

areata the skin is unaltered. Moreover, in the latter disease there are never signs of follicular inflammation. If there are favus crusts or evidences of folliculitis the diagnosis from favus is easy, as in folliculitis decalvans we do not have sulphur-yellow crusts, and in favus we do not have folliculitis. In inactive cases it is impossible to tell which disease we have, as both diseases produce baldness of the same general character. The history of the case will, however, enable us to decide.

TREATMENT.—Thus far, treatment has not been of much avail. Quinquaud recommends washing the patches with soap and water, and painting the scalp in their vicinity with tincture of iodine. Every morning the patches are to be bathed with hydrarg. biniodide, gr. i. (0.065); hydrarg. bichloride, gr. iv. (0.26); alcohol, ℥ ss. (16.); aquæ destillat. ad ℥ iv. (125). Of course the baldness is permanent, the scalp being converted into a cicatrix. *George T. Jackson.*

FOOD AND DRUG INSPECTION.—Modern Legislation Relative to Food and Drug Inspection.—The present article is chiefly devoted to the subject of legislation to provide protection against adulteration and to the amount of work accomplished under such laws.

Popular knowledge upon the subject of food adulteration is undoubtedly derived to a great extent from the occasional publications of the daily press, which are too often of a very sensational character, exaggerating not only the extent of adulteration, but also the comparative ratio of harmful adulteration to that which is merely fraudulent in its character. Fortunately these publications are not so common as they were a few years ago. It is but a few years since a public document, in commenting upon this subject, stated that "fraudulent adulteration is but little more common than injurious adulteration." An examination of the food supply of almost any community at the present day would undoubtedly show the incorrectness of this statement.

ENGLAND.—The history of food adulteration in England dates from a very early period. In the reign of King John, the price and size of the loaf of bread were regulated by law, and this law was afterward amended so as to provide penalties for adulteration, these consisting of fine, capital punishment, and the pillory. During the reign of Edward the Confessor punishment for brewing bad beer was publicly enforced, and in 1589 "this beverage could not be sold without the approval of official 'ale-tasters.'"

Addison says in the *Tatler* (1710): "These subtle philosophers are daily employed in the transmutation of liquors, and, by the power of magical drugs and incantations, raise under the streets of London the choicest products of the hills and valleys of France; they squeeze Bordeaux out of the sloe and draw champagne from an apple."

Modern agitation in England upon the subject of restricting food adulteration may be said to date from about the middle of the last century. From 1851 to 1854 the subject was often discussed in the columns of the *Lancet*, and a Parliamentary inquiry was finally ordered. After the report of the Committee of Investigation the first general English law was enacted, and was known as the Adulteration of Food Act of 1860. This act authorized the appointment of analysts by local boards, and made £5 the penalty for selling an adulterated article, the vendor knowing it to be such. For a second offence the offender's name and place of business could be published in addition to the fine. The Act was permissive as to the appointment of analysts, and was never satisfactorily enforced. In 1869, and again in 1871, bills were introduced in Parliament to improve the law, but failed to pass. In 1872, however, an act was passed which obliged the local boards to appoint analysts and provide for inspectors. The penalty for adulterating articles of food was fixed at £20 for a first offence, and for a second the name and residence of the delinquent could be published in a newspaper. The punishment for adulterating drugs was made £50 for a first of-

fence, and for a second imprisonment not exceeding six months. Previous to 1874 there were various attempts to enforce this law, but without noticeable success, owing to the lack of recognized standards of purity, the disagreement of analysts, and the varying decisions of magistrates in regard to the meaning of the term adulteration. In 1874 a new Parliamentary investigation was ordered and more scientific examination made of the whole subject of adulteration than had been secured before. The report of the committee was reassuring, and was to the general effect that the public was more cheated than poisoned by the adulterations generally practised. In 1875 a carefully digested measure was passed by Parliament (38 and 39 Vic., c. 63), and this, with the amendments of 1878, 1879, and 1899, is now the law for Great Britain.

The principal provisions of the law are as follows: First. No person shall mix, color, stain, or powder any article of food with any ingredient or material injurious to health, with intent that the same shall be sold in that state, and no person shall sell any such article under a penalty not to exceed £50 for the first offence, and every offence after a conviction shall be a misdemeanor, to be punished by imprisonment not to exceed six months.

Second. No person shall mix, color, stain, or powder any drug so as to affect injuriously the quality or potency of such drug, with the same penalties as provided in the case of food. Proprietary medicines and patented articles are excepted, as are also substances which are added merely to make the compound fit for carriage or consumption, and are not injurious to health.

Third. A person is not guilty, under the act, who proves that he did not know of the adulteration, and could not have obtained such knowledge with reasonable diligence.

Fourth. Mixtures containing articles not injurious to health, and not intended fraudulently to increase the bulk or weight, can be sold, if labels are affixed plainly stating that the substance is a mixture.

Fifth. Analysts are to be appointed, and any medical officer or private person can bring articles to be analyzed. The seller is to be informed that the article is purchased for analysis, and it is to be divided into three parts, one of which is to be kept by the seller if he desires, one given to the analyst, and one kept by the purchaser. A penalty of £10 is imposed for a refusal to sell.

Sixth. The seller cannot be convicted if the article sold is in the same state as when purchased by him, and he has a warranty from the manufacturer.

Seventh. A person forging a warranty is liable to two years' imprisonment. A false warranty makes the giver liable to a penalty of £20, and the same penalty is imposed for applying a warranty to a wrong article.

