy together in a pretty dramatic fashion," Gates added.

Personally, I've been especially impressed by the way that he's decided to go about addressing the root cause of most of mankind's current & future miseries – the fact that our leaders have consistently acted in ways that won't break our addiction to fossil fuel burning. Gates' "TERRAPOWER" nuclear startup is the only one of ~100 "advance reactor" candidates that's consistently focused upon developing a "clean" energy system capable of addressing 100% of those problems indefinitely , not just temporarily fill a few comfortably profitable little niches within "all of above".

Finally, here's something else that I've just knocked off (21Feb2023). It's a wordsmithed version of Why Flying, Air Travel, Airline Customer Service, Airports Are so Bad (businessinsider.com) supporting this book's contention that our government's policies are largely responsible for most of the problems we're agonizing about these days.

"*This past year has been a nightmare for air travelers, featuring epic flight meltdowns, over a million mishandled bags, and a nationwide ground stop caused by the Federal Aviation Administration's outdated equipment. It's become difficult to imagine a time when air travel was pleasant, much less enjoyable. Air travel's service decline is due to a shift in governmental policy priorities. Over four decades' worth of a largely deregulated industry's shortsighted decisions to prioritize efficiency and price cuts over quality and comfort came to a head during the Covid 19 pandemic, leaving millions of wannabe travelers trapped in a headache-inducing, butt & feet-numbing flying purgatory with no signs of a long-term fix.*

Shrinking seats and disappearing legroom are just two of the downsides of today's flying experience. At the heart of these "changes" is a governmental trade-off made over 50 years *ago. Before the 1970s, flying was a rich person's game with only a small set of Americans traveling by plane for leisure. But federal deregulation intended to open competition among airlines and thereby bring down prices to render flying more accessible changed everything. Unfortunately, it also sparked a race to the bottom by the airlines both new and old in terms of how poorly passengers could be treated to maximize profits. Today, the promise of more competition has also fallen by the wayside. By 2021 just four companies — Delta, American, United, and Southwest — controlled 66% of the US market, and as more Americans have started to fly, the idea of dramatically cheaper flights has also faded: Airline-ticket prices are now about 11 times what they were in 1969, whereas overall inflation has rendered other things about eight times as costly. The root cause for all this is that US airlines are supported at all levels of government and possess a virtual monopoly on long-distance transportation– there are no alternatives such as a national high-speed rail system meaning that "leisure" passengers are at the mercy of the airlines unless they can drive to wherever they want to go which most working people don't possess enough free time to do*.

APPENDIX VIII "Big Mac Meal" vs commodity-type people feeding cost comparison

"… here in the USA (29May2022) the average cost of McDonald's "Big Mac Meal" comprising a cheeseburger, a medium-sized packet of fries, and a soft drink was $8.64."

According to McDonald's website, that meal would contain 30 grams of protein and 1080 kcals worth of food energy - about one half of an average adult's daily requirement of both nutrients.

According to the FDA's "Food Data Central" website FoodData Central (usda.gov) 100 grams of corn/soybeans contain 365/446 kcal and 9.2/36 grams of protein respectively.

That day's commodity-type corn cost/value was $6.05/56 pound bushel .

That day's commodity-type soybean cost/value was $15.94/60 pound bushel Commodity Prices | Successful Farming (agriculture.com)

Cost of 4:1 corn/soybean mix per pound = (4*6.05/56+1*15.94/60)/4+1 =$ 0.14

kilocalories per pound same mix = 0.75*365*454/100+0.25*445*454/100= 1748 kcal/#

protein per pound same mix = 0.75*9.2*454/100+0.25*36*454/100 = 72 grams/#

cost /2500 kcal = 0.14*2500/1748= 20 US cents

protein per 2500 kcal = 2500/1748*72 = 103 grams

$8.64 would buy 8.64/0.20 = 43.2 person-day's-worth of 2500 kcal/day of that whole food combo.

That's 11 days' worth of food for four grownups - two weeks' worth if two of them are smallish children.

Let's next assume that our little family's decision makers decide that they would rather feed themselves with stuff they put together with a 1:3.9:8.2 by weight combination of SIMCO'S $9/50 pound all-purpose flour, WALMART's $8.58/gallon soybean oil, and $14.90/bushel Iowan soybeans.

If you crank those numbers through your spreadsheet, one McDonald's Big Mac Deal would provide them with 17.1 person days-worth of 2500/kcal/118 gram protein foodstuffs.

APPENDIX IX This world's "too sensitive" overpopulation issue

(warning! Dr. Shaka's (& my) opinions may disturb some readers)

On 8/2/2022 4:06 PM, A. J. Shaka* wrote:

Dear All,

I'd like to repeat what I've said previously: the problem is too many people. Even if fast-breeders, thorium MSRs, you-name-it, were implemented worldwide, and fast, all that would happen is an extra doubling of human population before the inevitable collapse. Malthus, commonly seen as the ultimate pessimist, was, in fact, simply a mathematician. Food production might be able to grow arithmetically. You bring 10,000 acres under cultivation this year, hold it, and 10,000 acres next year, etc. (and ignore that there is a finite surface area on the Earth) and that *might* be possible.

But, he said, you could not possibly bring 10k under cultivation this year, 20k next year, 40k the year after, and so on. That's the grains of rice on the chessboard fable! However, that's exactly how population growth occurs. I'm 64, I> have zero grandchildren, and one child. What do each of you have? You see the problem. Look in the mirror.

I predict we will destroy each other, fighting about scarce resources that would never be an issue if there were fewer people...

--->

* Professor, University of California, Irvine

Education: Ph.D., Oxford University, 1984, Physical Chemistry

Research Interests

Physical and Biophysical Chemistry; Chemistry of Aging; Nuclear Power; Radiochemistry

URL The Shaka Group

Academic Distinctions

1980 Rhodes Scholar
1980 NCAA Postgraduate Fellow
1984 Junior Research Fellow
1986 Miller Research Fellow
1988 National Science Foundation Presidential Young Investigator
1988 Beckman Foundation Young Investigator
1992 School of Physical Sciences Distinguished Teaching Award
1993 National Science Foundation Presidential Faculty Fellow
1994 UCI Alumni Association Distinguished Teaching Award
1994 Camille and Henry Dreyfus Foundation Teacher-Scholar
1994 Alfred P. Sloan Fellow
1994 Rolex Achievement Award
1995 Who's Who Among America's Teachers

2007 Fellow, American Association of Arts and Sciences
2010 Emmy Award, Best Instructional Series (chemistry distance learning, Coastline College)

Here's my own humble opinion:

Whether we wish to believe it or not, there are too many of us now & it'll keep getting worse until we either decide to become more sapient or the consequences of a "WWIII" kills most of us off.

It isn't just the USA's Trump worshippers that feel over-crowded by faster-breeding immigrant wannabes, it's happening in several EU member nations, England, and Sweden too.

