

45-84.
ADULTERATION OF FOOD.



FEBRUARY 4, 1881.—Referred to the House Calendar and ordered to be printed.

Mr. CASEY YOUNG, from the Committee on Epidemic Diseases, submitted the following

REPORT:

[To accompany bill H. R. 7005.]

The Committee on Epidemic Diseases, to whom was referred the bill (H. R. 7005) authorizing the President to appoint a commission to examine into and report upon the adulteration of food and other articles in the United States, beg leave to report:

That they have investigated, so far as they could with the time and opportunities they have had at their command, the injurious and poisonous compounds used in the preparation of food substances, and in the manufacture of wearing apparel and other articles, and find from the evidence submitted to them that the adulteration of articles used in the every-day diet of vast numbers of people has grown to and is now practiced to such an extent as to seriously endanger the public health, and to call loudly for some sort of legislative correction. Drugs, liquors, articles of clothing, wall-paper, and many other things, seem to be subjected to the same dangerous process. The legislation required to meet the end is of too important a character, the committee think, to be entered upon without a fuller investigation than any committee of Congress could give it, and it is therefore necessary for a commission to be appointed, as provided in the bill, to make a thorough and minute examination of the entire subject, aided by the necessary scientific appliances.

The committee have derived much information on the subject from Mr. George T. Angell, of Boston, who has devoted many years to its study and investigation, and to the collection of a large number of facts and statistics connected with it which he embodied in a paper submitted to the committee, and which is attached as Exhibit A to this report.

The committee recommend that the bill be passed.

POISONOUSLY ADULTERATED FOODS AND OTHER POISONOUSLY ADULTERATED ARTICLES IN AMERICAN MARKETS.

[Some of the evidence in paper read by George T. Angell, Esq., of Boston, before the Boston Board of Trade, November 11, 1880.]

To give all the evidence I have collected on this subject would require a volume. One paper which I have read upon it filled eleven and a half newspaper columns.

The German Government had in 1878, 231,478 samples of different articles analyzed for adulterations, and obtained 3,352 convictions in the courts.

In Great Britain during 1879, about 80 public analysts, appointed under act of Parliament, analyzed 16,772 samples, and detected and exposed 2,978 adulterations.

In other European countries stringent laws are enforced for the protection of public health against the poisonous and dangerous articles which would otherwise be sold in their markets.

The object of this paper is to show that protection is quite as much needed in this country as on the other side of the ocean.

[From Prof. George A. Mariner.]

NO. 81 CLARK STREET, CHICAGO, *October 18, 1879.*

DEAR SIR: In answer to your questions, I would say that I have been an analytical chemist to this city twenty-three years; am a graduate of the Lawrence Scientific School, chemical department of Harvard University, and was during two years assistant of Professor Horsford in the laboratory. I have devoted myself entirely to chemical analysis and teaching chemical students ever since. I think I have had much the largest chemical practice of any man in the West. At the request of a highly respectable citizen of Chicago, I have examined fourteen brands of sugar, bought, as I understood, in this city; some granulated, some white, some colored, some coarse and some fine. I tested them thoroughly for impurities. In twelve of the samples I found tin in the form of a chloride, an active poison. The other constituents I can furnish if you desire. I have examined several sirups made essentially and entirely of glucose, and found in them chlorides of tin, calcium, iron, and magnesia, and in quantities which made them very poisonous. In one case a whole neighborhood was poisoned, and I was told of one death. I have in several cases found sugar of lead in vinegar. I use no vinegar myself. I look with suspicion upon our vinegar. I use fruit acid in place of it—lemon-juice, &c. I never eat pickles. I have found in various cases they were poisoned with lead and copper. I have tested to some extent the cheap tinware sold in our markets, and have no hesitation in saying that there is great danger in using fruits, vegetables, meats, or fish put up in tin cans of any kind. They are liable to contain lead and tin, both active poisons. Terra alba is largely used in cream of tartar, confectionery, and pretty universally for adulteration. I have found in many baking powders alum instead of cream of tartar—a thing dangerous and injurious in all cases. I should say that I have come to expect adulteration, and to fear dangerous adulteration, in almost every article of the grocery kind. I have had large experience in the analysis of colored poisonous articles of clothing, being employed by one of the largest dry-goods firms of this city. I examined, I think, sixteen samples, and nearly all of them were poisonous. I have also analyzed for other parties. In one case a child nearly died from wearing colored stockings. I would like to add that I have analyzed numerous samples of cosmetics and powders used on the face and hair. Almost all the hair cosmetics, including most of those in common use, I have found to be very poisonous, and many of the face powders and preparations I have found to contain arsenic or lead. I should not be surprised if 20,000 people in Chicago to-day were injuring their health and endangering their lives by the use of these cosmetics and powders. You can hardly overestimate the present danger to public health from the large and growing sale of poisonous and dangerously adulterated articles in our markets, and you have my thanks and earnest wishes for your success in your efforts to call public attention to this subject. I would say that I have personally known Dr. R. U. Piper, of this city, more than twenty years. He has no equal in the West as a microscopist, and has had wide experience as a chemist and physician. I should say most decidedly that there is no scientific man in Chicago whose evidence would be entitled to receive higher credit in our courts.

Yours, respectfully,

G. A. MARINER,
Analytical Chemist.

GEORGE T. ANGELL, Esq.

[From Dr. R. U. Piper.]

CHICAGO, *October 16, 1879.*

DEAR SIR: I have no hesitation in saying to you—

First. That I have entirely abandoned the use of vinegar generally sold in our markets, believing it to be unfit for use and dangerous. I know that sulphuric acid is largely used in its manufacture.

Second. I never use the pickles generally sold in our markets. I think the yellow pickles are quite as dangerous as the green. I know that lead is largely used in their manufacture. Verdigris is used in making the green.

Third. I have examined a large number of specimens of oleomargarine, and have found in them organic substances in the form of muscular and connective tissue, various fungi, and living organisms which have resisted the action of boiling acetic acid; also eggs resembling those of the tapeworm. I have them preserved, to be shown

to any one who desires to see them. The French patent under which oleomargarine is made requires the use of the stomachs of pigs or sheep. This is probably the way the eggs get in. I have specimens of lean meat taken from oleomargarine. There can be no question that immense amounts of oleomargarine are sold and used as pure butter. I regard it as a dangerous article, and would on no account permit its use in my family.

Fourth. Enormous amounts of the meats of diseased animals are sold in Chicago. I have made a large number of examinations.

Fifth. I have been informed of several cases of poisoning in this city from the use of canned meats.

Sixth. I know that Prof. G. A. Mariner, of this city, a chemist of twenty years' standing, of as high reputation as any man in the West, and a personal friend of mine, has found chloride of tin—an active poison—in numerous samples of sugar he has examined; also in some of them chloride of calcium—another poison.

I do not dare to use the sirups commonly sold in our markets, and I use but little sugar, as I believe them nearly all adulterated.

In regard to glucose, I am informed and believe that seven-eighths of all the sugar sold in Chicago is made of or adulterated with glucose.

As now manufactured and used, I know that many of our eminent physicians believe it dangerous and productive of disease of the kidneys. The manufacture of glucose in this country is now enormous, and large factories are being built to increase its manufacture.

I could fill a volume with the adulterations which I have found within a few years past in articles of food and drink in common use, by microscopical and chemical analysis. I have made more than a thousand microscopical examinations of milk in this city. I think that not over ten per cent. of the milk sold here by dealers is wholesome and unadulterated.

At your request, I would say that I am a physician of over twenty years' practice, and the past ten years I have given almost entirely to chemical and microscopical analysis. I have written several volumes on scientific subjects—surgical, medical, &c.—and am well known to Drs. Storer, Holmes, Henry J. Bigelow, Cutter, J. B. Treadwell, Harriman, and others of your city.

Yours, truly,

GEORGE T. ANGELL, Esq.

R. U. PIPER.

[From J. M. Chapman, sugar dealer.]

CHICAGO, October 17, 1879.

DEAR SIR: I have been in the sugar business about twenty years. Fifteen years ago our markets were filled with excellent sugars. Among the brands then sold, as I remember them, were Stewart's, Miller's, Bradish, Johnson & Son's, and Ockershausen's, of New York; Lovering, of Philadelphia; Woods, Weeks & Co., of Baltimore; East Boston, Union, Salem T. Lamb, and Adams refineries of Boston; J. B. Brown & Sons, of Portland, and many others, all of which were excellent sugars. Every one of these sugars has been driven out of our markets. For the past two years, with three or four exceptions, there have been, I believe, no pure sugars sold in Chicago. The average sale of sugars now in this market is more than a thousand barrels a day. In my opinion, not more than one barrel in a hundred is pure sugar, the rest being what we call doctored goods.