Eighth. A person upon whom a fine is imposed can recover the amount with costs from the person from whom he bought the adulterated article, if it was sold to him as of the quality for which he sold it to the last purchaser, and that he did not know it to be otherwise. In addition to the general acts referred to, frequent statutes have been passed in regard to sophistications of special articles.

Adulterations of coffee were prohibited by acts passed in 1725, 1803, and 1822. Since the latter date there have been various Treasury regulations, the result of which was largely to permit the mixture of chicory and other ingredients with pure coffee, and in some cases an entire substitution of the imitations. Adulterations of tea were prohibited by an act passed in 1725, and other acts were passed in 1731, 1773, and 1824. Wines, liquors, ale, and beer have been the subject of frequent statutes from the earliest times. In the reign of Edward III., the Vintners Company was incorporated under the title of the "Wine Tonners," and power was given to examine wines and liquor offered for sale, and to confiscate any adulterated samples. They could also place the sellers in the pillory. In the time of Queen Anne, the use of cocculus indicus was forbidden in brewing beer, and further legislation

to enforce the law and to charge the expenses to the defaulting local authorities.

Public analysts must satisfy the board of their competency.

By section 4, the Board of Agriculture can make regulations concerning the standard quality of milk products. Sections 5-8 relate to the sale of margarine and imitation cheese.

Section 9. Name and address of vendor to be inscribed on his vehicle.

Section 10. Division of samples taken for analysis.

Section 11. Receptacles to be properly labelled.

Section 12. Labels to be legibly printed.

Section 16. Provides penalties for obstruction and bribery.

Section 19. Proceedings to be instituted within twenty-eight days after sale.

Section 23 and 24 apply the act to Scotland and Ireland. This act became effective January 1st, 1900.

The following statement from the Twenty-eighth Annual Report of the Local Government Board of England for 1898-99, shows the advantages of food and drug inspection in England and Wales since the beginning of Operations under the Food and Drug Acts in 1876.

The total number of analyses of food and drug samples made in 1898 was 49,555* or about 1,600 more than those of the previous year. The increase in the annual amount of work performed has been quite constant for the past twenty-two years. In the five years 1877-81 the average number of samples examined per year was 16,688 or one to every 1,520 of the population; in 1882-86 it rose to 21,772, or one in 1,237; in 1887-91, it was 26,846, or one in 1,060, and in 1898 it was 49,555, or one in 585. In London one sample was examined for every 353 persons, and in the provinces one for every 659. But in some quite populous districts, the provisions of the acts were imperfectly carried out, and in commenting upon the neglect of the authorities in these districts the Board says: "The degree, however, in which the acts were utilized was by no means uniform in different districts. Within the jurisdiction of ten County Councils, extending over an aggregate population of 910,032, only 180 samples were analyzed, or one sample a year for every 5,056 persons; and in sixteen boroughs, with an aggregate population of 405,239, only 68 samples were analyzed, or one for every 5,959 persons."†

RESULTS OF EXAMINATIONS MADE IN ENGLAND AND WALES BY THE PUBLIC ANALYSTS, UNDER THE FOOD AND DRUG ACTS, 1877-1898.

Character of samples.	Number of samples examined in 1898.	Adulterated.	PERCENTAGE OF ADULTERATION.					
			Five-year Periods.					
			1898.	1897.	1892-1896.	1887-1891.	1882-1886.	1877-1881.
Milk	20,315	2,011	9.9	10.4	12.3	13.2	16.7	21.1
Bread	717	6	.8	1.4	.7	1.4	3.4	6.6
Flour	1,013	20	2.0	.9	.2	3.0	.5	2.5
Butter	9,375	998	10.6	10.3	10.8	13.4	17.9	13.9
Coffee	1,879	187	10.0	9.6	11.1	14.8	17.8	18.6
Sugar	584	17	2.9	7.5	3.9	4.6	...	1.2
Mustard	775	30	3.9	5.5	6.6	9.2	14.5	17.4
Confectionery, etc.	488	14	2.9	5.3	3.2	3.2	2.7	2.8
Pepper	1,566	13	.8	.1	1.0	7.5	...	...
Tea	486	15	3.1	.2	.05	.1	...	...
Lard	1,421	1	.1	.7	3.6	7.9	...	...
Wine	84	2	2.4	2.4	4.7	4.4	14.2	...
Beer	256	1	.4	2.8	6.9	2.6	3.0	5.4
Spirits	4,872	603	12.4	15.1	17.6	18.5	22.3	34.9
Drugs	1,641	196	11.9	10.5	12.3	13.1	18.6	22.0
Other articles	4,083	204	5.0	7.1	8.3	7.5	...	...
Total	49,555	4,319	8.7	9.4	10.6	11.7	13.9	16.2

* This term "killing of seeds" is interpreted in the British Statutes (Chap. 12, 32 and 33 Victoria) as meaning "to destroy by artificial means the vitality or germinating power of such seeds."

† The Report of 1899-1900 (p. cxlv.) shows that 53,056 samples were examined in 1899, of which 9.4 per cent. were adulterated, and in 1900 62,858 samples were examined, of which 8.8 per cent. were adulterated. † Report of Local Government Board, England, 1898-99.

In the foregoing table the five-year periods show a marked improvement if we compare the earlier with the later.

The comments of the Local Government Board show that the practice of milk adulteration in the cities of England differs but little from that which prevails in the large cities of the United States. The accounts of prosecutions which fill the pages of the *British Food Journal* confirm the same statement.

The whole number of samples of milk examined in England in 1898 was 20,315, or about two-fifths of all samples of food examined. Of these 2,011, or 9.9 per cent., proved to be adulterated. As might be expected, the samples obtained in cities were much more adulterated than those procured in the country districts.