One of the reasons that China has become "great again" is that its leadership imposed/enforced a one-child per family policy circa 1980 which enabled its people to invest their energy and resources in doing so. It was good for their children too because they suddenly became "special" & grew up being treated like little princes & princesses.

Up until the dissolution of the USSR, the goal of Russia's cold war with the USA was to convince the rest of the world that its version of socialism is "better than capitalism'". Russia lost that war because the consequences of its leaders' policies/decisions/actions had proven their contention wrong. However, since then, the results achieved by Deng Xiaoping's "Socialism with Chinese Characteristics" combined with the issues serving as the subject of this book have demonstrated that the USA's version of democracy isn't the best way for it to "become great again" either[442]. It's especially notable to me because on January 1, 1979, he and US President Jimmy Carter re-established full diplomatic relations after which he made an official visit to the United States which would go down in history because that's when China began to make itself great again. We of course soon "fired" Mr. Carter & began our troubled marriage to "trickle down" economics. See BIG STORY – Mr. Deng goes to Washington | CGTN America - (CGTN December 26, 2017).

APPENDIX X More ways to address the now-near Future's technical issues

First, here's a tongue-in-cheek QUORA question that I posed to its editors last year. For some reason they refused to post it. Can you guess why?

[442] Some of today's democracies are becoming autocracies, not 'liberal" democracies that serve that county's people or their county's long-term best interests: "western world" examples include President Trump's USA, President Jair Bolsonaro's Brazil, prime minister Benjamin "Bibi" Netanyahu's Israel, and President Andrés Manuel López Obrador's Mexico.

Soylent biofuel?

Since adding another possibility to "all of the above" is officially the right way to look at addressing the future's energy issues, what if instead of burying or cremating dead people, we converted them to biofuels instead[443]? Having recently moved to corn-fed Iowa (home of the world famous "butter cow" and French fried everything on a stick) it seems to me that this suggestion invokes a very substantial renewable energy resource. Am I right? (I'm looking for answers backed up by calculations utilizing GOOGLable facts/data that put this suggestion into proper perspective, not answers based upon anyone's "feelings").

(the answer is "no")

Another almost-as-terrible suggestion.

There's a cheaper way to implement the albedo enhancement geoengineering scheme[444] that MIT Professor Forsberg has warned us that the Chinese might take it upon themselves to implement. It invokes universal adoption of the solution to Senora Teresina Cortez's food insecurity issues that Danny & his friend's finally hit upon (ref …John Steinbeck's , Tortilla Flats (1935)) when they decided to steal enough beans for her/them to resume their customary diet of 100% corn tortillas with beans. If all ~8 billion of us were to adopt that dietary regimen along with enough cabbage to provide us with sufficient vitamin C along with some extra dietary sulfur, the Earth's atmosphere might quickly build up enough "sulfate particles" to bounce excess solar radiation right back into outer space & thereby combat climate change (reactions: flatulence-generated H_2S plus atmospheric O_2, water vapor & misc. other gases would first generate SO_2, then H_2SO_4, & then "sulfate particles").

My wife doesn't like this idea, but she's only got a BS & what do women know about science anyway?

Saving the Salton Sea

Next, here's a "fun" suggestion the gist of which I sent off to the editors of the San Francisco Chronicle 6Apr2022. I don't know if it was published because I don't subscribe to that newspaper & it seems that newspaper editors are being taught(?) to never communicate with the folks submitting stuff to them)

Suggested title: "Another way for California's decision makers to 'save the environment.'"

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443 In Harry Harrison's 1966 novel "*Make Room! Make Room*!" (The basis for the 1973 film *Soylent Green*) deceased people were converted to a value-added foodstuff because in Harrison's too-crowded future world (not today's), "people food" was deemed more important than biofuels.

444 Albedo enhancement type "geoengineering" performed via anthropogenic addition of tiny sulfate particle "smoke" to the atmosphere would reflect more of the sun's radiation back into space and thereby cool the Earth. Mother Nature occasionally demonstrates that concept's effectiveness with her volcanos - see Year Without a Summer - Wikipedia .

In California there's been a tremendous amount of "green" handwringing about what's happened to its largest lake's environment - its "Salton Sea". That lake was first formed in 1905 by an inflow of water from the Colorado River from a ruptured irrigation canal dug from it to the old Alamo River channel to provide water to the Imperial Valley's farmers. That water in the formerly dry lakebed created the modern lake, which is now about 15 by 35 miles (24 by 56 km) and contains about 7.2 cubic kilometers of water.

That lake would have soon dried up, but California's farmers continued to use lots of Colorado River water and let the excess flow into it. During the 1950s into the '60s, that area became a resort destination, and local communities grew with hotels, vacation homes, restaurants, and a productive/popular sport fishery. Birdwatching was also popular as its surrounding wetlands were a major resting stop on the Pacific Flyway. However, during the 1970s, California's killjoy scientists began to issue warnings that that lake would shrink and become inhospitable to wildlife. In the 1980s, continued contamination from farm runoff promoted the outbreak and spread of diseases. Massive die-offs of its avian populations occurred after the loss of several species of fish due to over-salinity upon which they had depended. That blighted its beaches with stinky bird and fish carcasses drastically impacting property values and tourism.

After 1999, the lake began to shrink and become even saltier as local agriculture used the Colorado rivers' water more efficiently thereby reducing runoff to it.

In principle, desalination of its water could fix everything but would also create more "wicked" problems because desalination plants cost too much to build, would require lots of California's especially expensive electricity, and possess two water outlets, one of which is saltier than the other. The latter means that purifying it that way would create two lakes, one of which would be <u>extremely</u> salty.

I'm guessing that the good folks living near California's Salton Sea wouldn't want another giant salt flat growing next to their new, smaller, fresher-water lake which means that that salt would have to go somewhere else.

Where would that be?

Since other people probably wouldn't want another giant salt flat in their neighborhood either, the obvious Salton-salt "repository" is the Earth's oceans. They are now about 2/3's as salty as is the Salton Sea and have about 1.34E+9 km^3 of water in them meaning that they already contain ~124 million times as much salt as it does - their fish & whales wouldn't even notice it.

Therefore, a simpler, cheaper, and lower tech solution would be to continuously flush that lake out with ocean water thereby creating a beautiful inland sea for California's citizens, tourists, technical experts, & politicians to frolic in.

CA's entrepreneurs would quickly surround it with lots of high-end lakefront houses, restaurants, fishing guide/supply businesses, motels, resorts, gas stations, & WALMARTs, all of which would generate lots of new tax revenue for California's politicians to spend.

It'd also render that lake a much nicer place for California's surviving birds, fish, turtles, etc. to live.

Assuming that it's been decided to flush the Salton Sea with ocean water once per year (enough to maintain a salinity like that of the Red Sea), let's ballpark how much power would be needed to implement that scheme.

That boils down to raising its ~7.2km^3 of water 72 meters up from the Salton Sea to the ocean per year. Free gravitational energy/power would be driving about 13% more[445] ocean water downhill to it through the other canal/pipe.

