

DANGERS IN FOOD AND DRINK.

FANCY, if you please, the state of mind of a citizen of New York as to the deceptions and dangers which may exist for himself and his family in the food and drink they consume. That the milk may be watered or skimmed, that the butter may be oleomargarine, or that the sweetening for his buckwheat cakes may be glucose syrup, he has long since learned. Notwithstanding this, he manages to make a tolerable breakfast, only reflecting, as he sips his morning coffee, that not long since he has heard that raw coffees are frequently "painted," as those in the trade term it, with various colors, some of which contain poisons. At his dinner he would like some vermicelli, but he has recently read in the papers of prosecutions in the courts for coloring vermicelli with the poisonous chromate of lead; he would like a salad, but remembers that a few months ago there was a stir about the sale of mustard colored with a poisonous coal-tar color; he would console himself with pickles by way of condiment, but hesitates to swallow what may contain a full medicinal dose of copper compounds; he might slake his thirst with lager beer, but again fears that he will only imbibe copper or lead in another form; an effervescent mineral water might serve as a substitute, but he has been informed that many manufacturers of mineral water in the city use for their wares water contaminated with drainage. In despair, he thinks to refresh himself with ice-cream, but again hesitates, since it is reported that one of the ingredients may be gelatine whitened with zinc white. The good citizen, knowing not which way to turn, experiences a reaction, concludes to take his chances, and eats and drinks heartily, philosophically reflecting on the added significance of the saying, "Let us eat and drink, for tomorrow we shall die."

It is my purpose here to give a brief account of some of the dangers which have been discovered, and, it is to be hoped, materially diminished, by the action of the New York City Health Department during the past few months.

As to coffee: Two forms of treatment have been applied to raw coffee in order to affect the color and general appearance of the bean—"sweating," as it is sometimes termed, and revolving in cylinders. The latter process is termed "polishing" when powdered soapstone or nothing whatever is mixed with the

coffee, and "painting" when mineral pigments are added to change the color. The coffee is usually moistened to soften the exterior; sometimes a little gum arabic is dissolved in the water used.

When coffee was brought here in sailing vessels, requiring a long time for the voyage, the coffee underwent a change in the hold analogous to the sweating process in curing tobacco, or that used in the preparation of some kinds of tea. It is worthy of remark that a decided improvement in flavor is imparted by such a process to articles of the kind. The effect on the coffee was not only to improve the flavor, but to alter somewhat the form of the bean, while the color was changed from a brownish green to a more decided brown. When steamers began to carry coffee, the time of the voyage was too short to permit this sweating process to produce such an effect, and a method of treating the coffee by moist heat (140° to 150° Fahrenheit) was devised, which imitated in some respects the conditions produced in the hold of a sailing vessel. With some coffees this treatment produced a perceptible increase in the size of the bean, as well as the alteration in flavor and tint, and in this way, except in point of color, some South American coffees could be made to imitate the more popular "Java."

"Polishing" was originally practiced, without the addition of any mineral substances, to improve the general appearance of the raw coffee; but it was accidentally discovered that the addition of small amounts of pulverized soapstone effects a much more decided improvement. This led to the use of mineral substances and pigments to affect the color, until now coffee can be "painted" any desired shade by those skilled in this branch, just as one can get from a dyer any desired shade on woven fabrics. A list of the substances used in this "painting" may here find a place: gum arabic; Venetian red; French chalk, or soapstone; Silesia blue; chrome yellow; Prussian blue; turmeric; burnt umber; yellow ochre; drop-black.

The Silesia blue consists of a mixture of Prussian blue and barytes. In the sample examined a small amount of lead (probably there as white lead) was detected. The "drop-black" is ground bone-black. The other names require no explanation. Of these

colors only chrome yellow (chromate of lead) is *per se* poisonous. The ochres, however, are sometimes the product of the weathering and decomposition of pyrites containing arsenic or copper, and those elements can frequently be detected in them. In the colors examined, only the burnt umber showed arsenic; still, in consequence of careless handling, poisonous materials sometimes get mixed with the substances used.