J. M. CHAPMAN.

GEORGE T. ANGELL, Esq.

Who are these men?

DR. PIPER:

CHICAGO, October 18, 1879.

DEAR SIR: We take pleasure in certifying that the scientific standing and reputation of Dr. R. U. Piper, of this city, are well known to us, and that the testimony of no other scientific gentleman of this city would, in our judgment, be entitled to higher respect.

HENRY BOOTH,

Ex-Judge Cook County Circuit Court, and Dean of Union College of Law.

SAMUEL M. MOORE,

Chief Justice Superior Court, Cook County.

JOSEPH E. GARY,

Judge of Superior Court.

CHAS. H. WOOD,

Ex-Judge Twentieth Circuit, Illinois.

GEORGE T. ANGELL, Esq.

Professor MARINER :

CHICAGO, October 21, 1879.

DEAR SIR: I have known Prof. George A. Mariner, of this city, analytical chemist, for many years. His reputation is of the highest character, and I know of no man in the West of higher standing as a chemist.

Very truly, yours,

JOHN G. SHORTALL,
President Illinois Humane Society.

J. M. CHAPMAN :

CHICAGO, October 21, 1879.

I have known J. M. Chapman nearly twenty years. I consider him one of the squarest men I know.

S. A. KEAN, *Banker.*

I have known J. M. Chapman at least five years, and consider him an upright man in every particular, and will add, that, of my own knowledge, I am convinced that very little, if any, sugar sold in our markets is pure.

J. H. CLOUGH, *Merchant.*

CHICAGO, October 21, 1879.

Having known J. M. Chapman for twelve years, I will say that he has from time to time presented me with items and samples of poisonous substances in sugars that astonished me as an old sugar merchant.

I believe the public cannot too soon awake to a true knowledge of the dreadful facts in this matter.

J. H. DUNHAM,
Sugar Merchant.

D. L. Moody, the evangelist (a Chicago man), told me October, 1880, that what Chapman said I could rely on.

[From Dr. De Wolf.]

The following letter was received from Dr. De Wolf:

CHICAGO, October 21, 1879.

DEAR SIR: Nothing is more clear to my mind than the immediate and pressing need not only of national and State legislation, but also of protective health associations to prevent the enormous sales in our markets of foods and other articles dangerous to public health. While I fully appreciate the necessity of additional laws, I must add that it is, in my judgment, absolutely impossible for public officers in this country to contend successfully with great financial interests unless sustained by active organizations of good and patriotic citizens.

OSCAR C. DEWOLF,
Commissioner of Health of Chicago.

GEORGE T. ANGELL, Esq.

Also, the following, from Prof. C. Gilbert Wheeler:

CHICAGO, December 15, 1879.

DEAR SIR: From personal knowledge I can say that there is an enormous amount of dangerously adulterated foods and drinks and other poisonous and dangerous articles now sold in our markets, and I think this subject should receive the immediate attention of both the general government and State legislatures, and that boards of health and good citizens should at once take effective measures to stop this great and growing evil.

C. GILBERT WHEELER,
*Professor of Chemistry in the University of Chicago, and
President Chicago College of Pharmacy.*

[Grocers' Manual.]

The Grocers' Manual specifies, among other articles, these as liable to contain poisonous or dangerous adulterations: Cream of tartar, cayenne pepper, chicory, cocoa, coffee, confectionery, curry powder, wines, liquors, pickles, preserved meats, Worcestershire and other sauces, teas, tobacco, and soaps.

[Dr. Smart.]

Dr. Charles Smart, United States Army, has recently analyzed a wide variety of articles, and says adulteration is now practiced in this country to as great, if not greater, extent than it was in England when the great agitation commenced there a few years ago.

[Prize essays.]

A \$1,000 prize was offered last year, through the United States Board of Trade, for best essays on adulteration, and four have been published.

The writer of the first, G. W. Wigner, an Englishman, says, under British laws adulteration has been reduced from about 65 per cent. in 1860 to about 16 per cent. in 1878, and in Canada, under similar laws, from about 52 per cent. in 1876 to about 26 per cent. in 1879, though, he says, they still have in English markets tinned fish heavily contaminated with lead; sweetmeats colored with chromate of lead; hams externally coated with chromate of lead; bread containing large quantities of alum; and children's powders and sleeping draughts containing poisonous doses of narcotics. Teas, which used to be almost universally adulterated, are now good. This results from stringent laws enacted by Parliament, about four years ago, for the inspection and analysis of teas landed at any port of Great Britain. In the Sanitary Engineer of June 1, 1880, I find that seven thousand chests of adulterated tea had been recently burned, under British laws, in British India.

The second essay, written by V. M. Davis, of New York City, gives many adulterations, and says, referring to this country: "We believe it no exaggeration to say that adulteration is practiced wherever opportunity offers and pecuniary profit or commercial advantage is made thereby."

The third, by Dr. William H. Newell, of Jersey City, N. J., gives, among other poisons liable to be found in food and drink, "chromates of lead, Brunswick greens, red oxide of lead, arsenite of copper, sulphate of copper, acetate of copper, carbonate of copper or verditer, carbonate of lead or white lead, bisulphuret of mercury, sulphate of iron, gamboge, sulphate of lime, carbonate of lime, red ferruginous earths and other injurious substances; that potted meats, fish, anchovies, cayenne, &c., are liable to contain red lead, or even bisulphuret of mercury; and pickles, bottled fruits, and vegetables to contain copper"; and that "the ramifications of adulteration extend over this whole country."

The fourth and last is by Dr. O. W. Wight, commissioner of public health of Milwaukee. He names, under the head of usual adulterations of food and drink in this country, lead in canned vegetables and meats, corrosive sublimate in rind of cheese, poisonous colors in confectionery, caustic lime in lard, aniline colors in fruit jellies, preserves, sausage, and wine, salts of tin in sugar, cocculus indicus and tobacco in beer and ale, salts of copper in pickles, sulphuric acid in vinegar, and about twenty-five other deleterious adulterations. He says it is useless to attempt to estimate the number of deaths and the amount of sickness caused by adulterated foods and drinks, "but the articles used are known, and the effects of such articles when taken into the human body."

[Professor Johnson.]

In an essay read before the "American Social Science" at Saratoga, on the 8th of last September, by Prof. S. W. Johnson, professor of chemistry in the Sheffield Scientific School, Yale College, I find, among other adulterations named, the following as *liable* to be found:

Bread, with alum and sulphate of copper.

Yeast, with alum.

Baking-powders, with alum, terra alba, plaster of Paris, whiting, and kaolin.

Milk, with a variety of articles.

Cheese, with potatoes, beans, oleomargarine, vermilion, red chalk, sulphate of copper, arsenic, and corrosive sublimate.

Lard, with boiled starch, alum, and quicklime.

Confectionery, with chromate of lead, red lead, vermilion, Prussian blue, copper, and arsenic.

Pickles, with sulphuric acid and verdigris.

Mustard, with yellow ochre and chromate of lead.

Vinegar, with sulphuric acid, arsenic, and corrosive sublimate.

Coffee, with roasted acorns, spent tan-bark, spent logwood, mahogany, sawdust, and burnt liver of horses.

Teas, with a great variety of articles.

TEAS.

I see by the papers that last year some Baltimore tea merchants called on the Chinese minister at Washington to see how they could get pure teas from China. He told

them the brands sold in America were unknown in China, and were prepared and colored with chemicals for foreign markets.

The British Parliament passed a law about four years ago for the inspection of all teas, and that those unfit for human food be destroyed.

I see by the papers that under British laws 7,000 chests of adulterated tea have been recently burned in British India.

Some time since a friend of mine, partner in one of the largest importing tea houses in Boston, and one of whose partners had resided several years in China, said to me, "I will not drink, nor will any member of my firm drink anything but the natural uncolored teas, nor would I advise any other man to do it, but we find it difficult to sell them. Public taste demands teas colored and faced, which I consider more or less poisonous, and some of them contain prussic acid."

The chemist of the Chicago board of health recently analyzed eighteen samples of tea, and found sixteen adulterated with other leaves, and that more than half had leaves which had been used before.

Mr. Beale, of Virginia, in a speech in the United States House of Representatives last session, stated, as I see, that samples of tea sold in Washington had been found by analysis to be adulterated with Prussian blue and chromate of lead.

COFFEE, CHOCOLATE, ETC.

How is it with coffee?

Mr. Beale stated, in the same speech, that whole cargoes of low-grade Rio coffees had been raised in price from two to three cents a pound by being coated with lamp-black and chromate of lead.