Steady state power required = 7.2*1000 m^3*1000 kg water/m^3 *72meters *9.8 (m/s^2 - acceleration of gravity)/31500000 seconds/year = 162 MW. That's about one half of the power generated by pumping water back and forth between Washington's Grand Coulee Dam & Banks Lake during the past fifty years or so.

162 MW is also about 7% of the power generated by California's Diablo Canyon nuclear power plant – its most reliable zero-GHG-emitting power source &, of course, the one that California's "greenest" decision makers & their favorite experts have been trying to shut down for over two decades.

Another over-educated old troublemaker (Dr. Alex Canarra – he still lives in California) has just reminded me of something that puts my flushing scheme into better perspective.

According to WIKIPEDIA, the Edmonston Pumping Plant near the south end of the California Aqueduct lifts water over the Tehachapi Mountains where it's then split between the west and east branches of Southern California's "California Aqueduct" . It's indeed "big" but also much smaller than are the world's pumped-storage hydroelectricity stations like the USA's five-decade-old Raccoon Mountain.

It's got fourteen-4 stage 80,000-horsepower centrifugal pumps that push about 4500 cfs of water ~600 meters up to the top of the mountain through 14-foot diameter pipes. The station consumes ~800 MW of electricity, delivered through a dedicated 230kV transmission line from the Southern California Edison Pastoria substation.

My scheme should be considerably cheaper to build and would certainly require much less power to operate. It'd be especially nice if that power were "clean", not mostly generated by burning gas as is that currently powering the California Aqueduct.

I also suspect that the project would soon pay for itself. Wouldn't you like to go fishing & snorkeling[446] in California's beautiful new inland sea?

From a technical point of view, it'd be simple to address the Salton Sea's issues. What makes it a "wicked" problem is pervasive bullheadedness - especially that of some of our country's

[445] More liquid water would be going in than out due to evaporation.

[446] One of the Red Sea's special features is that its coral reefs withstand the water temperature "anomalies" responsible for the coral bleaching/mortality that's already ruined much of Australia's Great Barrier Reef. The Red Sea's corals have apparently already developed the biological mechanisms required for coral survival elsewhere while our leaders have been arguing about how best to become "greener". Clever Californian entrepreneurs might be able get richer by "planting" some of those corals in their brand-new inland sea thereby rendering it even more attractive to tourists and condo buyers.

greenest political leaders and over one-half of their constituents regardless of their educational levels or political leanings.

How Mr. Biden could save the world

(*The following suggestion reflects the conclusions I've come to about my ex-employer's approach to addressing the near future's "clean" energy conundrum. The fact is that we've known about the energy related/driven environmental & economic problems that we're all facing for over 50 years & had succeeded in working out a practical solution*[447] *to most of them almost that long ago. For instance , Kazakhstan's BN-350 breeder reactor situated on the shore of the Caspian Sea first went online (produced electricity) in 1973. In addition to powering nearby cities & towns, it desalinated 120,000* m^3 *of water/day for local consumption. The reason that it was shut down 24 years later (1997) was that the USSR had collapsed and Russia was no longer willing to refuel it – not because it no longer "worked"*[448]*. DOE's topmost NE R&D experts have been pretending that that never happened during those same 50 years & are still trying to convince our country's topmost decision makers that we/they should be building whatever its "industrial partners" currently think is "best" (apparently anything that's fueled with TRISO -type fuel kernels) irrespective of how unsustainable or too-small it might be.)*

Next, here's one written about 8 months after the little quarrel going on between Russia and Ukraine got started.

Almost a year before that I sent out a note to my ZOOM buddies (they're mostly ornery old PhD-type nerds like me) explaining what I'd concluded about the aggressive noises that Mr. Putin was then making about the Ukraine and what we might be able to do about it. It had to do with paying a young Ukrainian lady - ukrainian pole dancer - Google Search to go over to Moscow to address his "real man" issues –you know, distract him a bit, 'cause there's just not enough foxy-looking women in Russia…they're mostly babushkas.

That never happened so he went ahead & started his "special military operation". That called for another strategy, so I came up with what you see below.

I sent it out to my ZOOM colleagues again, but no one volunteered to call POTUS. I'm hoping that maybe one of you could do that.

---

[447] Windmills, solar panels, and batteries are too unreliable and too expensive to power our civilization.

[448] During those twenty-four years Russia had reprocessed its fuel to supply plutonium to its nuclear weapons program – not render that reactor's fuel cycle "sustainable".

It's beginning to look like Mr. Putin might be willing to risk starting another world war to prove that he's still a real man & that in his campaign to put the USSR back together again, Russia's just up against a bunch of gutless western-world wimps .

Biden is another old timey cold warrior who's in deep doo doo at home (stubbornly sub-40% approval ratings) & moreover, has also gotta prove that he's a real man capable of solving big problems including both un & under employment here at home, global warming's consequences, & the otherwise inevitable economic consequences of peak oil/gas/coal/soil/phosphorus etc. to everyone's grandkids. He's also at least nominally the leader of another nuclearly-armed-to-the teeth country that's a shadow of what it used be in many respects including the ability to either develop or implement anything as controversial as a big-enough sustainable/renewable nuclear renaissance.

Moreover, both of them would have to come out of this bruhaha looking like them & the country they're leading has won/done something that's really important.

It'd be tough for Mr. Biden to pull off, but one way for him to end up being considered a great President would be for him to secretly ask for Putin's "help" in jointly saving the world before the yellow peril (Trump's Chyna) totally dominates it & them both. Of course, that'd involve jointly saving both them & it by helping Russia build enough clean, reliable, & genuinely sustainable nuclear power plants to totally replace the whole world's evil, finite resource guzzling, atmosphere polluting coal/oil/gas burning power plants, starting off of course here at home with Russia's already developed, fully demonstrated, & ready -to-go "cheap" (~$4/watt) Liquid Metal (cooled)Fast Breeder Reactors (i.e., pay him & his oligarchs with freshly printed, genuine American dollars).

Mr. Biden could help a bit more by 1) volunteering to put the glass made from a sustainable nuclear fuel cycle's radwastes into another WIPP for free and 2) prohibiting any of the institutions (NRC & DOE) or other people responsible for what's happened to nuclear power here in the US to "help" their new Russian colleagues do what must be done (this wouldn't include that project's several hundred thousand US workers – just most of the USA's "experts", "advisors", regulators, and concerned citizens).

Of course, if Mr. Biden were to do that, most of the rest of the free world's leaders would likely decide that maybe they should get on the sustainable nuclear bandwagon too as they've done with just about everything else the US has decided to do good or bad, smart or stupid, ever since the end of WWII.

I can't be the one suggesting my plan to him because I've officially been "disgruntled" for over three decades now.

Who else among us could do that?

How Mr. Xi could save the world

Today's (17March2023) biggest political news is that Xi Jinping, general secretary of the Chinese Communist Party and chairman of its Central Military Commission, is going to be visiting Russia from Monday to Wednesday next week.