The use of colors containing poisons for "painting" coffee has been forbidden, and to a large extent stopped by the prompt action of the Health Departments of New York and Brooklyn. Although the aggregate number of pounds of coffee thus treated is no doubt very large, the proportion to the entire amount of coffee sold has been small, and in cases of "painting," as has been seen, but few of the colors have poisonous constituents. Nevertheless, so long as buyers of raw coffee follow the older traditions, depending upon color as their guide, and

"Do not care for dirty greens
By any means,"

or the reverse, some encouragement is given to these practices in defiance of the law, and only the enlightenment of buyers to suit the changed conditions of the coffee-trade can effectually stop "painting." At the present time the most expert buyers depend very little upon color, but judge of the samples by the appearance and aroma of the roasted beans, and the flavor of the infusion.

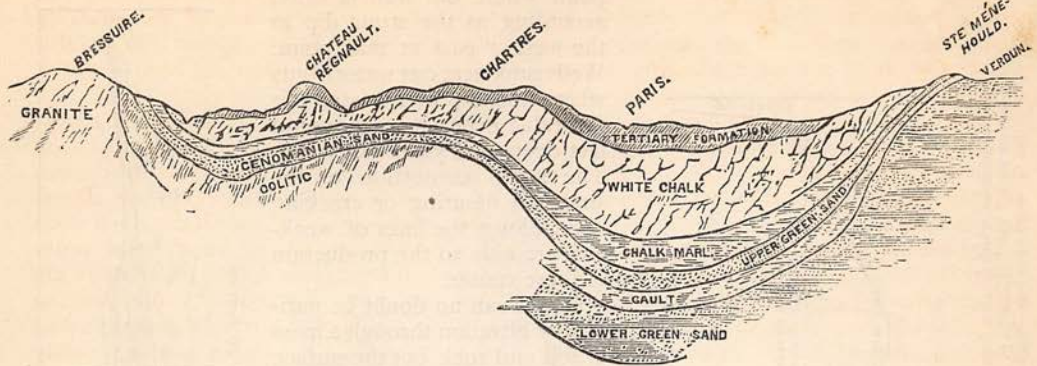
The coloring of vermicelli with chrome yellow seems to have come about in this wise: A large proportion of our population, chiefly Germans, are very fond of what they term "Eier Nudeln," a yellow vermicelli, the color being supposed to be imparted by the admixture of eggs with the flour used in the manufacture. Some unscrupulous manufacturers, having found that for their trade a yellow color in the vermicelli was sufficient to work upon the imaginations of their customers, omitted the expensive egg, and added instead some yellow coloring material. Turmeric, Martius' yellow (a coal-tar dye), and chrome yellow (chromate of lead) are colors which have been used. The last is by far the most dangerous addition, and at least one case of lead-poisoning in this city has been traced directly to this source. In some families the custom of making the nudeln at home prevails, which is certainly a safe plan. In some cases the manufacturers were most probably ignorant of the properties of the yellow coloring matter (chrome yellow) which they used. They simply used the material because other manufacturers did, and they

found a sale for goods so colored. It is to be hoped that, in consequence of the publicity which has been given to this matter, this form of danger may soon become a matter of history only.

Some persons imagine, when they buy mustard from a grocer of good standing, that they are receiving only the flour of mustard-seed, after grinding and bolting. They are almost invariably mistaken. If they were given what they supposed, the article would most probably lack the bright color to which they are accustomed, since the flour or farina from the four or five different kinds of mustard-seed now in the market has in but one or possibly two cases that brilliant tint; as a condiment, the genuine mustard flour would be thought to be too sharp and bitter, and as an ingredient in mustard plasters, it would be unendurable. It is also asserted that pure mustard farina does not keep well. What is ordinarily sold under the name of mustard is a mixture of mustard farina—after partial extraction of the oil—with flour or starch and turmeric; and this method of preparing the condiment has become so general, that it is not regarded as an adulteration by the manufacturers. By regulation of the New York State Board of Health, of March, 1883, manufacturers of mustard are allowed to add sixty per cent. of flour and turmeric to mustard farina, provided that fact is distinctly stated on the label of the package. These additions are not harmful. Turmeric is itself a condiment, being a constituent of the well-known curry-powder. Its physiological effects are described by the United States Dispensatory as similar to those of ginger.

