

epidemic disease. At first almost all of the sick die; and for long periods the mortality may range between 70 and 90 per cent.

The manner in which the disease spreads is not clear. It is certain, however, that no efficient protection is known for those who cannot isolate themselves absolutely from infected districts. The only successful treatment hitherto found has been rigid quarantine, with the most pitiless isolation of the sick or exposed. The disease must be stamped out as soon as it begins, if need be with the utter extermination of infected communities and the burning of their villages and effects. Leibermeister, writing when there was no probability of a recurrence of the plague in Europe, said, after describing the murderous measures which had been successfully employed to prevent the spread of the disease: "If we should ever again be threatened with an outbreak of the plague in Europe, we should know exactly what measures to adopt to ward off the danger. . . . It is scarcely necessary to mention, that owing to our imperfect knowledge of the nature of the plague and the mode of its development, as well as of the manner in which the contagion is carried, etc., it would be advisable rather to do too much than too little; and when there is any doubt it is better to follow the same way."

The black death which carried off so large a portion of the human race about the middle of the 14th century presented all the essential characteristics of the ordinary bubo plague, to which was added lung complications with expectoration of blood. Some have thought it a distinct disease; it is more probable, however, that it was the same pest, aggravated by other maladies—the natural result of so vast an accumulation of unburied corpses. Most of the recent epidemics of the plagues in the East and in North Africa have occurred during the warm damp weather of spring and early summer.

FOOD ADULTERATION.

We had occasion, not long since, to criticise somewhat sharply the management of the Social Science Association, in allowing a member to secure a quasi-sanction for a tissue of sensational assertions with regard to food adulteration in this country—assertions which we had the best of reasons for believing to be as groundless as they were sensational.

Indirectly, however, Mr. Angell's extravagances have been beneficial in calling out from public analysts a summary denial—not only of his assertions, but all others like them. The Boston *Evening Transcript* prints a three column report of an interview, touching this matter, with Professor James F. Babcock, State Assayer of Liquors and Professor of Chemistry in the Boston University.

While in hearty sympathy with the efforts making to prevent or diminish the adulteration of food, Professor Babcock is obliged to contradict emphatically Mr. Angell's sweeping statements. With regard to the use of poisonous adulterants, he said that in a large experience he had rarely found in foods or drinks substances which would be likely to be injurious to health.

As State Assayer of Liquors, he has had to examine a large number of samples sent to him by selectmen and other public officers. About one third of the samples were found to be "extended" by artificial colors and flavors; but almost without exception these adulterants were not injurious to health.

Those liquors most adulterated or likely to be adulterated with really injurious substances are ports and clarets, which are said sometimes to contain logwood or aniline colors, though he never met with any in the samples submitted to him as assayer.

For several years Professor Babcock was the official analyst of Boston, and made analyses of milk for the milk inspector. About a quarter of the milk sold was found to be diluted with water and the color restored by the use of burnt sugar. He had never found any other adulterations in milk. He said:

"All the stories of sheep's brains, starch, flour, chalk, etc., as adulterants of milk are idle fancies. Records of the milk inspector of the city of Boston, Mr. Henry Faxon, whom I believe to be a faithful and efficient officer, contain sworn statements of the results of analyses of milk, the first in 1859 by Dr. A. A. Hayes, and followed in succeeding years by others, from the late Charles T. Carney, Dr. Charles T. Jackson, Dr. J. C. White, and Professor J. M. Merrick, including about one hundred by myself, a record of twenty years, and comprising nearly five hundred analyses, and in no instances is anything other than water and caramel reported."

The average amount of water found in Boston milk was about 10 per cent; but that amount is decreasing. He knew of no adulteration of butter, except possibly by the addition of oleomargarine, which if properly prepared is worth even more than butter as a food. He never found granular or block sugar adulterated. In exceptional cases glucose has been worked up with cheap sugar; but glucose is not injurious. It is less sweet than cane sugar, but has almost the same food value.

Glucose comprises about 80 per cent of honey, about 60 per cent of dried figs. It is the substance into which in the body all starchy or saccharine food must be first converted before it can be assimilated. Bread and cane sugar when taken into the body are very rapidly changed into glucose.

In molasses the absence of foreign substances is almost the universal rule. The cheaper grades of sirups are sometimes mixed with glucose, but not in any of the refineries in the vicinity of Boston. Alum and tin are sometimes used in

bleaching sirup, but their use is not countenanced by the better class of refiners.