Xi is expected to discuss China's 12-point blueprint for ending the war, which document has been dismissed by most Western governments. However, criticism of his plan has been more muted from Ukraine, which has sought talks at a leader level with China since the war broke out, while also urging Beijing to take a more critical stance against Russia.

According to his spokesperson…

"*Xi's visit to Russia will be a journey of friendship" and deepening mutual trust"' and "the two leaders will discuss "developing the no-limits partnership and strategic cooperation between Russia and China*,"

Xi and Putin will be "exchanging views in the context of deepening Russo-Chinese cooperation in the international arena", adding that several bilateral documents will be signed, without providing details.

I'm hoping that Mr. Xi – likely the only person in this world that could convince Putin to behave sanely again - suggests basically the same thing that I've hoped that Mr. Biden would, i.e., that they combine their nations' special strengths - Russia's proven ability to design, build, and operate breeder reactors with China's huge economic power and manufacturing genius - to "save the world" starting with the Ukraine with a "Nuclear Powered Green New Deal" and thereby demonstrate that "communism with Russo/Chinese characteristics" is superior to capitalism.

Phosphorus recycle

Finally, here's one I knocked off two months ago (12/27/2022)

Phosphorus is perhaps the most genuinely limiting material resource upon which the future of mankind depends. It's a necessary component of every form of life here on earth[449]*, in very much limited supply in very few and widely scattered places, & for over three centuries now we've been irreversibly throwing it in away in the same fashion as we've been doing recently with fossil fuels. Before our industrial revolution we humans didn't really consume it because it was recycled both naturally and deliberately via both our & our domestic stocks' pee & "nightsoils".

However, doing that became too slow, too cumbersome, too messy, too "unsanitary", and too unprofitable so we then decided to consider phosphorus as just another mineral commodity to be mined out of the ground wherever it could be found, "processed" & shipped off to fertilize first croplands, then rivers/lakes/ponds, and finally seas/oceans like the Gulf of Mexico. Unfortunately, as is also the case with petroleum, there just isn't enough of it on/near the Earth's surface to keep "burning" it up that way so we must eventually reembrace another paradigm shift (resume recycling) to avoid the consequences of reaching "peak phosphorus".

[449] approximately 1% of our bodies is phosphorus – mostly within our bones.

Since at equilibrium, most of it will eventually end up in our & our livestock's' poo, piss, and eventually, corpses, nuclear power could help us do that too. All we'd have to do is run all that stuff through an arc plasma furnace & recover phosphorous from its off gas and ashes.

Here in the US, approximately 29.5 million metric tons (32.5 million tons) of solid waste is currently being combusted (burned with air's oxygen) annually at ~160 municipal waste combustor plants, generating approximately 8 million metric tons (9 million tons) of combined boiler, scrubber, and precipitator or baghouse ash. The major components of "average" such stuff are the oxides of silicon, calcium iron, magnesium, sodium, and potassium – not much phosphorous because that ends up in the stuff that our sewage plants isolate from their waste inputs. Although neither federal nor most state regulations categorically restrict the use of MSW combustor ash (as long as the ash is determined to be nonhazardous in accordance with regulatory testing criteria), the presence of trace metals, such as lead and cadmium, in MSW combustor ash, and "concern" over leaching of these metals, as well as the presence of dioxins and furans in selected ash fractions (fly ash), has led many regulatory agencies to take a "cautious"[450] approach in approving the use of MSW combustor ash as a substitute aggregate material. Consequently, here in the US almost all such ash is simply landfilled (wasted) . This is in sharp contrast to the European practice of using it many different constructive ways MSW Combustor Ash - Material Description - User Guidelines for Waste and Byproduct Materials in Pavement Construction - FHWA-RD-97-148 (dot.gov) .

Anyway, if we were to run everything through electrically powered plasma arcs, their combined ash would be a fine fertilizer that could and should be recycled to farmers' fields along with plenty of nuclear-power- generated "nitrogen" (urea or ammonium ion) fertilizer.

[450] Many of the USA's relatively rich folks seem to be living in Carl Sagan's ever fearful "***Demon Haunted World***" and vote/shop/act accordingly.

APPENDIX XI DIY chemistry lab-type work

Food density determinations

Because this is a technical nerd's cookbook, one of the things I decided to do was accurately measure the bulk density (its "weight" in grams/volume in cubic centimeters = g/cc) of my artisanal-type bread thingies because that characteristic has[451] become a key "quality" judging criterion (more and bigger gas pockets → lower density → higher score). Because the volume of an irregular-shaped-object based upon its tape-measured dimensions can't be accurately determined, it's impossible to determine their densities in that fashion. Consequently, I ended up doing it the way that Archimedes invented over two thousand years ago to detect counterfeit Greek coins, i.e., measure the amount (weight/mass) of water displaced from a brimful container when a non-porous object is fully immersed/pushed down into it. After their surfaces had been sealed by putting my thingies into plastic newspaper bags, sucking the air out of those bags, and then tightly twisting & tying their tops off, such volume measurements proved to be simple/quick to do.

For example, after it had been baked on my 450°F, ceramic floor-tile "pizza stone" for 25 minutes, a specimen (left side of Figure 97 Examples of "strong" (left) & all-purpose flour artisanal bread) made with 400 grams of ***"Strong" Gold Medal*** bread flour[452], 300 grams of water, 5 grams of super salt, and a quarter teaspoon (under one gram) of "***Saf Instant***" yeast, weighed 602 grams and displaced 1840 grams of water when fully immersed. Therefore…

- its bulk density was 602/1840 or 0.33 g/cc
- it had retained 602-(400+5) = 197 grams or ~65% of its dough's water

Those numbers along with its solid components' masses (400 g of 12% protein, 88% starch, flour + 5 grams of salt) and densities (~1.35 g/cc protein, ~1.59 c/c starch, and 2.16 g/cc NaCl) suggest that the total volume of that specimen's solids was 258 cc (405 g/1.56 g/cc) which means that my competition-ready foodie masterpiece was ~75% ((1840-258+197)/1840) gas by volume most of which is apt to be air by the time it's cooled off. That in turn means that while my entry was indeed "springy", it wasn't nearly as good via that criterion as is your supermarket's machine-made, super spongy , "wondrous" bread (bulk density ~0.15 g/cc & ~88% air-by volume).

[451] part of which special "fluffiness" is due to the additional "spring" engendered by the dough's additional leavening gas bubble expansion during baking (the volume of a gas is directly proportional to its absolute temperature).

[452] It had been oven-proofed once for four hours at ~90°F and then dumped onto a corn flour-covered plastic cutting mat to sit while the oven/pizza stone were heating up which added another twenty minutes worth of rise time. Total time from raw flour to baked loaf was about 5 hours.