In London the percentage of adulterated samples was 12.9. In Oldham, Huddersfield, Bradford, Cardiff, Salford, and Manchester, the rate of milk adulteration was only 2.1 per cent., while in six other cities, Liverpool, Birmingham, West Ham, Sunderland, Portsmouth, and Nottingham, it was as high as 20.3 per cent.

The Board says in regard to milk: "It is difficult to account for the great disparity between the rates of milk adulteration in these groups of towns, but part of it is probably due to differences in the methods of procedure adopted by the analysts. In certain towns every sample of milk submitted to the analyst is examined for the presence of boric acid, formalin, or other preservative, and the sample is condemned if only a small percentage of the preservative is discovered. In such cases the rate of milk adulteration appears to be relatively high, when compared with that of other districts in which the presence of preservatives is not regarded as of itself rendering the sample of milk liable to condemnation. Some analysts pass as genuine all samples, equal in quality to the poorest milk yielded by an individual cow, and some condemn only those respecting which there is a reasonable probability that legal proceedings, if instituted, will be successful. Others, again, hold it to be their duty to report unfavorably on every sample which fails to reach a somewhat high standard. We understand, also, that in certain districts it is the practice to test samples of milk with a lactometer or other similar instrument, and that only those that are suspected of adulteration are transmitted to the analyst for chemical analysis."

"Occasionally some instances of gross adulteration of milk are brought to light. One sample taken in Sheffield was reported by the analyst to contain as much as 85 per cent. of added water. In another case a man trading in several towns in the south of England under the name of the 'Farmers' Direct Milk Supply Company' admitted at his trial at Southampton, that for many months he had daily and systematically adulterated, by the addition of one-fifth of separated milk, the whole of the milk sent by him for retail sale to Southampton and Bournemouth."

"We have received a large number of representations as to the injurious effects upon infants likely to follow upon the consumption of condensed separated milk, which is almost entirely devoid of fat, and therefore contains but little (if any) nutriment.* It is stated that it is necessary to consume the contents of at least ten half-pound tins of condensed separated milk in order to obtain the nutriment yielded by a pint of good new milk. It is satisfactory to note that some local authorities have taken steps to make known throughout their districts that it is dangerous to use condensed separated milk for the feeding of infants."

Two-thirds of the samples of butter submitted by private purchasers and 55 per cent. of those submitted by agricultural societies were condemned. If we exclude the samples taken on behalf of these associations and by private purchasers, the rate of butter adulteration in London is found to be 14.2 per cent.; in the 32 great towns 12.9, and in the remainder of the country only 4.4 per cent.

*The insertion of these words ("if any") is a manifest error. Skimmed milk has a decided food value, but not so great as that of whole milk. [Ed.]

Of the 1,879 samples of coffee examined 10 per cent. were condemned. As usual, many samples were reported to contain large quantities of chicory. In one case in Cheshire a sample was found to contain sugar. The analyst states that "this was probably due to the practice of roasting coffee with a certain proportion of sugar, which will increase the weight of the coffee from 5 to 10 per cent. This admixture is so skilfully done that each berry is coated with sugar, and any one buying his coffee in the berry would think he was obtaining it pure. Some may say this is an innocent adulteration, but it is at the same time a most profitable one, for the sugar, which is not much more than one penny a pound, is sold at the rate of a shilling or more."

Seventeen of the 584 samples of sugar were reported against, and 12 fines, amounting to £11 15s., were imposed. Of 575 samples of mustard examined, 30 were condemned, and six small fines were inflicted.

Four hundred and eighty-eight samples of confectionery and jam were analyzed, and 14 were found to be adulterated, there being one conviction.

Thirteen samples of pepper out of 1,566 taken were reported against, and the vendors of three of them were fined.

Of the 1,421 samples of lard analyzed, all but 2 were found to be genuine. This is in striking contrast to the figures of 1888, when cotton-seed oil was extensively used to adulterate lard, and 299 samples out of 1,782 were condemned.

Eighty-four samples of wine were examined, and 2 were found to be adulterated.

Of 256 samples of beer, 1 was reported against on account of the presence of over 100 grains of salt per gallon. Apart from the presence in beer of salt in excess, it is difficult for analysts to pronounce beer to be adulterated, as under the present law beer may be manufactured by brewing any substitute for malt with any substitute for hops.

The percentage of adulteration of spirits is again higher than that of any other article specifically mentioned in the table.

There were 1,641 samples of drugs examined, of which 196, or nearly 12 per cent., were found to be adulterated. In only 93 of these cases were legal proceedings taken. There were 79 penalties, amounting in all to £53 0s. 6d. There were 39 samples of sweet spirits of nitre adulterated, out of 173 examined; of Gregory's powders 25 out of 75; of sulphur 15 out of 82; of rhubarb 15 out of 186; of lime water 13 out of 40; of magnesia 11 out of 44; and 8 out of 25 prescriptions were improperly or carelessly compounded. There were also 8 samples of wax condemned out of 30 analyzed; 9 out of 84 of cream of tartar; and 9 out of 43 samples of seidlitz powders.

Out of the 2,011 samples of milk reported as adulterated in 1898, 1,205 were the subjects of legal proceedings. In 986, fines were imposed amounting to £1,652 (about \$8,250).

The use of poisonous pigments in England, as elsewhere, appears to have nearly or quite disappeared under the protection of the Food and Drug laws.

FRANCE.—In France, as early as the year 1396, there was an ordinance of the city of Paris forbidding the coloring of butter with herbs, flowers, or drugs, and there were laws, dating from about the same time, regulating the purity of bread, wine, and other food products. In 1802 the Conseil de Salubrité was established at Paris and this was followed by the organization of various health boards to whom the French are now mainly indebted for their present immunity from food adulteration.