A Chicago gentleman writes me that coffee dyed to sell is largely sold in that market.

The author of "Food Adulteration," a valuable book recently published in Chicago, says there may be such a thing as unadulterated ground coffee, but (after persistent search) he has never been able to find it. He says it would require almost a page to simply name the articles used in its adulteration, among which he states that he has personal knowledge of the use of baked liver.

In regard to chocolates, cocoa, &c., I have less evidence. The books give a large number of articles, and some very dangerous, which have been used in adulterating them.

Dr. Piper writes that he has examined many specimens and never found a pure one.

I am inclined to think that with these, as with almost all other groceries, while there is much that is adulterated, there must be also much that is pure. I am inclined also to think that there may be considerable difference in the qualities of articles sold in different parts of the country. Analyses made seem to prove this fact.

Mrs. Richards, of the Massachusetts Institute of Technology, has recently analyzed sixty samples of white sugars obtained in Massachusetts. She found that not one of them contained tin or chloride of calcium, and only one contained glucose; and of thirteen brown sugars she analyzed, only three gave considerable amounts of glucose, and they contained no other injurious adulteration.

This evidence differs so immensely from the testimony of chemists and sugar dealers in other parts of the country, as will hereafter appear, that I cannot but think there must be a difference in the qualities of articles sold in different parts of the country. Whether the great agitation given to this subject in New England during the past two years would account for this difference, I cannot say. It has been often found that agitation of the adulteration of milk in a given locality brings into the markets for a time a better article; the same may be true of sugars, and the agitation now going on may for a time stop the use of dangerous adulterations, particularly in those parts of the country where there would be great danger of exposure.

CREAM OF TARTAR.

Now take cream of tartar, used for cooking. A Boston chemist tells me that he has found seventy-five per cent of "terra alba" in what was sold as cream of tartar. What is "terra alba"? White earth, that looks like flour, brought to our cities by the ship-load for purposes of adulteration. It commonly sells at from one to two cents a pound, and is used to doctor sugars; also by confectioners, spice mills, baking-powder manufacturers, &c. It is sometimes mixed with maple sugars. What are its effects? I am told by an eminent physician that it tends to produce stone, kidney complaints, and various diseases of the stomach. A large New York house sells three grades of cream of tartar. A Boston chemist analyzed a sample of the best grade and found fifty per cent. of terra alba in that.

A grocer who has been fifteen years in the business states, in the Sanitary Engineer of March 1, 1880, that probably not one sample of cream of tartar in twenty sold by grocers is pure, and refers to one case in which analysis showed it to contain ninety per cent of terra alba.

Mrs. Richards, before named, recently analyzed, in Massachusetts, 160 samples of cream of tartar. She found 47 consisted largely of terra alba and 9 almost wholly of terra alba.

Dr. Kedzie, president of the Michigan State Board of Health, recently analyzed five samples of cream of tartar which varied from 8 to 86 per cent. adulteration.

BAKING-POWDERS.

Bad as this is, baking-powders seem to be worse. The New York Evening Post of January 6, 1879, states that more than 500 kinds of these powders are now manufactured in this country; that the price of alum is less than 3 cents a pound; while cream of tartar costs more than 30; that the makers of these powders substitute alum for cream of tartar in part or altogether, and the result is griping, constipation, indigestion, heartburn, and dyspepsia. Dr. Henry Mott, jr., a New York chemist, some time since analyzed sixteen of these powders, and found alum an important ingredient in every one.

I also find from an article by Dr. Mott in the Scientific American of November 16, 1878, that these powders often contain, in addition to alum, terra alba, insoluble phosphate of lime, &c.

Of fourteen samples of baking-powders recently analyzed in Chicago, all but three contained alum, and of twenty samples of baker's bread recently analyzed there sixteen contained alum.

On pages 43 and 44 of the before-quoted book on adulteration will be found the opinions of a large number of eminent scientific men as to the poisonous effects of alum in the human stomach.

Professor Johnson says that "no considerable amount of alum is required to disorder digestion and ruin health is shown by a vast array of competent testimony."

In England its use by bakers is prohibited by law.

One effect of alum is to make bread very white. Dr. Clifford Mitchell, lecturer on chemistry to the Chicago Homeopathic College, writes me in regard to the severe effects upon himself of eating the beautiful so called Vienna bread, which he found by analysis owed its beautiful whiteness to the use of alum. Another gentleman writes me that he was told by the foreman of one of the leading bakeries in New York that Vienna bread is made with alum. The same gentleman writes me that *lard* is now manufactured from dead *hog grease treated with alum*; which fact Professor Johnson confirms.

PICKLES AND VINEGAR.

"If you want good pickles," says Professor Johnson, in his paper before quoted, "you had better make them, for they are not easy to buy at economical rates"; and he adds: "In making pickles for the market, such as you may eat with your oysters at the common restaurant, dilute sulphuric acid (oil of vitriol) is used in place of most of the vinegar; and a dose of copper is administered in the shape of verdigris, or blue vitriol, while alum is of course added in liberal measure. If eaten in any considerable quantity, they are dangerous, not only because they are indigestible, but because they are loaded with metallic poison."

Professor Mariner and Dr. Piper both testify that they have stopped using them. Professor Mariner says he has in several cases found sugar of lead in vinegar, and in various cases pickles poisoned with lead and copper, and he now uses lemon juice and fruit acids instead.

Dr. Piper says verdigris is used in making green pickles, and sugar of lead in making yellow pickles, which are quite as dangerous. He writes me, October 14, 1879, that the head of a large drug house in Chicago tells him that one pickle factory buy of them subacetate of lead in quantities of five gallons at a time; and the same drug house sells verdigris to pickle men to be used in making green pickles. I find in the report of Massachusetts State Board of Health of 1873 that in ten out of twelve samples of pickles put up by twelve different wholesale dealers, ten were found by analysis to contain copper, and nine to contain also alum.

The author of "Food Adulteration," before quoted, states that it is within bounds to say that not one of the very green cucumber pickles found in grocery shops is free from copper.

The New York Tribune of December 24, 1880, says, "The death of Rebecca Isaacs, aged 13, from eating poisoned pickles, was reported yesterday at the coroner's office." I have recently seen a case of severe poisoning of a family in New York City by eating chow-chow.

The Scientific American stated some time since that probably half the vinegar sold in New York City groceries was rank poison.

TOBACCO.

Tobacco, as we have before seen, is adulterated with poisonous articles. Professor Henry Leffman, a most respectable and well known Philadelphia chemist, says: "If I should enumerate the many ways in which tobacco is tampered with it, would not only disgust but terrify consumers."

I find in a New York paper the report of a case in which a cigarette was found to contain opium, and its wrapper, warranted to be rice paper, was ordinary paper whitened with arsenic.

Ex-Surgeon General Hammond reports that he has recently taken from the lip of a young man a huge cancer caused by smoking adulterated cigars.

I find in the Massachusetts Ploughman of May 15, 1880, that much of the foil in which some kinds of cheese and some brands of tobacco are put up contains lead, which is absorbed and dangerous.

CONFECTIONERY.

The subject of confectionery might well occupy an entire paper.

Dr. T. D. Williams, of Chicago, recently analyzed 150 samples, and found 127 adulterated. Terra alba was frequently found in large quantity, also glucose, also poisonous flavoring articles, also poisonous colors.

Professor Blaney, of Chicago, also analyzed a large number of samples, to ascertain the extent to which terra alba was used, and the report states that the results were simply appalling. In lozenges, for instance, he found from 25 to 42 per cent. of terra alba.

In France, manufacturers are now compelled to put their names on every package of confectionery, and are held responsible for all injurious results.

I find in the Boston Transcript of August 6, 1879, that the adulteration of ice-cream has come to be a serious matter, particularly in Philadelphia, and has caused much sickness.

In the New York Tribune of September 1, 1880, I find among the census industrial statistics of that city the reports of certain confectionery manufacturers. They say that granulated sugars cost $10\frac{1}{2}$ cents a pound, while glucose and grape sugar cost only 4 and terra alba 1 cent. They say large New York manufacturers are now largely adulterating their goods with these and other dangerous articles and selling at low prices, and if these things go on honest dealers will be driven out of business. They say this adulteration is frequently from 50 to 75 per cent., and in gum drops much more, and that these candies are causing sickness and death to children.

Professor Johnson, after giving the various poisons used, suggests (1st) to avoid colored confectionery; (2d) to avoid cheap confectionery; and (3d) to avoid all confectionery.

SPICES, MUSTARDS, PEPPERS, ETC.