Figure 97 Examples of "strong" (left) & all-purpose flour artisanal breads

Another sorta-artisanal specimen (right side of Figure 97) made with the same amount of ***WALMART's*** all-purpose instead of "bread" flour   ended up weighing 590 grams and displacing 1320 grams of water. Therefore…

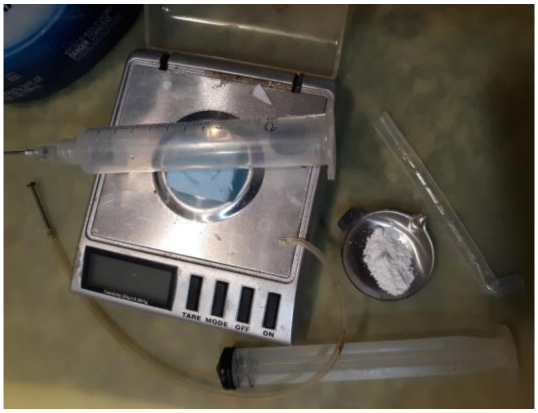
- its density was 590/1320 = 0.45 g/cc
- it had retained   590-(400+5) = 185 grams or 62% of its original water
- gas (mostly air) occupies 65% of its volume

Determining your lime's "strength"

One of the reasons that affordable (cheap) slaked lime *probably*[453] isn't as "strong" as is AMAZON's ~$2.50/ounce & probably purer "CAL Mexicana" is that it's apt to have a good deal of carbonate in it because its parent limestone may not have been completely calcined (generating the heat required to calcine limestone costs its manufacturer big bucks) and/or it had subsequently been recarbonated via subsequent exposure to atmospheric CO_2 (a weak

[453] "probably" because none of AMAZON's Cal Mexicana suppliers disclose such information.

acid). I rigged up Figure 98's gadgetry to see how strong/pure my big sack of $0.009/ounce



builder's/mason's-type hydrated lime is.

Figure 98 Carbonate measuring equipment

Here is how I did that determination:

- Pull the plunger out of the syringe, put the syringe onto your most sensitive (in my case, 20 g max) digital scale, tare it, put a small amount (e.g., 77 milligrams) of your sample into it, and record its weight.
- Reinsert the plunger, tilt the syringe's nose upwards, and push the plunger up to the syringe's base thereby compressing your powdered sample up there too.
- Stick the syringe's needle up & into a ~6 inch long piece of smaller bore plastic tubing (I made mine by pulling the wire out of plastic-insulated 20 gauge solid strand copper wire), insert that tubing's other/free end into a container of hydrochloric (or sulfuric) acid-type drain cleaner (e.g. 9.5 wt% HCl), suck ~1 cubic centimeter of it up into the syringe, and immediately plug the tubing's open end by inserting a tiny nail or toothpick into it.
- Put the syringe into a tall glass of near-boiling water for 2-3 minutes - its heat will cause the acid to dissolve the lime thereby generating/releasing any carbonate-CO_2 it may contain.
- Pull the syringe up out of the hot water, dump it into a pan of room temperature water, and pull the needle/nail/toothpick back out of the end of the tubing to permit enough water to enter/leave the syringe to equilibrate its CO_2's pressure with that of its surroundings (~one atmosphere here in DesMoines).
- After the syringe's contents reach room temperature, note the volume of the gas (CO_2) within it.

Calculations: When 77 milligrams of my mason's lime was subjected to the above-outlined protocol, it generated 9.4 cc of ~20°C carbon dioxide. Since at a "standard" pressure of one atmosphere, the volume of one gram mole of any gas occupies ~22.4 liters at zero degrees centigrade (that's an absolute temperature of 273+20 absolute or Kelvin degrees) and gas volumes are inversely proportional to absolute temperature, 9.4 cc of CO_2 corresponds to 9.4/22400*273/(273+20) or $3.9E^{-4}$ gram-moles of CO_2. That figure multiplied by the molecular weight of carbon dioxide (44 grams/mole) means that my 77-milligram of "slaked lime" was 22.3% CO2.That's just under one half as much as we'd expect to see in raw, uncalcined, dolomite (2*44/(2*44+24.32+16+40+16)= 0.468 = 46.8 wt percent. That in turn means that it was under one half as "strong" as fully calcined pure slaked lime (100% $CaOH_2$).

While that's not a big deal for cookbook-type applications (Mason's lime is both cheap and nutritious/harmless enough to render doubling the amount used perfectly acceptable), my results provide with yet another example of how much leeway the USA's regulators give its businesspersons with respect to labeling their wares.

Quickie foodstuff water content determinations

One of the biggest differences and source of confusion about common foodstuffs is the amount of water in them. For instance, thirty-nine cents/pound potatoes may *sound* like a bargain relative to 50 cents/pound all-purpose flour. However, a typical potato is 80% water vs flour's ~10% water which means that the relative costs of those energy-type foodstuffs normalized to their food values is $39/(1-.8)_{spud}/(50/(1-.1)_{flour}$ = 3.51, which means that flour is that combo's "bargain".

The classical way of determining a foodstuff's water content is rugged in terms of simplicity but terribly total-time inefficient (heat it within an oven at a temperature just above the boiling point of water and periodically check its weight until it doesn't drop any farther). Because I wanted to do many such determinations (e.g., create **Error! Reference source not found.** plot), I've developed/used the following approach which can produce reproducible results within about ten minutes.

Weigh 10 to 50 grams of a particulate sample (e.g., filtered, rinsed-off SBM particles, okara, or a home ground meal or flour), dump it into a slick Teflon or "magic ceramic" coated frying pan & heat the pan while gently sliding it back and forth over one of your kitchen range's medium-heat setting "burners". Periodically cover the pan with its, clean, cool transparent glass lid and see what happens: as long as there's still some water left in your sample, steam will immediately condense upon the inner surface of the lid where it's easily detected. Remove the lid, wipe off that water, & repeat until no condensate forms. Then take the pan off the "burner', brush the now-dry sample into a convenient- sized, lightweight, tared (preweighed/zeroed) container – (e.g., a Teflon covered, 3-ounce sized, empty/clean cat food canFigure 99) & reweigh it. The difference between its initial and final weight represents the sample's water.

For smaller-scale experiments I usually oven dry my samples in lightweight (~4 gram) scoops made of end-folded beer can aluminum foil -Fig 100 .

Figure 99 Okara-containing homemade weighing scoop

Homemade thermostatted proofing/fermenting/sprouting oven

Because two out of three of my kitchen's almost new (to me) and rather expensive ***Life is Good*** appliances had gone belly up & I just happened to have some scrap wood, two-inch thick

Figure 100 DIY light-bulb-heated proofing/fermenting/sprouting oven

expanded polystyrene (EPS) foamboard, and Great Stuff left over from a basement wall insulation project, I decided to put my burnt-out waterbed heater's thermostat to work again controlling Figure 100's 5.5 cubic foot, 60-watt light bulb heated, proofing/sprouting/fermenting oven. For those purposes, it works every bit as well as does my high tech ~$800 kitchen range's oven and is much cheaper to operate.

Also, as far as I'm concerned it was almost "free" to build.

That's enough for now but I'll be happy to discuss further details with anyone who gives me a phone call asking for them.