In France, at the present time, there is a law establishing laboratories in the principal cities for the analysis of articles bought by private persons, or secured by duly appointed inspectors, who have power to punish offenders. The officials provided for the laboratory work and the inspection of the markets and stores are a director, inspectors, and chemists. In connection with the laboratories there are elaborate photographic apparatus pro-

vided, so that juries can judge by ocular demonstration of many forms of adulteration.

Paris.—The work of examining the food supply of Paris has been conducted at the Municipal Laboratory, on the north bank of the Seine, during the past twenty years. Prof. C. Girard is the chief chemist in charge. Two printed reports of this laboratory have been published, dated 1882 and 1885. A monthly bulletin is also published detailing the work of the laboratory during each month.

By decision of the Municipal Council gratuitous qualitative analyses are made at this laboratory of such articles of food and drink as are deposited at the laboratory for this purpose. The greater part of the articles examined is collected by inspectors authorized to visit shops and markets where food is sold, for the purpose of making collection of such samples. These inspectors also have authority to destroy unsound food. Their collections are generally made from such kinds of food preparations as are suspected of adulteration or are especially liable to this species of fraud. Hence the monthly bulletins issued from the laboratory do not represent the actual condition of the markets, since many articles of food are not liable to adulteration. The number of articles examined in each year amounts at present to more than 25,000 annually. The scope of the analyses embraces several articles in common use besides food, such as children's toys, wall-paper, cooking utensils, preparations used in embalming, coloring matter, cosmetics, and illuminating oils.

The following condensed statement, compiled from the monthly bulletins for the year ending March 31st, 1900, will give a fair illustration of the work accomplished in Paris during that period: Number of visits made to markets and shops, 53,437.

Under the present classification articles are divided into three groups, good, passable, and bad.

The total number of articles collected for examination by the inspectors or collectors of samples was 26,583; of this number 48.2 per cent. were classed as good, 25.8 per cent. as passable, and 26 per cent. as bad.

There were also 969 samples for which a fee was paid for analysis, and 244 samples were deposited at the laboratory by citizens for gratuitous examination.

CLASSIFICATION OF WORK OF MUNICIPAL LABORATORY OF PARIS FOR THE YEAR ENDING MARCH 31ST, 1900.

Articles examined.	Good.	Passable.	Bad.
Wines	1,408	3,428	2,520
Vinegar	62	66	45
Beer	464	198	137
Cider	43	43	156
Spirits	402	970	249
Syrups	339	8	218
Water and ice	749	250	319
Milk	1,390	1,388	1,638
Butter and cheese	2,036	246	231
Lard	113	25	50
Oils used as food	107	12	75
Bread and cake	591	58	158
Flour	918	68	96
Sugar and confectionery	731	88	273
Preserves and honey	78	7	171
Chocolate and cocoa	240	33	133
Coffee and tea	972	60	29
Meat	715	37	237
Pepper and spices	873	4	96
Tinware and crockery	186	10	118
Toys and colors	68	3	21
Petroleum	301	10	20
Fireworks	7	.....	37
Drugs	47	.....	14
Embalming material	7	.....	5
Miscellaneous	400	115	100

The principal adulterations found in the articles named in this list were the following:

Wines were either watered, fortified, sugared, plastered, or treated with salicylic and boric acids as preservatives. Beer was watered, or treated with glucose, sugar, and other materials. Cider was colored and treated with sugar or tartaric acid. Spirits were either watered or

fortified by the addition of alcohol. Syrups contained glucose and artificial coloring matter. Water contained an excess of mineral and organic matter and in one sample lead was found. Milk was watered, skimmed, colored, or treated with preservatives, including formalin. Butter contained margarine, boric acid, and an excess of water. Lard was adulterated with cheaper fats and cotton-seed oil. Olive oil was adulterated with cheaper oils. Bread and flour were found to contain cheaper flour or meal than was called for. Sugar and confectionery contained glucose. Honey and preserves were adulterated with glucose and coloring matter. Meat was treated with salicylic and boric acids. Tin and earthenware contained lead. Pepper and spices contained starch, ground olive stones, nutshells and other foreign matter. Toys were colored with forbidden colors. Illuminating oil ignited at a lower temperature than 35° C. (95° F.). Drugs were found to be below the required standard.

In the recent years of work, bacteriological examinations were made in addition to chemical analysis of certain articles as follows. In the past year: Of wine, 380 samples, of milk 44 samples, of water and ice 1,849 samples, and of cider 8 samples. Of the water 828 samples were pronounced good, 651 passable, and 320 contained pathogenic germs and were condemned.

GERMANY.—In Germany there were enacted at a very early date laws inflicting severe penalties for selling adulterated bread, drugs, or wine. "In the fifteenth century, at Bieberich on the Rhine, a wine adulterator was forced to drink six quarts of his own stock and it is recorded with due gravity that the test resulted fatally" (Battershall, "Food Adulteration," p. 3). The statutes now in force were passed quite recently—one in 1872, regulating the sale of drugs, and another in 1879, relating to food. By the law of 1872, the German Pharmacopœia was made the standard of purity. In 1878, 231,478 samples of food, drink, drugs, etc., were examined, and there were 3,352 convictions for violations of the law. The penalties are fines or imprisonment, and it is not necessary to prove that the seller was aware of the adulteration. The following general laws relating to food inspection are in force.

By a law enacted in 1879 police officers are authorized to enter shops where food is offered for sale and to take samples.