When tin and alum are used, the object is the saving of time and labor. Their use is very limited.

Candy, though a good deal mixed with glucose, is rarely adulterated with anything injurious to health. "There are some candy toys, not intended, but of course liable, to be eaten by children, which are sometimes painted or colored with poisons—metallic pigments—but I think the attention which has been called to this matter by the published reports of the State and city boards of health and the prosecution of one or two manufacturers last year has had a very beneficial effect, and I think it would be difficult to find in Boston at the present time candy adulterated or colored with any substance likely to be injurious. Starch is used to a considerable extent in making lozenges, and gum arabic in some kinds of confectionery, also gelatine, but these can hardly be called adulterations, as they are well-known articles of food."

The adulterations of ground mustard, pepper, spices, etc., are of a nature to affect the pocket rather than the health. The same may be said of teas and coffees. Of the general purity of drugs, Professor Babcock said: "I think of all classes of merchants, retail druggists are less guilty of adulterating their goods than any other."

THE FARMER'S BEST FRIEND.

The inventor helps the farmer, not merely in devising time saving and labor saving means for getting in and harvesting his crops; not merely in perfecting means of communication by which the most distant markets are made accessible, and the cost of transportation so reduced as to give value to the surplus products of the most secluded farm; not merely in multiplying and cheapening the comforts and luxuries of the farmer's home, but still more in making home markets for the farm's productions, and thus preventing the steady drain upon the resources of the soil incident to the exportation of raw products.

As the Chicago *Inter-Ocean* observes:

"Nature is a bountiful giver, but she requires that what is taken from the ground by the processes of vegetation shall be repaid with equivalents in the shape of manures. For lack of paying that debt, she punishes the farmer with increasing sterility of the soil. We, therefore, have seen the richest wheat fields retire from the State of New York and take position in Ohio, Illinois, Indiana, and Michigan, then leave these localities for Wisconsin, Iowa, and Minnesota, whence they are making ready to take their flight to Nebraska, Kansas, and Colorado. In many places of the West the yield of wheat has permanently fallen from 35, 30, or 25 bushels an acre down to 12, 10, or 7 bushels. This is the penalty which the agriculturist pays for exporting the vegetative constituents of his land. Only where the produce of the fields is consumed in their neighborhood can the waste of consumption be applied to maintain fertility, otherwise the loss is constant and sure. The waste of consumption is always in proximity to the fields when manufacturing industry, widely diversified and developed, is in proximity also. It is for this reason that the thorough establishment of manufactures always precedes a scientific agriculture and a highly prosperous condition of the farming classes. Poor lands will make farmers poor. Manufactures help to keep the lands rich, and to improve those which are less fertile."

The inference is that, as tariff protection multiplies all branches of manufactures, that policy must be conducive to the welfare of farmers, and should receive their energetic and unwavering support. But this is not the only inference that is warranted by the facts of the case.

During the past twenty years the farmers of the West have been enormously benefited by the increase of home markets due to the rapid extension of manufactures throughout the great agricultural States. By far the larger part of the manufacturing industry of those States is based on and made possible by recent inventions. Without such inventions the West could do little manufacturing. Without them the millions of consumers lately added to the non-agricultural portion of Western communities would have remained at the East, or in Europe, whither the Western farmer's crops would have had to go to find a market, his profits diminished by the cost of transportation, and the strength of his land decreased by the elements carried away. Yet, strange to say, the representatives in Congress of communities which inventors have made possible, professedly acting in accordance with the wishes of their constituents, have directly and strenuously assailed the system which, more than anything else—more, probably, than all things else together—has been the mainspring of recent invention. It has made the American people—those by adoption as well as those of native birth—a race of inventors, and the farmers of the West have been benefited thereby more than any other part of the community, yet their representatives say that the patent system is injurious!

A CABLE JUBILEE.

Invitations have been sent out by Mr. Cyrus W. Field, of this city, for a grand dinner party, on the 10th of March, in celebration of the twenty-fifth anniversary of the formation by merchants of New York of the company to establish telegraphic communication across the Atlantic.

Now that the world is covered by a network of ocean cables, it is hard to realize how recent is the innovation, or how much the originators of the movement had to contend against. Only one of the five gentlemen who met at the

house of Mr. Field twenty-five years ago to organize the first ocean telegraph company has since died, namely, Mr. Chandler White. His successor, Mr. Wilson G. Hunt, with the other four founders—Peter Cooper, Moses Taylor, Cyrus W. Field, Marshall O. Roberts, and their legal adviser, David Dudley Field—are still alive to see the wonderful extension of electrical intercourse that has grown out of the enterprise they inaugurated a quarter of a century ago.