APPENDIX XIII The why's of global warming

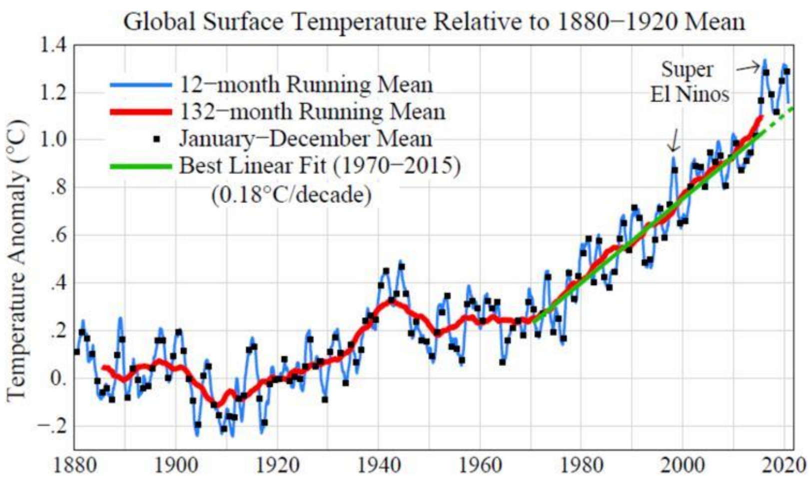


Figure 101 The root cause of climate change

The French polymath Jean-Baptiste Joseph Fourier (1768 – 1830) is credited with the discovery of the greenhouse effect. In 1821, he concluded that the Earth must be covered with some sort of invisible blanket because calculations based upon balancing its sunlight heating energy input and its thermal energy emissions output[454] (cooling), indicated that its mean

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[454] A surface's re-emission of absorbed energy is $Q=\sigma\varepsilon AT^4$ where…

- Q is the radiation heat emission/loss in joules/sec (watts (W)
- , σ is the Stefan-Boltzmann constant = 5.67E-8 W/m^2 &

temperature is about 30 Centigrade degrees higher than it would be otherwise. Then in 1856, an American polymath, Eunice Foote, wrote one of the world's first scientific papers submitted by a woman accepted/published anywhere ***("Circumstances affecting the heat of the sun's rays"***, American Journal of Science and Arts). It describes the experiments that she had done to identify Fourier's mysterious blanket. She had measured the temperatures of otherwise identical glass tubes filled with different gases exposed to sunlight. '"Carbonic acid gas" (CO_2), stood out because its tube heated more quickly, reached a higher temperature, & then cooled down more slowly[455].)

The next big breakthrough came in 1896 when a Swedish physical chemist Svante Arrhenius calculated/published that a doubling of the atmosphere's CO_2 concentration would raise the Earth's temperature by about 5 Centigrade (or Kelvin) degrees, and that, at the rate at which civilization was then consuming coal, it might become "*important*" towards the end of the next millennium.

In 1957 Roger Revelle and Hans Suess published the opening shot in what eventually turned into "the great global warming debate". Before most other scientists and their sponsors would take human-caused (anthropogenic) greenhouse-effect driven global warming seriously, Revelle/Suess had to get past the long-standing, soothing-sounding, counterargument parroted by almost everyone else, i.e., that the immense mass of the Earth's oceans would quickly absorb carbon dioxide produced by human activities. In the mid 1950's, Revelle & Suess discovered that even though CO_2's residence time in the atmosphere before being absorbed was indeed rather short - roughly 10 years – the oceans' capacity to continue absorbing it is both rather limited and shrinking. The reason for this is something that most of us were exposed to in an undergraduate chemistry class, i.e., that an aqueous solution's ability to absorb CO_2 is determined by its pH, acid/base buffering capacity, and temperature. Its acid buffering capacity is determined by its relatively small amount of dissolved inorganic carbon's most basic form, the carbonate anion. Only about 10% of the ~0.002 moles/liter of total carbon in "clean" seawater is present as carbonate and its proportion is shrinking because the

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- ε is the surface's emissivity and
- … A is its surface area in m^2 (from the sun's point of view, the earth's area is that of a circle whereas its total area is that of a sphere; i.e., 4 times larger
- T is the surface's absolute temperature (K)

Assuming that its surface emissivity ='s absorption coefficient and 1000 watts/m^2 input when the sun is directly overhead, and & that only half of the earth's surface gets sunlight at any given time, solve for T sans "blanket"

='s $(1/4*1/2*1000/(1*5.67E\text{-}8*1))^{1/4}$ = 258°K = -12°C = 10°F

(due to its GHG "blanket", the EARTH'S s total area/time-averaged temperature is now ~57°F)

[455] John Tyndall, not Eunice Foote, generally gets credited for that revelation. Five years later he rediscovered (or stole) her ideas & published them himself in a more prominent journal.

absorption of atmospheric carbon converts it to the bicarbonate anion which results in a lower oceanic pH. This means that seawater can absorb only about a tenth as much CO_2 as prior, simpler-minded, calculators had concluded. While it is true that most of the CO_2 added to the atmosphere would wind up in the oceans within a few years, most of it (or an equal amount of that already in them) would promptly reevaporate back out again.

In 1958, David Keeling, Revelle's second most famous student (that honor goes to Al Gore), set up the atmospheric CO_2 measuring system that's still pumping out data on the top of Hawaii's Mauna Loa. Plots of that data generate what's now referred to as the Keeling curve (Figure 101) - one of the 20th century's most important scientific accomplishments.

In 1980, NASA's James Hansen finally put everything together and set out to try to convince his/our country's topmost decision makers to do something about it - or in other words, he too started to become a "troublemaker".

Next, here's how I've convinced myself of the "special" nature of fossil fuel-generated atmospheric CO_2

During the last few years, mankind has been dumping about 37 billion tonnes of CO_2 into the atmosphere each year which has raised its concentration therein about 2.4 ppm (ppm = part per million by volume/molecule count). If we assume that the fuel burned to produce it is ~halfway between coal and methane chemistry-wise, it'd have a composition of $(CH_2)_n$ and

Representative Concentration Pathway (RCP)	Forcing compared to 1750 (Wm^{-2})	Climate policy associated with scenario	CO_2 Equivalent (ppm)	Projected global average temperature increase from 1986-2005 (°C)
2.6	2.6	Mitigation	475	1.0
4.5	4.5	Stabilization	630	1.8
6.0	6.0	Stabilization	800	2.2
8.5	8.5	None	1313	3.7

Figure 102 IPCC's climate modeling conclusion

a heat of combustion of about 44 kJ/gram. Since burning one gram mole of CH_2 (MW =molecular weight =12+2*1) makes one gram mole of CO_2 (MWt = 12+2*16=44), 37 billion tonnes of CO_2 would have required the burning of 14/44*37 B tonnes of such fuel which would have generated 14/44*37E9*1E+3 *44,000=5.18E+20 J worth of useful-to-someone heat per year.