Imitation or adulteration of food and stimulants with a view to deception, the sale of putrid, falsified, or adulterated food and stimulants, and offering them for sale under a description calculated to deceive the purchaser, are forbidden. The manufacture, sale, or traffic in food stimulants and other necessaries, whose consumption or use is injurious or may destroy health, is forbidden by heavy penalties (in some cases by imprisonment).

The application of these general principles is further facilitated by the following special enactments with reference to particular necessities of life.

1. Petroleum, which parts with inflammable vapor at a lower temperature than 60° F. must be kept in vessels bearing the inscription "inflammable" in large indelible letters in a prominent position.

2. Eating, drinking, and cooking utensils must not be made of lead, or of any alloy containing more than ten per cent. of lead, they must not be coated internally with any metallic alloy containing more than one per cent. of lead. The latter regulation applies to all objects which come in direct contact with the mouth, or are used for preserving meat, fruit, spirits, etc. These precautions are for the prevention of lead poisoning.

3. No coloring agents can be used in the manufacture of food or stimulants, which contain any of the following substances: arsenic, antimony, barium, lead, cadmium, chromium, copper, mercury, uranium, zinc, tin, gamboge, coralline, or picric acid. Such colors cannot be used in the wrappings of provisions, in making soap, or other preparations for the skin or hair, in manufacturing toys, etc. In particular, the use of arsenical coloring is strictly forbidden in the manufacture of carpets, curtains,

wall-papers, paints, furniture, artificial flowers, clothes, type, etc., etc.

4. The sale of imitations of butter is forbidden, unless they are distinctly labelled and sold as margarine, etc.

5. By a law of February 1st, 1891, the use of machines for the manufacture of artificial coffee berries is forbidden.

6. By a law of April 29th, 1892, the addition of a number of specified harmful substances to wine is forbidden. Definite limits are also laid down relative to the use of other adulterations of wine.

Hamburg.—Drs. Dunbar and Farnsteiner report upon the inspection of food and drinks in Hamburg (*Revue des Falsifications*, vol. xii., p. 111). Of medicinal wines, 22 out of 102 samples were condemned either for the addition of sugar, or salicylic acid, or other impurities; 11 out of 81 sweet wines were condemned for similar causes. Also 27 out of 212 German wines, 12 of which contained too little extractive matter, 3 out of 23 samples of beer were condemned; 2 out of 20 samples of vinegar; 21 out of 56 specimens of sausage and hashed meat were condemned on account of artificial color and excess of sulphurous acid.

Dresden.—Dr. Heinze, of Dresden, reports upon the examination of 1,781 samples of food made during 1898 (*Revue Internationale des Falsifications*, vol. xiii., April, 1900, p. 37). Of this number 590, or 33 per cent., were condemned. Of 170 specimens of butter, sold as such, only 4 proved to be margarine. Out of 69 samples of vinegar, 35 were of inferior strength. One hundred samples of sausage were examined and 58 were artificially colored. Three contained boric acid in small quantity. Of 269 samples of spices, 27 were condemned.

Three hundred and forty-one samples of milk were examined, and 267, or 77.7 per cent., were condemned as adulterated.

The high percentage of adulteration in some of the foregoing articles is accounted for by the fact that the police authorities charged with their collection were also instructed in the methods of making rough tests of purity, so that they were enabled to select for final examination an unusually large number of adulterated articles.

The chemist also reports upon 72 samples of children's toys, whistles, musical instruments, tin preserving cans, covers of beer mugs, etc., which were examined for lead, and of this number 49 were condemned.

Altona.—Dr. Reinsch, director of the Municipal Laboratory of Altona, reports upon the work of the year ended March 31st, 1899 (*Revue Internationale des Falsifications*, vol. xii., December, 1899, p. 179); 2,612 specimens were examined, of which 950 where articles of food and cooking utensils, 360 were samples of the public water supply, 965 were of the city gas supply.

One hundred and forty-three of the food samples, or 15 per cent., were condemned as adulterated or injurious to health.

Twenty-four out of 187 specimens of butter, or 12.8 per cent., contained more than 16 per cent. of water. Fines were imposed from 20 to 150 marks.

Of 348 samples of milk, 77 were adulterated either by skimming or watering.

Breslau.—The report of the official chemist of Breslau for 1898-99 embraced a wide field of objects. The principal articles examined were: butter, 326 samples, 28 adulterated; milk 341 samples, 12 adulterated; sausage, 93 samples, 2 adulterated. The general ratio of adulteration reported was very small.

One hundred samples of vinegar were examined, and the acetic acid varied from 1.4 to 5.8 per cent.

The samples of milk varied in their fat contents from a minimum of 2.40 to a maximum of 11.2 per cent. Thirteen samples contained over 6 per cent. of fat in each. The total solids in the lowest sample were 6.58 per cent., indicating an addition of 45 per cent. of water.

Three hundred examinations of illuminating gas were made on as many working days during the year.

Other examinations were also made of beer measures containing lead, lamp-shades containing arsenic, children's toys, etc.

HOLLAND.—Dr. Lam, commercial chemist at Rotterdam, reports upon the work of inspection for the year 1898 (*Revue des Falsifications*, vol. xii., p. 128).

The whole number of examinations was 5,438, of which 548, or 10.1 per cent., were condemned, the principal adulterations being as follows: Milk, 3,942 samples, 169 adulterated. Spices, 147 samples, 54 adulterated. Coffee and tea, 51 samples, all genuine. Cocoa, 43 samples, 32 adulterated. Vinegar, 500 samples, 143 adulterated.

AUSTRIA-HUNGARY.—Dr. M. Mansfeld, director of the Laboratory at Vienna, reports upon the food preparations collected during the year ending August 31st, 1899.