TRADE ARBITRATION IN ENGLAND.

Some months ago Governor Hartranft, of Pennsylvania, sent Mr. J. D. Weeks, of Pittsburg, as special agent to England, to inquire into the practical workings of arbitration in the adjustment of labor disputes. A meeting of the Congressional Labor Committee was held, January 22, for the special purpose of listening to a statement of the results arrived at by Mr. Weeks, a full report of which, with statistical proofs and much collateral information, having been already submitted to the Governor.

Mr. Weeks said that the practice of arbitration began in the iron trade in England in 1870. The trade in the North of England was then new, and the workmen, gathered from all parts, had nothing in common. The strike of 1865-66 lasted four months, and there were constant troubles until 1869, when a board of arbitration was formed. Since that time there has not been a strike. Wages were raised under the operations of the board from \$2 to \$3.30 a ton for puddling, and they have since declined to \$1.75 a ton, the present rate.

The best evidence of the popularity of the system was found in the fact that at the close of the year 1875, 35 works, 13,000 ironworkers, and 1,900 puddling furnaces were its supporters. In the English Northumberland coal regions, from 1873 to 1877, all disputes were settled by arbitration, during which time troubles between the employers and employed ceased. In the Durham region, in which 50,000 miners are at work, the same system is in operation, and the men are now working on a sliding scale of wages. In South Wales the strikes, after causing a loss of nearly \$15,000,000, ended in the formation of a board of arbitration and the adoption of a sliding scale of wages, now in operation. The scale provides for a minimum figure below which prices cannot fall, and twice the men themselves agreed to a lower figure. Two years ago the people interested in this industry in Wales took a vote whether to continue or abandon arbitration. The vote stood 19,000 for it, and 9,000 against continuation. The hosiery and pottery arbitrations were not successful. Arbitration is resorted to in the nut and bolt, nail, iron stone, miners, quarrying, iron moulding, chemical manufactures, boot and shoe makers, and in the manufacturing of textile fabrics, the only system of arbitration made legal in Wolverhampton. Here the awards of the board were accepted as a set of working rules, and the contract of hiring between the employers and employed was as binding as any other.

Mr. Weeks expressed the opinion that there could not be a successful system of arbitration without trade unions. He believed that the system would be beneficial in this country. It is to be hoped that in his official report Mr. Weeks will be able to explain the failure of arbitration in several recent cases of strikes in England. In regard to wages and living, Mr. Weeks said that while puddlers received \$5 a ton in Pittsburg, the same work brings in England less than \$2. Rents are cheaper, but living is higher in England. American competition in iron, he said, was due to the fact that common American iron is equal to their best, and they cannot approach the former in quality.

AN IMPROVED CANE MILL WANTED.

Our Louisiana sugar growers are calling loudly for an invention which some of our ingenious readers ought to supply, namely, a cane mill which will largely increase the yield of juice obtainable by current methods of pressing. At present but little over half the juice is extracted, even in the best managed mills, the majority of planters failing to realize so much as 50 per cent of the possible yield of their cane. The Mason process, in which the pressed cane, or bagasse, is saturated and subjected to a second pressing, is said to increase the yield from 15 to 20 per cent, but the cost of evaporating the greater volume of water must considerably reduce the gain. The Mallon process, in which the cane is subjected to the action of steam direct from the boilers, while the cane is passing through the mill, is said to demonstrate the possibility of getting 72 per cent of the juice from old stubble cane, and 74 per cent from plant cane; though whether it will do this in average working we are not informed. The problem is no doubt a difficult one to solve, but it is well worth attempting. A process that would economically save any considerable portion of the juice now wasted would not only largely increase the profits of sugar growing, and enable our American industry to compete successfully with that of the countries most favored by nature for this work, but would certainly remunerate the inventor. In the words of a planter, who begs us to lay this matter before our active-minded readers, the planters will pay as well as bless the man that can say Eureka!

Mr. C. O. Gregory, in a communication in the *English Mechanic*, states that he has successfully used the gas and water pipes in his dwelling as a source of electricity for a microphone. He connects one of his microphone wires with the gas pipe, the other with the water pipe, and finds the current ample and of course constant.