A few months since it was discovered that some manufacturers were not only using in their lower grades of mustard excessive quantities of flour, but were replacing the flour in part with terra alba, and were substituting for the turmeric a coal-tar color—Martius' yellow, scientifically termed "calcium dinitronaphthalate." This color, besides being as explosive as gunpowder when unmixed with anything else, was proved by experiments on dogs to be poisonous.

That copper compounds have frequently been used to give a bright green tint to pickles and preserved green vegetables generally has long been known. It may perhaps not be known that minute quantities of copper have been found in almost all vegetable products, apparently as an accidental constituent, since the amount varies according to the soil upon which the cereals, potatoes, etc., have been grown, and the element is sometimes entirely absent. In an experiment connected with this investigation, copper to the extent of 2.57 parts of the



SECTION OF THE STRATA UNDERLYING PARIS AND ITS ENVIRONS. HORIZONTAL SCALE, EIGHTY MILES TO AN INCH. VERTICAL SCALE, TWO THOUSAND FEET TO AN INCH. (FROM HUMBER'S "WATER SUPPLY OF CITIES AND TOWNS.")

metal per million was found in fresh cucumbers bought in market. In some mollusks, and in the coloring matter of the feathers of certain tropical birds, copper is an essential constituent; it has frequently been detected in the human body.

The question as to whether copper compounds are really poisonous has been vigorously disputed, and cannot be regarded as positively settled. It seems probable that to certain persons, possibly the larger proportion of mankind, they are poisonous, while to others they are not.

The westerner who visits this city on business or pleasure may "forget to taste" the Croton water; but how would he feel if he were told that the sparkling effervescent water which he drank with his claret at some fashionable club, even though it bore some well-known foreign brand with the label and cork-fastening looking as though the bottle had just come from abroad, was water drawn from a well sunk on Manhattan Island, and was contaminated with the drainage of some of its busy streets and leaky sewers.* Yet that has been often the fact.

The assertion that New York wells are liable to be bad has been received with skepticism on the part of some. Artesian wells sunk in Paris or London yield good water, it is said; why not those in New York? In the first place, it must be said that the wells on this island, from which many manufacturers of effervescent waters draw their supplies, are not artesian wells; and in the next, that most of them are shallow, varying in depth from but little over twenty feet to seventy-five or eighty; and still further, that the geological formation of our island is such that we cannot expect to draw from these wells any other water than that which has soaked into the ground not

very far from where the well is sunk. A glance at the illustrations will make this clear. London and Paris both happen to be situated in geological basins, and stand on an impervious clay; and wells sunk in those cities which failed to penetrate to the strata below have frequently been proved to be centers for the propagation of disease.

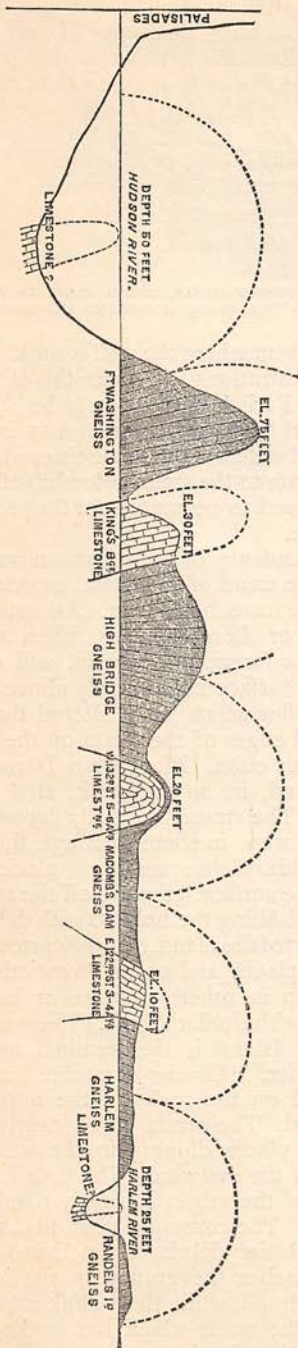
The tendency of subterranean water is to follow the trend of the strata, especially when the strata have been bent. An artesian well in Paris or London, then, when sunk into the strata forming the basin, will draw not from the surface immediately above, but from the supplies which have filtered through the upturned edges of the strata on the hills outside those cities. Manhattan Island, on the other hand, is, so to speak, all "upturned edges." The strata, originally deposited horizontally, were in some past age thrown into sharp folds. Subsequently, a glacier moved across the surface, grinding off the tops of the folds, and filling the hollows with débris. The lower part of the island, below Fourteenth street in some places, and up to Twentieth street or higher up in others, is more or less deeply covered with similar débris. The western end of Long Island is the terminal moraine of that glacier. "Glacier scratches" are still to be found on the rocks at the upper end of the island. The strata stand nearly vertical, in some places dipping to the westward, in others to the eastward. The "strike" or direction of the edges is nearly parallel to the avenues. The consequence is, that wells sunk in the glacier débris fill up from the water which reaches the ground in the immediate neighborhood, while those sunk into the rock receive the water which has worked its way through the slanting strata from a short distance to the eastward or westward of the