The whole number of samples examined was 1,028, of which 349, or 34 per cent., were condemned as adulterated, or injurious to health. Of 8 samples of beer, 2 were adulterated; of 42 samples of strong spirits, 13 were adulterated. Of butter, 23 out of 76 specimens were adulterated. Of cocoa, 15 out of 50 specimens were adulterated.

Several substances sold as preservatives were examined and found to contain salicylic and boric acids and formalin. An American sausage was found to contain boric acid; one specimen was colored with carmine. Of 39 samples of spices 21 were falsified. Pepper contained starch, ground olive stones, sago, and nutshells. Two samples of honey were adulterated with glue. Several coffee substitutes were examined and found to contain starch, chicory, barley, turpin, and figs. Five samples of lard out of 18 contained other fats and cotton-seed oil. Of wine, 62 specimens out of 175 were adulterated with glycerin, alcohol, sugar, plaster, and artificial coloring matter.*

SWITZERLAND.—In Switzerland the work of examining articles of food and drink is well organized by the appointment of a competent chemist in each canton, whose duties embrace the analysis of all articles in domestic use, where a chemical analysis may be required.

St. Gall.—Dr. Ambühl, canton chemist of St. Gall, reports upon 3,954 samples of food examined in 1898, of which 754 or 19.1 per cent. were condemned (*Revue Internationale des Falsifications*, vol. xii., 1899, p. 152).

Of 1,940 specimens of milk, 93 were condemned. Of 124 samples of butter, 40 were condemned. The addition of flour to sausages has nearly ceased. Out of 27 samples of American dried fruits, 15 contained zinc. Out of 775 samples of wine 254 were condemned, being either diluted, fraudulently marked, or otherwise adulterated. The use of lead in the manufacture of cooking utensils was prohibited in this canton as early as 1808.

Basel.—The chemist of canton Basel reported as follows for the year 1899 †:

Whole number of examinations made, 5,469. Number adulterated, or of bad quality, 411. The list is as follows:

Articles examined.	Total.	Adulterated.
Beer	19	2
Bread	5	1
Butter	388	45
Cocoa and chocolate	13	6
Chemicals	350	....
Preservatives	4	4
Cosmetics	255	63
Vinegar	4	1
Colors	64	5
Meat and sausages	3	1
Fruits	4	1
Fodder for animals	182	4
Spices	62	7
Honey	20	4
Coffee	41	....
Meal	2,712	95
Milk	3	....
Petroleum	204	11
Lard and other fats	9	....
Soap	75	7
Oils		

* "Falsifications observées en Autriche-Hongrie." Extrait du Rapport, par M. le Dr. M. Mansfeld, Directeur de la Laboratoire à Vienne. *Revue Internationale des Falsifications*, February, 1900, p. 3.
† "Verwaltungsbericht des Sanitäts-Departments über das Jahr 1899," Baselstadt, 1900.

Articles examined.	Total.	Adulterated.
Toys	1	....
Spirits	15	2
Water	285	....
Wine	493	111
Sugar	59	20
Examinations for poisons	28	....

Fines were imposed in 143 instances, chiefly for adulteration of milk, wine, sausages, vinegar, and butter.

Berne.—Dr. Schaffer, canton chemist of Berne, Switzerland, reported upon the following articles in 1900, from which it appears that the scope of the canton chemist's authority extends to other articles in domestic use as well as to food and drugs.

Articles examined.	1900.	
	Number examined.	Number found adulterated.
Beer	8	1
Brandy and spirits	128	45
Bread and cake	9	3
Butter	21	5
Vinegar	4	0
Meats	9	4
Cereals	15	4
Honey	3	1
Coffee and tea	19	10
Cocoa and chocolate	21	2
Cheese	4	1
Milk	204	79
Pepper	3	0
Saffron	3	0
Cloves	3	2
Water	520	68
Fats and oils	31	8
Wine	407	145
Preserved fruits	2	2
Sugar	2	1
Miscellaneous	27	6
Proprietary medicines	14	5
Examinations for poisons	27	12
Syrups	12	3
Articles of household use	160	36

In addition to the foregoing the chemist reports upon several proprietary articles, paints, metals, chemicals, clothing, wall-paper, coal and coal-oil soap, and washing-powders, compressed yeast, insect-powders, fire-extinguishers, ice machines, etc.*

UNITED STATES.

In this country most of the States have laws prohibiting adulteration in general, or special forms of it, and many of the larger cities have, in addition, municipal regulations to prevent the sale of harmful products. In the summary of food acts presented in the third volume of the REFERENCE HANDBOOK by Mr. Riley, in 1886, it was stated that there were four States in which no legislation had been enacted in regard to food. In a later summary presented by Dr. C. V. Chapin, in his work on "Municipal Hygiene" (1901), it appears that every State has enacted legislation upon the subject, although in several instances this legislation had reference to special articles of food and in some cases to such as were of comparatively little importance. In some of the States, public sentiment has not been aroused so as to secure a thorough enforcement of the laws, or else adequate appropriations have not been made for the proper performance of the preliminary work of analysis. As a result, the effects accomplished by legal methods have not been so satisfactory as could be desired. The condition of affairs is, however, steadily improving, the people are coming to see the great need for rigorous enforcement of the laws, and experience has shown in what directions the legislation already had, has proved defective.

* "Bericht über die Thätigkeit des kantonalen chemischen Laboratoriums in Bern im Jahr 1900," Bern, 1901.