If I were to attempt to explain all their adulterations, an entire paper would be required. By report of the Canadian commissioner of inland revenue, published in 1877, it appears that out of 180 articles of the grocery kind analyzed 93 were found to be adulterated.

Professor Mariner testifies that he has come to *expect* adulteration and *fear dangerous adulteration* in almost every article of the grocery kind.

Dr. Piper says: "I could fill a volume with the adulterations which I have found within a few years past in articles of food and drink in common use, by microscopical and chemical analysis."

Under English laws, I am informed, manufacturers of spices, sauces, &c., are now required to print on labels the true contents of packages.

PRESERVES, JAMS, JELLIES.

The adulterations of the preserves, jams, and jellies usually found in grocers' shops might well occupy several pages. Several pages are devoted to them in the recently published book on "Food Adulteration" before quoted, and the result arrived at by the author is "that it is entirely safe to say that four-fifths of them are neither pure nor wholesome."

DRUGS.

Hardly any subject can be more important to the sick than the adulteration of drugs.

Some time since a chemist and medical gentleman of Boston said to me, "The adulterations of drugs in this country are perfectly abominable. The physician orders a medicine for a patient in extreme danger. The medicine has only a quarter the

strength it should have, because of its adulteration, and the patient dies." I have no doubt that our best and most experienced druggists endeavor to obtain and sell pure drugs; but one of our most respectable Boston merchants told me some time since that he had within a few days talked with one of the largest wholesale drug dealers in the city, who told him that the adulterations of drugs were now so great that it was almost impossible to make a living by the sale of honest goods. Subsequently I called upon one of our most respectable retail druggists and he indorsed the statement as correct.

Our National Board of Health has recently published a report of twenty-seven pages on the adulterations of drugs, showing the magnitude of this evil.

ARSENICAL POISONING.

The amount of arsenic imported into this country during the year ending June 30 1875, was 2,327,742 pounds. Each pound contained a fatal dose for about 2,800 adult human beings. It is sold in our markets almost as freely as wood and coal, at a wholesale price of from a cent and a half to two cents a pound.

What becomes of it? I answer, it is used, with other poisons, in wall papers, paper curtains, lamp shades, boxes, wrapping papers for confectionery, tickets, cards, children's kindergarten papers, artificial flowers, dried grasses, eye-shades, and numerous other articles. Among the articles frequently made dangerous by this or other poisons may be named also ladies' dress goods, veils, sewing silks, threads, stockings, gentlemen's underclothing, socks, gloves, hat-linings, linings of boots and shoes, paper collars, babies' carriages, colored enamel cloths, children's toys, various fabrics of wool, silk, cotton, and leather in various colors.

One chemist finds eight grains of arsenic to each square foot of a dress; another ten grains of arsenic in a single artificial flower. A child dies in convulsions by taking arsenic from a veil thrown over its crib to keep off flies. A Boston gentleman is so poisoned by a flesh-colored undershirt that for several days he could hardly see. Several cases of children poisoned by colored toys. A Boston girl not expected to live because she sucked a cheap colored balloon. A lady dangerously poisoned by wearing a blue veil. A Lynn girl so poisoned by wearing colored stockings that it was feared amputation would be necessary. A child nearly dying from wearing colored stockings. Poisoning by tarlatan used to keep off flies. Several poisonings by colored gloves. Several poisonings by colored hat linings.

Death in colored stockings.—A fatal case of poisoning from wearing colored stockings has just come to light. Gertrude, the six-year-old daughter of A. G. Thornton, of Port Jervis, N. Y., a little over a month ago, wore a pair of stockings colored in brown and old gold. The day being warm, she perspired very freely. Soon afterwards unmistakable symptoms of poisoning appeared, and Dr. Sol Vanetten was called. He said the illness was undoubtedly caused by poison absorbed from the coloring matter in the stockings. She suffered the most intense pain, and at times her screams could be heard some distance from the house. She died on Sunday afternoon, after an illness of thirty-nine days.—(Washington Star, February 2, 1881.)

These are only a few of many cases brought to my notice.

Professor Mariner says he was employed by a large dry-goods house in Chicago to analyze sixteen samples of suspected clothing, and found nearly all poisonous.

Prof. S. A. Lattimore, LL. D., professor of chemistry in Rochester University, in an address before the Central New York Medical Association on arsenical poisoning, says: "We now wear it in our apparel, eat it in sweetmeats, drink it in sirup, and write with it as ink;" and he adds, "Has the time not come when this broadcast sowing of a dangerous poison should be in some manner arrested?"

POISONOUS BOXES, CARDS, ETC.

Now let us look at poisonous papers, boxes, cards, &c.

In France bookbinders have recently been notified that they must not use poisonous colors, and to violate this law is made a criminal offense.

The commissioner of public health of Milwaukee writes me that within his knowledge even health reports have been bound with poisonous arsenical papers.

In the British Medical Journal of November 8, 1879, will be found a case of poisoning by the use of poisonous playing-cards.

Dr. Wallace, analyst of the city of Glasgow, states that he has found nearly one-fifth of an ounce of arsenic in a pack of playing-cards.

The secretary of the Connecticut State Board of Health reports arsenical poisoning from putting up packages in tinted paper; also severe poisoning from artificial flowers.

In the Boston Transcript of August 22, 1879, I find two deaths caused by a poisonous paper box.

A card almanac picked up in front of a school-house in my town was found to contain a large quantity of arsenic.

In my season railroad ticket a few years ago was found enough arsenic to kill a child.

At Boston's big baby show some years since one baby nearly died from sucking the invitation card.

Various cases have been reported to me in which kindergarten papers put into the hands of little children as playthings have been found to be loaded with arsenic.

I find in the Boston Daily Advertiser of March 4, 1879, that Swiss authorities have prohibited the use of poisonous colors in wearing-apparel, papers, toys, confectionery, wines, liquors, sirups, and a great variety of other articles.

Professor Lattimore, of Rochester University, says that not only are candles colored green and yellow by arsenical pigments, but sometimes the wicks also are saturated with arsenic to improve the brilliancy of the light.

I have recently read a case in which a lady was severely poisoned from the burning of arsenical candles in her chamber.

In regard to its being put into powders for the face and cosmetics, I have considerable evidence, but none stronger than that of Professor Mariner, who says that probably 20,000 people in Chicago are injuring their health and endangering their lives by the use of these cosmetics and powders, which contain arsenic or lead.

When we consider that if one-twelve-hundredth part of a pound of Paris green gets into a man's lettuce or cabbage it is likely to produce death, it seems a great pity that it should be deemed necessary to use this dangerous article, particularly if, as some scientific men have declared, vegetables have power to absorb it from the soil.

I think, in view of the wide and dangerous use of this article, that it would be wise for Congress to authorize the offer of a prize for the discovery of some new cheap and harmless substitute for Paris green.

POISONOUS WALL PAPERS.

These poisonous papers are of various colors, green, blue, yellow, red, pearl, and other colors; some cheap, some costly; some figured, some plain; some glazed, some unglazed.

Professors Wood and Hills, of Harvard University, have recently been analyzing a wide variety of colors, red, blue, green, drabs, slate color, &c., and have found about 33 per cent. of all they have analyzed poisonous.

Professor Love, of the New York School of Mines, reports that of all the wall papers he has recently analyzed he has found nearly or quite 50 per cent. poisonous.

The Michigan State Board of Health has published a book containing seventy-five representative specimens of these papers, and by order of that board it has been put into every important public library of Michigan, as a warning to the people of that State. It bears the very appropriate title of "Shadows from the Walls of Death." This book states that these papers are sold in every city and important village of that State, and that their use is increasing. It advises (1st) to use no wall paper at all; (2d) never to use wall paper without first having it tested for arsenic; and (3d) if arsenical paper is already on the walls, and cannot well be removed, then (as some protection) to cover it with a coat of varnish.

There can be no doubt that thousands of people in this country are now suffering, and many have died, from the effects of arsenical wall papers. Yet their manufacture and sale are permitted to go on without restriction. "When I was in Heidelberg," said an eminent Boston chemist to me, "I discovered arsenic in two specimens of wall paper, and the manufacturer was in jail before night. Here I have analyzed hundreds of specimens in a single year, and found arsenic in a large proportion of them, but nobody was prosecuted."

I cannot say how it may be in other States, but in Massachusetts there is no law under which anybody can be prosecuted.

In the British Medical Journal of February 21, 1880, fifty-four cases of poisoning by wall papers are reported.

In this country numerous and well-attested cases are within the knowledge of almost every intelligent physician and chemist. Many such cases have been reported to me.

The Sanitary Record states that diseases of the eye are often traceable to this cause.