* At one time the sewers of New York were built without being closed at the bottom—to all intents and purposes an arch resting upon the earth below, affording the best possible opportunity for the liquid contents of the sewer to soak into the soil. Some sewers of this pattern still exist in the lower portion of the city.

point where the well is sunk, according as the strata dip to the west or east at that point. Wells sunk near our water fronts where the dip of the strata is favorable, even when a thousand feet deep, will yield salt water. The sharp contortion of the strata by fissuring or cracking them along the lines of weakness are aids to the production of these results.

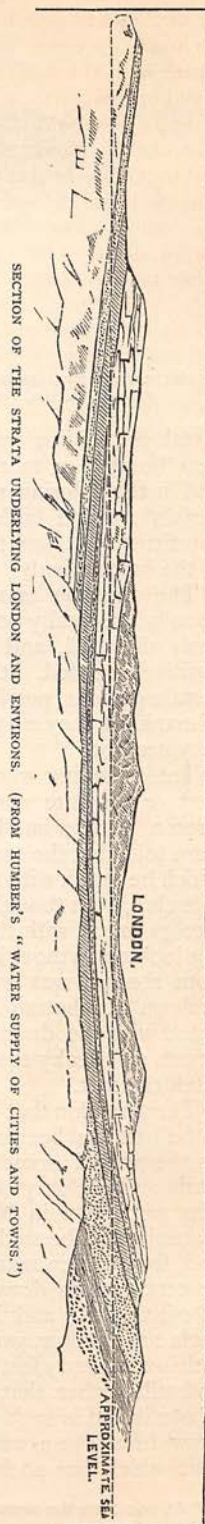
Water can no doubt be purified by filtration through a mass of soil and rock, but the surface water of New York city, containing as it does so much that is, to say the least, objectionable, would require a long journey through rock and soil to make it fit for use; so that a depth of two thousand feet for a well, even if surface water were excluded (which is seldom the case), if we consider the constant accumulations in our streets, would probably be insufficient.

It must not be rashly inferred from the items which from time to time are published that *everything* which we purchase in the way of food and drink is bad or adulterated. Probably if the proportion of adulterated articles to the whole number of sales, say in a day, a month, or a year, could be calculated, it would be found to be small; and if those articles which were really dangerous or had received dangerous additions were only reckoned, the proportion would be still smaller. People may be horrified to read that of more than six thousand samples examined in the Paris municipal laboratory last year, over fifty per cent. were found to be bad; but an important point must not be overlooked. Chemists, or, as they prefer to call them in England, "analysts," do not frequently examine an article of food except to confirm or disprove a suspicion that it is "no better than it should be"; as a consequence, the percentage of adulterations discovered is usually high. In other words, the "analyst" is apt to see the worst side of the question.



SECTION ACROSS NEW YORK ISLAND ALONG THE SOUTHERN SHORE OF SPUYTEN-DUYVIL CREEK AND HARLEM RIVER.
(FROM "ANNALS OF THE LYCEUM OF NATURAL HISTORY," VOL. VIII.)

This illustration, which is taken from a paper by Dr. R. Stevens, on the "Past and Present History of the Geology of New York Island" ("Annals of the Lyceum of Natural History of New York," Vol. VIII, 1867, p. 108), was intended to show the occurrence of limestone at the northern end of Manhattan Island. Further south the limestone does not appear, but the strata have been folded in essentially the same manner. The dotted lines represent the supposed position of the surface before it was ground off by glacial action.