Congress has passed no general law concerning adulteration of food and drugs, and such would not be greatly needed, except as regards the importation of adulterated articles, if all the separate States had adequate laws on the subject. A bill prepared under the auspices of the National Board of Trade was presented to Congress in 1880, but failed to be enacted. As early as 1848 Congress passed an act to prevent the importation of adulterated and inferior drugs and chemicals, and examiners were appointed. This law seems to have been much needed, for at New York alone, in nine years from 1848 to 1857, over 900,000 pounds of adulterated drugs were seized. For some time past the law does not seem to have been enforced, and the examiners have not made reports to the Treasury Department. No rules have been adopted to secure the systematic prosecution of the work.

Soon after the passage of the English Adulteration Act of 1875, a general interest in the subject was awakened in the United States, and legislation soon resulted. The way for this had largely been paved by the previous examination of adulterations of food by the State boards of health of some of the States, such as Massachusetts and Michigan. The lead in this agitation was taken by the *Sanitary Engineer*, a paper published in New York City, and through its efforts three prizes were offered for the best essays on the general subject of adulteration of food, accompanied by drafts of a law. This competition was established in 1879, and in October, 1880, a report was made by a committee consisting of Dr. John S. Billings, U. S. A.; ex-chancellor Williamson, of New Jersey; Prof. Charles F. Chandler, of New York, and A. H. Hardy, Esq., of Boston, awarding the first prize to George W. Wigner, of London, one of the English public analysts. The law framed by the committee was submitted to the legislatures in several of the States, and in its material parts became a law in New York and New Jersey in 1881, in Massachusetts in 1882, and still later in Ohio, Connecticut, California, District of Columbia, Illinois, Indiana, Kansas, Kentucky, Michigan, Mississippi, North Carolina, Oregon, Pennsylvania, Tennessee, and Wisconsin.

The committee, in making their report, stated that the investigation showed that the adulterations practised were not so injurious to health as had been claimed, and that legislation was needed more for commercial than sanitary reasons. At nearly every session since the 50th Congress, a bill for the prevention of food and drug adulteration has been favorably considered, but has not yet reached the stage of enactment. In 1892 Senator A. S. Paddock, of Nebraska, introduced a bill intended to prevent adulteration of food, but the bill was defeated, as would appear from the published debate upon it, by the vigorous efforts of certain Senators, who represented States in which the production of cotton-seed oil was largely conducted. A more recent bill known as the Brosius bill appears to have a fair prospect of becoming a law (June, 1900). This bill (H. R. 9677, 56th Congress, 1st session) provides:

Section 1. That the Secretary of Agriculture shall organize the Chemical Division of such Department into a bureau of chemistry, which is charged with the inspection of food and drug products and the analysis thereof. He is to publish the results of examinations and analyses. This Department is fully equipped, both in experienced men and in laboratory arrangements to carry out the work designed in this bill, more economically and thoroughly than any other branch of the Government.

Section 2. By this section adulteration or false handling of food and drugs is prohibited, and penalties are provided for violation of the law.

Section 3 provides for the examination of samples of food and drugs offered for sale in original packages in the District of Columbia, or in the Territories, or in any State other than that in which the same shall have been manufactured or produced.

Section 4 defines the duty of the district attorney.

Sections 5 and 6 contain the definitions which are practically the same as those which have existed for several

years in New York, Massachusetts, New Jersey, and other States.

Section 7 provides for the establishment of a board of experts to fix standards of food products.

Sections 8 and 9 refer to the method of taking samples.

By section 10, the bill is not to be construed to interfere with the police regulations of any State or Territory.

Section 11 provides for the disposal of confiscated articles.

This bill does not interfere with any legitimate trade or industry, or prohibit the use of any product so long as that product has not been deemed injurious to health by an impartial commission.

MASSACHUSETTS.—As this was one of the first States to adopt a general food act, with annual appropriations for its execution, the law is herewith quoted in full, with the principal amendments.

ACT RELATING TO INSPECTION OF FOOD AND DRUGS.

Acts of 1882, 263, § 1.

No person shall, within this Commonwealth, manufacture for sale, offer for sale, or sell any drug or article of food which is adulterated within the meaning of this act.

Acts of 1882, 263, § 2. Acts of 1886, 171.

The term "drug" as used in this act shall include all medicines for internal or external use, antiseptics, disinfectants, and cosmetics.

Acts of 1882, 263, § 3. Acts of 1884, 289, § 5. Acts of 1884, 289, § 7.

An article shall be deemed to be adulterated within the meaning of this act—

(a) In the case of drugs—(1) If, when sold under or by a name recognized by the United States Pharmacopœia, it differs from the standard of strength, quality, or purity laid down therein, unless the order calls for an article inferior to such standard, or unless such difference is made known or so appears to the purchaser at the time of such sale;

(b) In the case of food: (1) If any substance or substances have been mixed with it so as to reduce, or lower, or injuriously affect its quality or strength; (2) If any inferior or cheaper substance or substances have been substituted wholly or in part for it;

The provisions of this act shall not apply to mixtures or compounds recognized as ordinary articles of food or

drinks, provided that the same are not injurious to health, and are distinctly labelled as mixtures or compounds. And no prosecutions shall at any time be maintained under said act concerning any drug the standard of strength or purity whereof has been raised since the issue of the last edition of the United States Pharmacopœia, unless and until such change of standard has been published throughout the Commonwealth.

Acts of 1882, 263, § 5. Acts of 1886, 101, § 4.

The State board of health shall take cognizance of the interests of the public health relating to the sale of drugs and food and the adulteration of the same, and shall make all necessary investigations and inquiries in reference thereto, and for these purposes may appoint inspectors, analysts, and chemists, who shall be subject to its supervision and removal.