Some twelve or fourteen of the medical societies of Massachusetts some time since petitioned the legislature to enact a law to prohibit the sale of these papers, but were unable to overcome the opposition of the great financial interests enlisted on the other side, and so, in the words of the chemist before stated, "nobody is prosecuted."

THE REMEDY.

How can we be protected from poisonous clothing and papers?

Require every package, roll, and article to be stamped "*poisonous*," and every seller to call every buyer's attention to that word. Keep chemists at work at public expense

analyzing and publishing names, and the manufacture of poisonous clothing and papers will soon cease, and they will disappear from American markets.

I will now take up, in the order named, tinware and tin cans, glucose and sugars, and oleomargarine.

Tin ware and tin cans.

I find in the Boston Herald of August 30, 1880, that Baltimore firms alone use nearly forty-eight millions of cans per annum. I find a similar statement in the Sanitary Engineer of December 15, 1880. What are these cans used for? The grocer nearest my residence furnishes me a list of articles he has for sale in tin cans, from which I take the following: Peaches, corn, tomatoes, apricots, pears, pineapples, strawberries, raspberries, blueberries, and blackberries for pies, puddings, and sauces; plums, cherries, grape, green gages, quince, asparagus, okras, sweet and other pickles of various kinds, baked beans. Of soups, he keeps in tin cans tomato, pea, ox-tail, green turtle, mock-turtle, terrapin, julienne, macaroni beef, consommé, mutton, chicken.

Of meats and fish, he keeps in tin cans a great variety, including codfish, fish-balls, lobster, clams, oysters, roast beef, roast turkey, chicken, game, tongue, ham, &c., He has always in stock many hundreds, perhaps thousands, of these cans.

It would seem as though almost everything we now eat on hotel, restaurant, and boarding-house tables is liable to be taken from tin cans.

Is there any objection?

G. W. Wigner, in his prize essay before quoted, says that notwithstanding all the precautions taken in England, it is still possible to find in English markets tinned fish heavily contaminated with lead.

Dr. O. W. Wight, in his prize essay before quoted, names first in his list of foods dangerously adulterated in this country—

Lead in canned vegetables and meats.

In the Boston Journal of Chemistry of November, 1878, I find the following:

"Attention has recently been called to a new risk of chronic poisoning by the old enemy, lead. What we call tin vessels are in daily use in every household. They are cheap, durable, and convenient, and have been considered perfectly safe. They are safe if the tin plate is honestly made. But, unfortunately, this is not always to be counted on. Tin is comparatively cheap, but lead is cheaper, and an alloy of the two may be used with profit.

"The alloy is readily acted upon by acids, and salts of lead are thus introduced into food. The Michigan State board of health has lately been investigating this subject, having been led to do so by a letter from a physician who found that certain cases of what had been taken for chorea were really paralysis agitans, which could be traced to this kind of lead poison. Other cases were brought to light in which children had died of meningitis, fits, and paralytic affections, caused by milk kept in such vessels, the acid in the fluid having dissolved the lead. Malic, citric, and other fruit acids are, of course, quicker and more energetic in their action upon the alloy. The danger is greater because lead salts are cumulative poisons. The effect of one or two small doses may not be perceptible, but infinitesimal doses, continually repeated, will in the end prove injurious, if not fatal. Analysis of a large number of specimens of tin plate used in culinary articles showed the presence of an alloy with lead in almost every instance, and often in large quantities. It is safe to assert that a large proportion of the tin wares in the market are unfit for use on this account." This is what the Boston Journal of Chemistry says.

The editorial article goes on to say: "It is stated by Dr. Kedzie [who is not only president of the Michigan State board of health, but an eminent chemist] that a peculiar kind of tin plate, the coating of which is largely made up of lead, is coming into general use for roofing, eaves-troughs and conductors, and it is suggested that much of this lead will eventually be dissolved and find its way into household cisterns. Susceptible persons may be poisoned even by washing in this lead-charged water, and all who drink it, even after it is filtered, are in danger of chronic lead poisoning."

In a subsequent issue of the Journal of Chemistry, January, 1879, appeared the following:

"Dr. Emil Querner, of Philadelphia, writes us that since we called attention to the subject he has tested a great number of tin vessels from different sources, and found lead in every case." He adds: "All my vessels for cooking, &c., are now made of sheet-iron, and give satisfaction."

This evidence, published in a scientific journal, seems to me worthy of serious consideration. What else is there to corroborate and sustain it?

Professor Mariner says he has tested cheap tinware and has no hesitation in saying there is great danger in using fruits, vegetables, meats, or fish put up in tin cans of any kind, for they are liable to contain lead and tin, both active poisons.

Dr. Piper says: "I have been informed of several cases of poisoning in this city from the use of canned meats."

Dr. Baker, secretary of the Michigan State board of health, wrote me March, 1880, of cases within his personal knowledge in which persons were poisoned and made sick by eating peaches and pine-apples, from tin cans.

William Jones, of Boston, Mass., reports to me that he was severely poisoned—vomiting, &c.—by drinking coffee made in a new, cheap tin coffee-pot.

In the Home Journal, of May, 1879, I find the case of a family poisoned by eating bread baked in tin sold from a five-cent counter.

From the Boston Transcript, of July 30, 1879, I learn that several cases of sickness have recently been reported at Worcester, Mass., from eating canned fruit and meats.

I have also an account of a Brooklyn family made violently sick by eating canned cherries.

In the New York Witness, of July 17, 1879, it is stated that illness from eating canned food is much more common than usually supposed, and canned meats, corn, fruit, and fish are all cited as having produced sickness.

In the same paper, of July 24, 1879, J. R. Buchanan, of Brooklyn, gives his experience in being poisoned by eating tomatoes from a tin can.

In the Boston Journal, of June 18, 1880, I find the following dispatch from New York: "Henry Davidson, wife, and daughter are seriously ill from eating canned corned beef. Mrs. Davidson is not expected to live."

Millions of these tin cans are annually used in this country to supply our hotels, restaurants, boarding-houses, and private families. In the competitions of trade there are certainly great inducements for canners to buy those which are cheapest and most poisonous.

Personally, as at present informed, I prefer to avoid, as far as possible, all articles taken from tin cans. To enable me to do this the landlord of my hotel at the White Mountains, last summer, kindly gave me the following list of articles which, taken from tin cans, he was then using on his table: Apple for pies and sauce, pine-apple, peaches, cranberries, pears, apricots, gages, green corn, squash, pumpkin, Lima beans, blueberries, and tomatoes.

Considering the general lack of information on this subject and the great temptation to canners to buy cans as cheaply as possible, it seems to me public health demands that this gigantic business be at once thoroughly investigated and made absolutely safe.

Can it be made absolutely safe?

The remedy.

Yes. Let honest chemists, paid by national and State governments, be constantly employed analyzing canned goods, and publishing in the reading columns of papers in all our cities every article in which they find lead or other poison, with the name of the canner. Canners will then require from makers a guaranty of the safety of every can they buy. Cans containing soluble lead or other poison will cease to be manufactured, and canned goods, as a rule, will be absolutely safe.

Glucose and sugar.

Glucose, a cheap substitute for sugar, made in Germany of rags, and which can be made of sawdust, but generally made in this country by boiling corn starch in dilute sulphuric acid [oil of vitriol], is a giant which has grown in a few years from nothing to most colossal proportions. A single factory uses in making it over five millions bushels of corn a year. Another, more than two millions bushels. I am told that it sometimes sells in large quantities as low as two cents a pound.

Dr. T. D. Williams, of Chicago, recently analyzed over a hundred samples of confectionery, and found more than 70 per cent. were made wholly or in part of glucose. He also recently analyzed six samples of brown sugar, procured from six different sources, and found they all contained glucose; two of them, very light colored, dry, and apparently fine articles, contained respectively 33½ and 41½ per cent. of glucose.

P. Casamajor, chemist, in paper read before the American Chemical Society, March 4, 1880, says he has found refined sugar largely adulterated with glucose.

Dr. O. W. Wight, health commissioner of Milwaukee, writes me November 8, 1879, that a chemist in charge of a glucose factory tells him that about 20 per cent. of glucose is put into granulated sugars, 60 to 70 per cent. into some brown sugars, and about 40 per cent. into candies; that it is largely put into honeys, and constitutes the greater portion of many sirups. In twenty-one samples recently analyzed by Dr. Kedzie, twenty were made wholly, or very largely, of glucose.

President Kedzie, of the Michigan State board of health, analyzed seventeen table sirups, and found fifteen made of glucose.

In twenty samples of table sirups recently analyzed at Chicago, only one was found unadulterated, several of them being made almost entirely of glucose.