SECTION OF THE STRATA UNDERLYING LONDON AND ENVIRONS. (FROM HUMBER'S "WATER SUPPLY OF CITIES AND TOWNS.")

It is unfair in the extreme to assume that all dealers are dishonest, or that if they have a choice they will invariably prefer to adulterate with the most deleterious substance obtainable. What is at the bottom of all this is a desire for gain, and results from innumerable causes. Some manufacturers and dealers endanger the health or the lives of their customers through sheer ignorance, and take the same risks themselves without being aware of it. They imitate the practices of other manufacturers so as to be able to compete with them, and only know that their goods are marketable. Questions of casuistry do not trouble them. Adulteration is supposed to embrace the element of fraud, yet, more frequently than is supposed, fraudulent intentions are absent. The moral standards of men also are variable. One man considers anything moral which is not illegal; another goes a step farther, and regards any act of his as consistent with morality, provided he doesn't get caught. Adulteration is sometimes technical, rather than actual. For

instance: some grocers buy strong vinegar, and dilute it to the point which they find their customers prefer. In Massachusetts, if vinegar contains less than five per cent. of acetic acid, it is regarded as adulterated. In England, three per cent. is the limit. If now a grocer should dilute his vinegar so that it contains but four per cent. of acid, it would be adulterated in Boston, and not adulterated in London.

The general laws of the State of New York are so constructed, or interpreted, that *injurious* adulterations or additions to food are illegal, while the plea of ignorance is seldom, if ever, accepted as a bar to conviction in the courts, though it may have weight when sentence is pronounced. Our citizens must be protected from the ignorance and carelessness as well as from the dishonesty of dealers in articles of food and drink. The law rightly assumes that dealers have sufficient acquaintance with articles in their line to be able to distinguish between what is good and what is bad.

Elwyn Waller.

AT MRS. BERTY'S "TEA."

"THANKS, yes, with pleasure. It's awfully good of you, Mrs. Bert. She's charming; quite the prettiest girl in the room, I should say."

"Miss Malbrook, permit me to present to you Mr. Widdle. Mr. Widdle has been everywhere, my dear, even in Japan. No doubt he can give you, out of his Japanese experiences, a great many valuable hints in regard to your china painting."

"Oh, how very interesting. I always have wanted to travel in the far East. Was it *very* queer, Mr. Widdle?"

"Ah, exceedingly, I assure you. Mrs. Bert tells me that your china painting is charming. Indeed, she has shown me that lovely vase—with the violets on the crimson ground, you know. It is positively delightful. Isn't it a dreadfully difficult sort of thing to do?"

"No, not difficult, at least not very; but dreadfully bothersome. The paints dry so, you know—that is, when you don't want them to dry; when you're done, and want to fire, then they just never dry at all! And then, one has so many interruptions in one's work. Really, I assure you, several of my very nicest things have been spoiled in just that way."

"Yes. It's beastly to be interrupted. Puts one out so, you know. I remember once

being interrupted in a murder—Mayn't I take you out to the tea-room?"

"Thanks. I do want a cup of tea. Mrs. Bert always has such good tea, you know. I beg your pardon. In a murder, did you say, Mr. Widdle?"

"Yes; it was awfully annoying, I assure you."

"Yes?"

"Yes. You see the circumstances were a little trying, any way. It was my grandfather, you know—These are shockingly awkward stairs, aren't they?"

"Dreadfully. I wonder why Mrs. Bert will keep on living in this old-fashioned house. Your grandfather?"

"Quite an old gentleman, you know. In his youth he had been strikingly handsome, and as an old man there was an imposing grandeur in his presence that I never shall forget."

"I can very well believe you, Mr. Widdle."

"Ah, you are quite too good. Mrs. Bert has told me how very good you are. Thank you very much indeed. Yes, he was a grand old man. For all his seventy-one years he was erect and vigorous. His snow-white hair and beard flowed in great masses about his head, giving him a positively leonine appearance. His dark eyes shone brilliantly beneath his shaggy gray brows. His voice was rich