Figure 102 IPCC's climate modeling conclusionFigure 102 is an EXCEL plot of the Intergovernmental Panel on Climate Change's (ICPP's) "change forcing factors" values vs atmospheric CO_2 concentrations fitted with a 2^{nd} order polynomial trendline (that figure's equation).

The forcing factors predicted for 400 and 402.4 ppm (currently one year's concentration difference) work out to 1.6059 and 1.6385 watts/m^2 respectively. If we multiply the difference between them by the Earth's surface area (5.1E+14 m^2) and the number of seconds in one year (3.15E+7), we come up with an annual atmospheric heating effect of 5.24E+20 Joules.

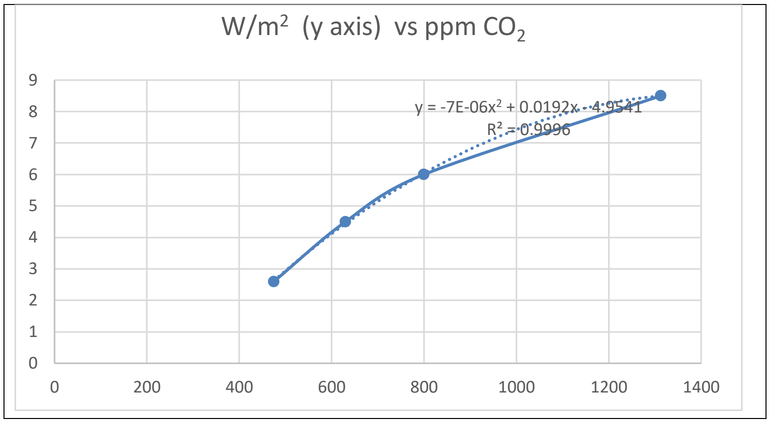

Figure 103 Plot of IPCC's conclusions

A comparison of that number with that fuels' combustion energy indicates that fuel burning's "bad" global-warming effects surpass its "good" effects (the reason that we burned it in the first place) within about one year. What's worse is that on average, that same CO_2 will hang around in the atmosphere for at least another 50 years and thereby continue to warm the globe we live on long after producing/dumping it has done us any good.

APPENDIX XIV The USA's Peanut Oligopoly

Jan 15, 2021 — March 12, 2020 update: Archer Daniels Midland today announced that it would pay $45 million to settle peanut farmers' price-fixing claims [Op-ed: The Peanut Industry Has a Monopoly Problem—but Farmers Are Pushing Back | Civil Eats]

When peanut farmers harvest their crops, they must either feed them to livestock or sell them to the "shellers" that ready them for conversion to valuable high-fat products like peanut oil and peanut butter and relatively low value (~2.5% fat) "ground nut meal" livestock feed. Two companies, Golden Peanut and Birdsong, control between 80 and 90% of the USA's peanut shelling industry. Those two, along with a third called Olam, "shell" almost 100% of all U.S. grown peanuts. The USA's peanut industry used to be competitive and local. In 1970, there were 92 active US shelling companies which means that most farmers had some choice to whom they could sell. Big mergers in that industry began in the 1990s when Golden Peanut bought Domco, a major sheller. By 2011, Archer Daniels Midland, the ag giant that along with CARGILL dominates most of the USA's food crop commodity marketing/processing, had bought Golden Peanut, and four years later also Texoma Peanut Company, the sunbelt's largest sheller.

Olam, meanwhile, was created by merging the industry's third- and sixth largest shellers.

Without the other food commodities' "futures prices", there was no competitive market and those shellers were free to set prices however they saw fit. And, of course, peanut prices paid to farmers remained stubbornly low.

In 2009 our government's ag-business analysts admitted that there was a problem when the USDA revealed that published peanut prices didn't have much to do with a real market. Market prices were figures submitted by oligopolistic shellers who simply made them up.

Finally in 2019 a civil lawsuit filed by nearly 12,000 U.S. peanut farmers (not the USDA) accused those buyers of establishing a cartel ("trade association") to divide up the market and set prices. Price fixing is a natural consequence of regulations written by "captured" public servants (e.g., farm state politicians) overly influenced by the especially important people owning/running the businesses nominally being regulated. Two years later a Virginia-based federal judge, Raymond A. Jackson, approved a $45 million settlement between Archer Daniels Midland's Golden Peanut subsidiary and the farmers leading that class action suit four months after giving his blessing to a $50 million deal letting Birdsong Corp. out of the case and a $7.75 million settlement with Olam.

> *Jackson wrote. 'Adjudication of plaintiffs' claims has already proven costly," and "future appeals of any jury outcome are not only possible, but likely given the amount of money at stake," "Any further litigation of this case would be lengthy, complex, and expensive, making settlement favorable to the class."*

The ruling came one day after a final fairness hearing July 26, at which he indicated that he would approve the deal and take "under advisement" a bid by class counsel for fees totaling one-third of the $102.75 million settlement fund.

Jackson had already awarded $1.9 million in expenses to them in April 2021.

There's nothing genuinely surprizing about any of this because ADM has had to pay even larger fines for misdeeds involving its other business dealings. Those transgressions include Sherman anti trust violations, tax dodging, price fixing, violation of the foreign corruption act, environmental pollution, and blatant political schenniagans the most recent of which involved its rather special business relationship with Mr. Trump's USDA chieftain, Sonny Purdue (see ADM (company) - Wikipedia).

However lucretive such settlements have proven to be for people employed by the USA's tort service industry, many of its farmers continue to accumulate debt to keep their farms afloat and family farm bankruptcies are still spiking because farmers still get only about 16% (25 cents/pound) of every dollar that you and I – the biggest losers in the USA's food sector's casino - must pay for their little or no value added staple foodstuffs like whole peanuts, potatoes, and soybeans.

ADM is just one of the four "trading giants" known as the ABCD group—ADM, Bunge, Cargill, and Dreyfus—controlling most of the free world's grain, oil seed, and biofuel businesses[456].

APPENDIX XV Another way for the USA's leaders to "save the world"

Whenever we or our descendants finally get around to providing our/themselves with a cheap, clean, and reliable clean energy source such as lots of breeder-type reactors, we/they could then turn water, air, and any carbon containing material including "waste" carbon dioxide into something else that could help "save the world". That magically "green" material is urea-formaldehyde plastic which in its bulk form is used in/for decorative laminates, textiles, paper, foundry sand molds, wood glues and wrinkle-resistant.

[456] A similar degree of fertilizer business consolidation has raised prices to the point that some farmers are being squeezed to the breaking point because their input costs have risen 55% since 2020. Fertilizer now costs farmers nearly 73% more than it did in 2020. The University of Missouri reported that net farm income in that state is apt to decrease by 14% in 2023 while the U.S. Department of Agriculture anticipates national farm income to fall by a fifth. see Facing high fertilizer costs, farmers still struggle to use less - Investigate Midwest. And The cost of growth: Fertilizer companies cash in while farmers and communities struggle - Investigate Midwest.