The editor of the Chicago Grocer writes me that seven-eighths of all the sugars sold in Chicago are adulterated with glucose, and subsequently states in his paper that seven-eighths of all the sirups sold in that market are of the same kind.

I am told by a Chicago sugar dealer that ship loads of it are sent to New Orleans to come back as New Orleans sugar and molasses. I am told that it is largely used also by bakers and brewers in jellies, jams, preserves, honey, maple sugar, beers, wines, liquors, and is constantly being put to new uses, and is sold in immense quantities to sugar refiners.

Recently a grocer in Glasgow, Scotland, was fined for selling American honey which contained fifty-seven per cent. of glucose.

H. W. Wiley read a paper before the American Scientific Association, at Boston, August 27, 1880, in which he states that ten glucose factories are now running in the United States night and day, and producing over 200,000,000 pounds a year. He states that eleven other factories of larger capacity are now being built, and to be completed in less than a year. When finished the united capacity of the whole will be over 500,000,000 pounds a year, or more than ten pounds each for every man, woman, and child in this country.

The Merchants' Reporter, of September 11, 1880, states that fifteen glucose factories are now running in the United States, and now producing about 300,000,000 pounds a year.

Saying nothing of its effect on health, this article has only from one-fourth to two-fifths the sweetening power of pure sugar. It is obvious that any one who buys this article, or any of its products, by whatever name called, supposing that he is buying pure sugar, or honey, is badly cheated.

But is the article wholesome?

Not as it may possibly be made in the chemist's laboratory, at high cost, but as it is made and sold for two or three cents a pound in our markets. A recent writer on the subject says, "the glucose of the laboratory and the glucose of commerce are very different things." The one can be sold at a profit for three cents a pound; the other for no such price.

Is the glucose of commerce a wholesome article? That is the question. The Chicago Grocer, of September 25, 1879, says: "The manufacturers deny admittance to their factories." The Chicago Tribune says the manufacture is carried on with as much secrecy as the illicit distillation of spirits.

The Merchants' Reporter states that some of these factories are considered such nuisances as to greatly increase the risks of insurance. It quotes from the Chicago Evening Journal, in regard to its manufacture at Des Moines, Iowa, that neighboring families were made sick by the nauseous smell, which caused sore throat and severe vomiting; twigs of fruit trees were colored and withered by the gas given off; and house plants exposed to it withered and died. The immense amounts of sulphuric acid used eat up not only the pipes and machinery, but even the buildings, making constant repairs and replacing necessary.

Professor Charles R. Fletcher, chemical lecturer to Boston University, and State assayer of Massachusetts, writes me that he has recently analyzed three samples of the best solid glucose, and two samples of the sirup, grades A and B, and in every sample found free sulphuric acid (oil of vitriol). In one sample of best glucose he found thirty grains of oil of vitriol to the pound of glucose. In a sample of the best sirup he found nearly as much.

Dr. Kedzie, of the Michigan board of health, found in one sample of glucose sirup 141 grains of oil of vitriol and 724 grains of lime to the gallon, and in another, which had caused serious sickness in a whole family, 72 grains of oil of vitriol, 28 grains of copperas, and 363 grains of lime to the gallon.

In Dr. Kedzie's report published by the National Board of Health July 17, 1880, he states that he has almost always found in samples of glucose analyzed by him copperas and sulphate of lime, and usually in considerable quantities; and that two instances have come to his knowledge where a number of persons were made alarmingly sick by eating glucose sirups which contained considerable quantities of copperas (sulphate of iron.)

Dr. T. D. Williams, of Chicago, states that in the various samples of glucose sugars and sirups he has analyzed, he has in every sample found quantities of free sulphuric acid (oil of vitriol).

Professor Mariner testifies that in several glucose sirups he has analyzed he has found chlorides of tin, calcium, iron, and magnesia in quantities which made them very poisonous.

The Journal of Materia Medica says the use of tin in glucose sirups has been proved by numerous analyses.

Dr. Kedzie says that hams cured with glucose have been found to mold, blacken by heat, and become bitter.

In the recently-published book on food adulteration before referred to, I find a case in which the men employed in twelve different Michigan lumber camps were poisoned by eating glucose sirup.

A New York lawyer of the highest respectability writes me that a man recently applied to him to hire a building and machinery for the manufacture of glucose; that he objected because his brother, a professor of natural sciences in a western college, had told him that the sulphuric acid used was very destructive to both building and machinery, making constant repairs and replacing necessary; that this man admitted to him that immense quantities of sulphuric acid were used; that quantities of this did remain in the product, and large quantities of sulphate of lime were formed, which was very injurious to health, and, as he understood it, affected the kidneys; and that he himself would only use on his own table the highest grades of granulated sugar.

I have another letter from a most respectable Saratoga gentleman, well known to me, that he has recently bought the highest priced granulated sugar, which he found to be largely mixed with another white substance, and to have only about one-half the sweetening power of pure sugar.

Dr. Williams also states, in letter of April 9, 1880, that he has found glucose products almost invariably contaminated with lead, and that Professor Mariner tells him that he has recently found lead in almost every sample he has analyzed.

Dr. Wight, commissioner of public health of Milwaukee, writes me, November 8, 1879, that an eminent chemist and college professor, tells him that he has analyzed many specimens of sugar for muriate of tin, and has frequently found it in dangerous quantities.

Professor Mariner stated, October, 1879, that out of fourteen samples of sugars analyzed by him, he had found in twelve tin in the form of a chloride, "an active poison."

The students in the school of mines of Columbia College, New York City, extracted some time since quantities of tin from sugars and hung the lumps from the necks of the bottles from which they were taken.

President Kedzie, at a meeting of the Michigan board of health, January 14, 1879, said that, as a general thing, cheap sugars in Michigan were adulterated; that poisonous materials were used to color sugars, and that A coffee sugars often, and B and C coffee sugars almost always, contained tin salts.

Mr. Stearns, the great manufacturing chemist of Detroit, told me, September, 1879, that he could not buy a pound of sugar in Detroit which he could use to coat his pills, and Mr. J. M. Chapman, as we have before seen, says that not more than one barrel of sugar in a hundred now sold in Chicago is pure, "the rest being doctored goods," which evidence is confirmed by other sugar merchants of that city.

In view of all these facts I am inclined to believe there is some foundation, at least in some parts of our country, for what Mr. Fuller, the retired sugar dealer said to the United States Board of Trade in New York City, November 13, 1878, viz, that sugars, molasses, and honey were then so adulterated that, though very fond of those articles, he did not dare to use them, except in small quantities; and I am not surprised to know that some of our physicians believe that the great increase of kidney complaints in this country may be attributed to the great increase in the adulteration of sugars.

It may be said that since the country has become somewhat alarmed by the agitation of this subject, unscrupulous manufacturers are leaving out some articles they before put in; but that gives us no security for the future, when the agitation shall have been quieted, unless permanent measures are taken to protect the public.

The remedy.

What can be done to stop the adulteration of sugars?

1. Compel every manufacturer who sells articles adulterated with glucose to place on his store and factory a sign, "glucose products sold here," and on every box and package containing them the words, "glucose products." Then set the public analysts at work and let them publish in the reading columns of newspapers in all our cities what they find in glucose, and the names of its manufacturers.

2. Compel every manufacturer of sugar or sugar products adulterated with other articles to hang out a sign, "adulterated sugars or sugar products sold here," and put on every box or package the word "adulterated." Then keep the chemists at work and let them publish, as before, what they find, and the names of manufacturers.

Oleomargarine.

I have spoken of glucose as a giant which has grown in a few years to colossal proportions. I will now speak of what I may properly call its twin-brother—oleomargarine.

Few persons have any correct idea of the extent to which this article is now made in this country. A single firm in New York City has recently contracted with parties in Vermont for 300,000 firkins, to be delivered this year, for packing oleomargarine butter.

It is estimated that there was made in this country last year about a hundred millions of pounds.

It is sold, as I am informed, in almost every butter stall in our great Faneuil Hall market, and large quantities of it, I am informed, are shipped to Vermont to come back as Vermont butter. It is put up in beautiful forms as well as in tubs and firkins, and cannot ordinarily be distinguished from the products of the milk of the cow.

It is not only filling our markets in the shape of butter, but also as cheese. Many creameries and many large dairies, as I am informed, are now mixing 25 per cent. or more of oleomargarine oil with their cheese.

Are these commodities unwholesome? Manufacturers will tell you they are even better than the products of the milk of the cow; and they will show you a long list of certificates from their paid chemists to the same effect.

I have microscopic photographs which tell a different story, and the testimony of scientific men whom I believe.