Within thirty days after the passage of this act the said board shall adopt such measures as it may deem necessary to facilitate the enforcement hereof, and shall prepare rules and regulations with regard to the proper methods of collecting and examining drugs and articles of food.

Acts of 1891, 319, § 1.

For the purpose of carrying out the provisions of chapter two hundred and sixty-three of the acts of the year eighteen hundred and eighty-two, relating to the adulteration of food and drugs, the State board of health may expend annually a sum not exceeding eleven thousand five hundred dollars: provided, however, that not less than three-fifths of said amount shall be annually expended for the enforcement of the laws against the adulteration of milk and milk products.

Acts of 1882, 263, § 6 (see also 1886, 318, § 1).

Every person offering or exposing for sale, or delivering to a purchaser, any drug or article of food included in the provisions of this act, shall furnish to any analyst or other officer or agent appointed hereunder, who shall apply to him for the purpose and shall tender to him the value of the same, a sample sufficient for the purpose of the analysis of any such drug or article of food which is in his possession.

Acts of 1882, 263, § 7.

Whoever hinders, obstructs, or in any way interferes with any inspector, analyst, or other officer appointed hereunder, in the performance of his duty, and whoever violates any of the provisions of this act, shall be punished by a fine not exceeding fifty dollars for the first offence, and not exceeding one hundred dollars for each subsequent offence.

Acts of 1884, 289, § 2. Acts of 1886, 101, § 4.

The State board of health shall report annually to the legislature the number of prosecutions made under chapter two hundred and sixty-three of the acts of eighteen hundred and eighty-two, and an itemized account of all money expended in carrying out the provisions thereof.

Acts of 1884, 289, § 8.

Before commencing the analysis of any sample the person making the same shall reserve a portion which shall be sealed; and in case of a complaint against any person the reserved portion of the sample alleged to be adulterated shall upon application be delivered to the defendant or his attorney.

The principal amendment to the foregoing act was that of 1897, wherein the section relating to labels was amended as follows:

"The provisions of this act shall not apply to mixtures or compounds recognized as ordinary articles, or ingredients of articles of food, if every package sold, or offered for sale, is distinctly labelled as a mixture or compound, with the name and per cent. of each ingredient therein, and

if such mixtures or compounds are not injurious to health."

Other and special statutes have since been enacted in Massachusetts relating to special articles of food, such as that of 1897 relative to canned goods, and to molasses and syrups, and the more recent statutes of 1901 relating to labels and to the use of preservative.

The following summary presents in a condensed form some of the results of the work of food and drug inspection in Massachusetts by the State board of health during the past eighteen years of its work in this direction:

Table with columns for Summary, 1883, 1884, 1885, 1898, 1899, 1900, and 18 years, 1883-1900. Rows include Number of samples of milk examined, Number of samples above standard, etc.

In the foregoing table the first three columns of figures present the general statistics of the first three years' work; the next three columns give the figures of the last three years, and the final column presents the summary of eighteen years.

As is customary under the operation of all new laws of similar character, the first few months of work are usually devoted to an examination of the different sorts of food, in order to determine the extent and the character of adulteration. This preliminary examination established the fact that many staple products are not subject to adulteration, except in rare and isolated instances.

"There can be no question as to the beneficial results of the law, as executed by the officers of the board, in improving the quality of the food and drug supply of the State, especially in regard to milk and butter—in the former case as relates to the quality of the supply, and in the latter as relating to the proper branding and marking of spurious goods.

"The actual economic results obtained by the enforce-

ment of the statutes relative to food and drug inspection cannot be stated exactly. The law is comprehensive and its provisions cover a great variety of articles. Its restraining influence extends outside of the State to manufacturers sending goods to this market.

It was found convenient, after a year's work, to adopt

a code of regulations for the government of its analysts and inspectors in the performance of their duties under the Food and Drug Acts. The following is a copy of these regulations.

Rules and Regulations of the State Board of Health of Massachusetts Relative to the Inspection and Analysis of Food and Drugs.—1. The State board of health shall appoint analysts and inspectors, as provided in section 5 of chapter 263, Acts of 1882.

2. It shall be the duty of the inspectors to procure samples of drugs and articles of food at such times and places as the secretary shall direct, in the manner provided in section 6 of chapter 263 of the Acts of 1882, and in section 3 of chapter 289 of the Acts of 1884, and in all acts amendatory of said provisions.

3. Under the direction of the secretary, the inspectors shall, for the identification of samples, affix a number to each sample of food or drugs obtained by them, in such manner as may be prescribed. Under no circumstances shall an inspector convey any information to an analyst as to the source from which any sample was obtained.

4. The inspectors shall keep records of each sample, each record to include the following items: (a) The inspector's number; (b) the date of purchase or receipt of sample; (c) the character of the sample; (d) the name of the vendor; (e) the name of the city or town, and street and number where the sample is obtained, and, in the case of a licensed milk pedler, the number of his license; (f) as far as possible the names of manufacturers, producers, or wholesalers, with marks, brands, or labels stamped or printed upon goods.

5. It shall be the duty of the analysts so appointed to determine, under the direction of the secretary, by proper examination and analysis, whether articles of food and drugs, manufactured for sale, offered for sale, or sold within this Commonwealth, are adulterated within the meaning of chapter 263 of the Acts and Resolves passed by the General Court of Massachusetts in 1882, and all acts amendatory thereof, adulteration being defined as follows, viz.: (Here follows a statement of the statute as already given in a previous page.)

6. It shall also be the duty of the analysts to receive such specimens of food and drugs for analysis as may be delivered to them by the secretary, or by the inspectors,