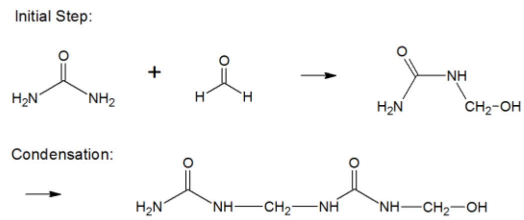

Figure 104 Urea (CON_2H_4) - Formaldehyde (COH_2) reaction

More importantly, it can be foamed up with a gas to make a cheap building/home insulation with R-values up to 5.0 °F·ft²·h/BTU (0.8 K·m²/W) the proper use of which could greatly reduce the future's energy wastage and demand.

Its use for that purpose dates from the 1930's when it was generally pumped into voids with a hose-equipped "gun" that mixed the "resin" with a foaming agent and compressed air. The resulting shaving cream-like foam firmed up within a few minutes and cured to form a strong lightweight solid within a week. It was generally injected into the wall cavities, crawl spaces, and attics of homes built or retrofitted.

Unfortunately, it got a bad reputation because it was often installed in a slipshod fashion into spaces that couldn't be adequately ventilated or kept reasonably dry[457] which caused it to both release stinky formaldehyde and shrink which compromised its insulation value.

Consequently, I'd recommend that our government render factory-built/inspected urea formaldehyde insulation boards "dirt cheap" (<$15 for each 4 by 8 ft, 3-inch-thick sheet of it) thereby enabling us to insulate our homes and whatever else we wish with them. Its installation would involve gluing those boards over the structure with something like "Great Stuff" (~$4/12 ox can at WALMART) and then coating them with a durable, polymer modified cementitious stucco such as "Custom Building Products MTSW50 VersaBond Thin-Set Mortar" (today's ***Home Depot*** price is $21.27/50 pound sack).

Figure 105 depicts an example of what you can do with Great Stuff-as-glue, thinset-as-stucco, mason's lime as "whitewash", and a different, also cheap,-but not as "Green" foam board (EPS aka beadboard).

[457] "Dry" is important because unlike fossil fuel-derived plastic insulation, it's biodegradable which means that given enough water, world, and time, "bugs" will eat and thereby decompose it back to air, dirt, and water. If we wished to speed that process up, our cows could probably digest it.

Figure 105 DIY foamboard insulation

Moveable indoor window shutters could easily be fabricated of those same foamboards which if combined with beefed up wall insulation would be a far more effective way to address your home's energy issues than is replacing its light bulbs with light emitting diodes. Doing things along those lines is not "rocket science" and could be accomplished by homeowners with or without the "help" of professional experts, regulators, volunteers, wives, friends, or subcontractors.

APPENDIX XVI Modern journalism

Here's a fresher rant that I've just come up with (it's been wordsmithed from an article: "*That Paper Is Dead' – The Power of Propaganda*, posted by Media:Lens 23Feb2023)

'Remember this date. First rationing of food in UK due to extreme weather. Things will only get worse as climate breakdown bites ever harder.'

UK climate scientist Professor Bill McGuire 21 February 2023

Dr. McGuire's super tweet was in response to UK's leading liberal news source, the "Guardian's" announcement that British supermarkets are rationing fresh produce - tomatoes, cucumbers, peppers, etc. - and that that could go on for weeks. As the Guardian's reporter put it, those shortages were caused by "*poor weather in southern Europe and north Africa"*. In fact, during June and July 2022, heatwaves caused temperatures to exceed long-standing records in many places around the world in both hemispheres. Europe experienced its hottest summer on record. Many counties surrounding the entire Mediterranean Sea endured heatwaves and fires that damaged their staple food grain crops, displaced people, and devastated forests. On 13July2022, the temperature of Tunisia's capital city (Tunis) reached 48 degrees Celsius, breaking a 40-year record.

Elsewhere in the world unprecedented flooding had the same effects upon well over a hundred million additional people.

In addition to the "food insecurity" issues generated by the resulting rapid run up of staple foodstuff costs in the UK and elsewhere, there's also been a reduction in the UK's in situ "salad "production due to its field crops being badly damaged by an early frost and the rising cost of growing such stuff within fossil fuel heated greenhouses.

Although there was some UK media coverage of produce rationing, that reporting gave little more than passing mention of its systemic connection to anthropogenic global warming. Also, par for the course, there were no headlines or in-depth analysis of the urgency of shifting our current version of civilization's course from its path of corporate profit-driven destruction; in other words, no mention of very real risk that we are beginning to experience the collapse of our civilization.

That's symptomatic of a corporate money propagandized society.

A previous ***Media Lens*** alert had noted the silence across virtually the whole of today's corporate owned media in response to journalist Seymour Hersh's report that the US had blown up the Nord Stream gas pipelines delivering cheap gas from Russia to Europe.

In a public debate about that issue, much-respected US journalist, economics professor, and Director of Columbia University's Center for Sustainable Development, Jeffrey Sachs said…

> "*The Swedes that went in to clean up the debris following that blowout said, 'We cannot share our findings with Germany because of national security" [???…]. How could Sweden not share its findings with Germany and Denmark? Apparently, their job also included to clean up so nobody else could investigate either*.' Who Destroyed the Nord Stream 2 Pipeline?? Jeffrey Sachs Has the Answers - YouTube

That talk's 8-minute video clip is extraordinary but what's more surprising is the lack of 'mainstream' reporting about it. It is as if the whole of US journalism has simply vanished - there's more to genuine journalism than just "reporting".

Sachs said that he spoke with '*a leading reporter of one of our leading papers whom he has known for forty years'*. Sachs told that friend that he believed the US carried out the attack on Nord Stream.

The reporter replied, '*Of course the US did it*.'

Sachs responded, '*Why doesn't your paper say so*?'

The reporter blamed his editors. '*It's hard; it's complicated*.'

Sachs continued:

'*When I was young, I used to read your newspaper, because you went after Nixon and Watergate, and because you published the Pentagon Papers*.'

The reporter replied:

'*Yes, but that paper is dead.'* (can you guess which newspaper he's referring to?)

In fact, one might as well say that almost all the western world's 'leading papers' are moribund.

The function of what now passes for 'journalism' here in the "West" seems to be propagandizing its nations' populations to allow 'national interests' to set both foreign and domestic policy. These 'national interests' are those of the billionaire class owning those countries' assets, and the political, military, and intelligence forces working for it/them in one way or another.

That class is terrified of the prospect of people that believe and act as I've been trying to do ever becoming "important" enough to interfere with their business models.

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FIGURES

TABLES

~~ne tablespoon of dried onion granules and a chopped up medium sized red pepper and fried everything for another 2-3 minutes. I then stirred the boiled dehulled/cracked soybeans, a half cup of corn flour, and enough additional water to produce a rather thick, lumpy gravy-like, stew which then was spiced up with a quarter tsp of Wright's Smoke, a half tsp of black pepper, and one tsp each of super salt and ground thyme. (total ~ 370 grams, 740 kcal, 51 g protein, 82 g carbohydrate, & 38 g fat).~~