It is a great pity that chemical analyses are so expensive. A great glucose or oleomargarine ring, making millions of dollars, can easily afford to furnish all the chemists in the country carefully-prepared samples of their commodities, and pay the highest prices for analyses and certificates. But who is there in this country to cautiously collect from the highways and by-ways in our various cities and towns, a great variety of the articles actually sold, and pay honest chemists to analyze them?

Prof. Henry Lefman, one of the most respectable chemists of Philadelphia, states that he knows large establishments which employ scientific men simply for the purpose of adulterating and to invent new processes of adulteration.

The French Academy of Medicine have, as I am informed, recently reported that French oleomargarine is unfit for use in French hospitals, and the French minister of the interior has refused to permit its use in French hospitals. The ground taken was, as I am informed, that while it might be possible to make, in a chemist's laboratory, a pure article which would not be unwholesome, in point of fact it was found by the academy experts in Paris that only an inferior article was actually sold in commerce, and which appeared to injure the digestive organs of sick and debilitated persons.

Mr. Michels, of New York City, a well-known microscopist and editor of a scientific journal, testifies that oleomargarine is simply uncooked, raw fat, never subjected to sufficient heat to kill parasites which are liable to be in it; that those who eat it run the risk of trichinae from the stomachs of animals which are chopped up with the fat in making it. He states that he has found in it tissue, and muscle, and cells of suspicious nature, and that Mr. Saylor has also found in it positively identified germs of disease.

Mr. Michels further states that all the caul fat of oxen brought to New York City in a week would not supply one factory four days, yet there were then seven factories in New York City, and he asserts that there can be no doubt that fats and grease of various descriptions are used in making oleomargarine.

The eminent English chemist, Professor Church, states that he has found in it horse fat, fat from bones, and fats such as are ordinarily used for making candles.

But the gentleman who, probably more than any one else, has written upon this subject is Dr. R. U. Piper, of Chicago, concerning whom the chief justice of the superior court of that city, and three other judges, certify "that the testimony of no other scientific gentleman of that city would, in their judgment, be entitled to higher respect."

Dr. Piper says his attention was first called to the subject by an article published by Mr. Michels, before referred to, in the American Journal of Microscopy. Since then he has examined a large number of specimens. He testifies that, while no true butter can carry trichinae, eggs of the tape-worm, &c., he has found in oleomargarine not only organic substances in the form of muscular and connective tissue, and various fungi, but also living organisms which have resisted boiling acetic acid, and eggs resembling those of the tape-worm; these he has preserved to be shown to any who may desire to see them, and he has also microscopic photographs of them. He thinks these may get in through the stomachs of pigs and sheep used in making the article, though he has found in it specimens of uncooked meat. His conclusion is that it is a dangerous article, and that he would on no account permit its use in his family.

The Rev. E. Huber, microscopist, of Richmond, Va., writes in the Southern Clinic of May, 1880, that oleomargarine differs in its microscopical appearance as well as in its nutritive and dietetic qualities from true butter; that the fats in it are not subjected to a heat sufficient to destroy the germs of septic and putrefactive organisms, and that there may also be introduced into the system by its means the eggs which develop in tape-worm. And he also states that he has frequently found in oleomargarine eggs resembling those of the tape-worm.

Mr. Michels says I have reason to believe that the refuse fat of at least one pork-

packing establishment is used for oleomargarine; and as the trade increases, fat of every description will probably be offered for sale; even that from the carcasses of diseased animals may be purchased without guilty knowledge of the managers.

Professor Piper says it is not unreasonable to suppose that one of these populated stomachs chopped up with the fat, even if washed and cleaned, may contain thousands of living organisms.

From an article in Boston Herald of January 8, 1881, I find that Dr. George B. Harri-man, a most respectable microscopist of Boston, well known to me, has recently examined some twenty specimens of oleomargarine obtained from different dealers, and has found in every specimen more or less foreign substances, a variety of animal and vegetable life. Among these were corpuscles from a cockroach, and small bits of claws; the blood corpuscles of sheep; the egg of a tape-worm. Yeast was found sprouting in considerable quantities, and spores of fungi were very prevalent; a portion of a worm, a dead hydra viridis, portions of muscular fibers, fatty cells, and eggs from some small parasite were among the discoveries.

I find also in the American Journal of Microscopy of October, 1878, a letter from the celebrated English microscopist, W. H. Dallinger, said to be the greatest living authority on this subject, in which he shows that oleomargarine is not subjected to a heat sufficient to kill the living organisms which refuse fats are liable to contain.

In view of the great and increasing magnitude of this business; and the report of the French Academy of Medicine; and the discoveries of the scientific gentlemen before named; and the danger of using the raw fats and stomachs of diseased animals, and of those that die on the cars, which number hundreds of thousands annually; or of pleuro-pneumonia; or of cattle fever; or of hog cholera; I think we have no reason to rejoice over the erection of these enormous factories which are now supplying the tables of our hotels, restaurants, boarding-houses, and private families with oleomargarine butter and cheese.

Whatever else may be said by the great capitalists engaged in their manufacture, one thing they cannot honestly deny, viz, that not three men or women in a hundred would eat an ounce of these articles if they could know by color or otherwise what they were eating.

No man would knowingly give his wife or children for butter the raw uncooked fats of animals that may have died of cattle plague, hog cholera, or other diseases. But how manufacturers are to guard either themselves or the public against the fats of such animals is a problem which no manufacturer or chemist employed by him has, thus far, to my knowledge, attempted to explain.

If any one shall ever assert that such fats cannot be used, I am prepared with evidence to prove the contrary.

A new article of butter and cheese has recently made its appearance in western markets containing from fifty to seventy-five per cent. of hog's lard. The Chicago Tribune, of November 17, 1880, states that fifteen factories in that city are now engaged in its manufacture, and that one article used in making the cheese will eat through the oak barrels in which it is kept. Concerning its effects on the human stomach, I have, thus far no evidence.

The remedy.

How can those of us who prefer to eat butter and cheese made from the milk of the cow be protected against oleomargarine?

Require every seller of that article to keep a sign on his stall or store, "oleomargarine products sold here," and to put on every firkin, box, package, and cheese the word "oleomargarine."

I would go further, and require every hotel, restaurant, and boarding-house keeper to stamp or label every lump of this article he puts on his tables "oleomargarine." Then let honest health officers frequently ascertain what fats these factories are using, and keep honest chemists at work analyzing and reporting results in the papers, with names of manufacturers.

It may be said there are not enough honest chemists in the country who are not already in the pay of one or more of these great corporations. Then offer inducements to trained chemists in Germany and other countries to come here, and at once take measures to increase the number of students in our schools of chemistry. We can afford to pay higher prices than are usually paid in Germany and other countries. We can better afford to pay very high prices than to have our markets filled with poisonous and dangerously adulterated foods.

The power of glucose and oleomargarine.

That we may rightly understand the power which those who attack these articles have to encounter, I think it proper to say that their manufacturers by simply adding one cent a pound to the price of their products can raise annually a fighting

fund of probably not less than five millions of dollars—enough probably to pay an annual salary of \$10,000 each to every prominent chemist in the country who can be enlisted in their behalf, and then have more than \$4,000,000 per annum left to be used in other ways. It is a gigantic power, able to retain chemists and health officers and some portion of the public press, and make it exceedingly uncomfortable for those who attack it. But there is a greater power, namely, the American people, who are every day liable to eat these products.

I hold in my hand a pamphlet just printed in New York City, evidently intended to be put before Congress, in which I am assured that glucose is harmless. You will, doubtless, be assured, in ways and by means I cannot anticipate, that all these articles are harmless. I shall not deny that each of them can be made, in a chemist's office, at some cost, to be practically harmless; but so long as men are willing to get rich by sacrificing the health of their fellows, and can get rich faster by using, at times and places where discovery seems improbable, poisonous and dangerous articles, so long shall we have the same state of things here which existed in England when Tennyson wrote: "The spirit of murder lurks in the very means of life."

If the power of dishonest, combined capital has become so omnipotent that these great crimes cannot be stopped here, as they have been to a great extent in England, and the people of this country cannot be protected, then republican government is a failure.

What I want.

In conclusion, what would I have Congress do?

Appoint a committee or commission to probe these things to the bottom, and vote an appropriation large enough to do it. In their appointment I would let politics have no consideration, and would appoint no man that either glucose or oleomargarine can buy even with four and a half millions of dollars. I would employ no chemist or microscopist who has been regularly employed by the great corporations selling these products. I would permit no chemist or microscopist to make known his appointment or the results found to any but the committee or commission. I would have great care taken in obtaining the samples to be analyzed.

If American chemists should not agree, then I would have samples taken to and analyzed by chemists in other countries.

Let Congress appoint such a committee or commission, and let it be known through the United States, and, in my judgment, articles would at once begin to improve in our markets as they did in England, when the public analysts commenced their work there.

What I do not want.

A bill is now before Congress to prevent adulterations without imposing needless restrictions on commerce, and I am informed that it is quite acceptable to certain members of the Board of Trade and National Board of Health. It will not impose much restriction on commerce, as its highest penalty is fifty dollars, and it puts the power of investigation and having analyses made into the hands of the executive officers of the National Board of Health.

I do not refer to the bill of Mr. Beale of Virginia, which seems a good one so far as it goes.

National Board of Health.

I object to this matter being put into the hands of the executive officers of the National Board of Health for two reasons:

1st. Because I think this a subject of too much immediate importance to the health and lives of this people to be entrusted solely to officers already loaded down with other duties. That they are so loaded down with other duties I will undertake to prove, if the committee desire. This paper, which probably contains more evidence on the subject than any other ever read in this country, and for the reading of which I have received unanimous votes of thanks from the Boston Board of Trade, and other audiences of the highest intelligence, I offered more than two months ago to read before each of two executive officers of the National Board of Health whenever either of them could find time to hear it. They have neither of them found time to hear it to this date.

2d. Last year a great oleomargarine seller in New York City (whose firm I understand sell more of that article than any other in that city), and who is also, as I am informed, an influential member of the National Board of Trade, offered through that board \$1,000 prize for the best essays on adulteration. The affair was managed by a paper in New York City, said to be owned by a dealer in plumbers' materials of that city, and called the Plumber and Sanitary Engineer, which paper has published so much to disparage and denounce my humble efforts that I have come to look upon it as the organ of those gentlemen whose opinions do not agree with my own. A high official

and executive officer of the National Board of Health is a regular contributor to that paper, and probably through its influence was made chairman of its committee of award on these prizes. The report of that committee, signed, and perhaps, as is common in such cases, written by its chairman, sets forth, among other things:

1st. That none of our staple articles of food or drink are so adulterated as to be dangerous.

2d. That one of the main objects of legislation should be to nullify the operations of ignorant and sensational alarmists.

3d. That adulterated drugs are more dangerous than adulterated foods.

4th. That it is much better to do too little than too much.

5th. That it would be unwise to attempt to secure uniform State laws.

6th. That the law should not attempt to define in detail what is adulteration.

7th. That the Board of Health should have power to exempt any article from the penalties.

8th. That care should be taken not to make penalties excessive.

9th. That under no circumstances should fees or moieties be allowed informers.

And the bill now before Congress, urged and pushed by this Plumber and Sanitary Engineer man, who says he is chairman of a special committee of the National Board of Trade to look after the passage of this bill, seems to be drawn in strict compliance with the above recommendations. This bill and the report of the committee of award, stating that none of our staple articles of food or drink are so adulterated as to be dangerous, have been published in the National Board of Health Bulletin of January 22, 1881, printed at the national expense, and sent widely over the country. I will give the board of health a hundred dollars to print my paper in that bulletin and send it over the country as widely. On what do they found their opinion that there is no dangerous adulteration of food or drink in this country? They say, on results recently obtained by several expert chemists, whose names and results they do not mention, and on the fact that none of the essayists produce satisfactory evidence of dangerous adulterations.

Now I have read the four published essays written for the prizes. The first was written by G. W. Wigner, an Englishman, who, so far as appears, was never in this country, and has not the slightest knowledge of American adulterations. He drew the first prize. It relates to matters in England, where stringent laws have been enforced, and eighty or more public analysts appointed under act of Parliament have been employed many years in detecting adulterations. He shows that in 1860 about 65 per cent. of all samples analyzed were found to be adulterated. In 1878 only about 16.06, though he says it is still possible to find in English markets "tinned fish heavily contaminated with lead; sweetmeats colored with chromate of lead; hams externally coated with chromate of lead; bread containing large quantities of alum; and children's powders and sleeping draughts containing poisonous doses of narcotics."

In Canada, through the employment of similar analysts, he shows that adulteration has been reduced from 51.66 adulterated in 1876 to 26.22 in 1879.

The second essay, written by V. M. Davis, of New York City, gives many adulterations, and says, referring to this country: "We believe it no exaggeration to say that adulteration is practiced wherever opportunity offers and pecuniary profit or commercial advantage is made thereby."

The third, by Dr. William H. Newell, of Jersey City, N. J., says in the essay, though from a marginal note it would appear as though he quotes it: "We have ourselves detected" [in food and drinks] amongst others, "three chromates of lead, three Brunswick greens, red oxide of lead, arsenite of copper, sulphate of copper, acetate of copper, carbonate of copper or verditer, carbonate of lead or white lead, bi-sulphuret of mercury, sulphate of iron, gamboge, sulphate of lime, carbonate of lime, red ferruginous earths and other injurious substances." Potted meats, fish, anchovies, cayenne, &c., are liable to contain red lead, or even bi-sulphuret of mercury; and pickles, bottled fruits and vegetables to contain copper; and that "the ramifications of adulteration extend over this whole country."

The fourth and last is by Dr. O. W. Wight, commissioner of public health of Milwaukee. He names, under the head of usual adulterations of food and drink in this country, lead in canned vegetables and meats, corrosive sublimate in rind of cheese, poisonous colors in confectionery, caustic lime in lard, analine colors in fruit jellies, preserves, sausage, and wine, salts of tin in sugar; *cocculus indicus* and tobacco in beer and ale; salts of copper in pickles; sulphuric acid in vinegar; and about twenty-five other deleterious adulterations. He says it is useless to attempt to estimate the number of deaths and the amount of sickness caused by adulterated foods and drinks, "but the articles used are known, and the effects of such articles when taken into the human body."

How this executive officer of our National Board of Health can find on such evidence that none of our staple articles of food or drink are dangerously adulterated, or why such a statement should be published in the Bulletin of the National Board of

Health, and sent at public expense all over this country, is a question which I leave others to answer.

A Western editor speaks of this report as follows:

"Out West it looks as if unscrupulous and dangerous adulterations have poisoned the people and trade until the demand for reform cannot be stopped, and 'the wise men from the east' kindly propose to capture and take charge of the whole reform business after this style:

"1st. There is no danger.

"2d. Stop the 'ignorant alarmists'; they will damage the business interests of adulterators.

"3d. Poisoned food eaten three times a day is not as bad as adulterated drugs.

"4th. The laws we propose, if passed, will not be worth a cent. It is better to do too little than too much.

"5th. Don't try to get uniform State laws, for you can't.

"6th. We don't think, &c., &c.

"7th. Don't define what adulteration is (somebody might be caught). If any one is caught, give the board discretion to let him out.

"8th. Don't hurt any one much, and under no circumstances pay any one for enforcing the law.

"9th. It is desirable that something should be done."

Now, admitting that this great oleomargarine dealer and influential member of the National Board of Trade was influenced in offering \$1,000 prize for best essays on adulteration, only by the highest, purest, and most philanthropic motives for the public good, and that this Plumber and Sanitary Engineer has been actuated only by similar motives; and admitting that this high executive officer of the National Board of Health is a gentleman of the highest social, moral, and scientific standing, like Bayard of old, without fear and without reproach, who would not for four and a half millions of dollars act otherwise than impartially; still I say, having deliberately expressed and signed these opinions, which have been widely published through the country, he now stands in regard to future investigations in the place of one summoned to serve as a juror, who, having already made up his mind and widely declared it, is disqualified from sitting on the jury, particularly when the question to be tried concerns the health and lives of fifty millions of the American people.

Therefore, for this second reason, I say that, in my judgment, this investigation should not be put solely into the hands of the National Board of Health, as now constituted, but should be put into the hands of an independent committee or commission.

Conclusion.

In conclusion, when I read the paper from which this evidence is taken before the Boston Board of Trade, I named seven of the most prominent and highly respected citizens of that city, either of whom, or any other we might agree upon, in case any statement of mine in the paper should be disputed, should act as referee; and if a single statement of mine in that paper should be proved untrue, I would pay the whole costs of reference to the amount of five hundred dollars.

If those who oppose will not meet me before a referee, but still declare my statements untrue, then I would say to those who do not know me that I have for the past thirteen years been unanimously elected president of one of the most influential humane societies of the country; that I have for the past six years held the office of director of the American Social Science Association; and have, since its formation, been vice-president and chairman of the executive committee of the American Humane Association; and that I give my time and, so far as I think I am able, my money, to what seems to me to be the public service, asking no other reward than the good which I hope may be accomplished.

GEO. T. ANGELL.



