

monia, though the density of the lung could not be attributed to filling of the alveoli, many capillaries were empty. This condition was caused by a cell accumulation between the capillary wall and the lung epithelia. Traube thought that these cells were from the bronchial mucous glands, and that the entire process was an adenitis of these glands.

PROGNOSIS.—Under favorable conditions a fatal termination of uncomplicated measles is most rare. Indeed, except in cases of malignant or "black" measles, it may be said never to occur. Meigs and Pepper reported not one death in two hundred and fifty-seven cases. The complications of measles are, however, so many, and of such frequent occurrence, that what would ordinarily otherwise be quite a trivial malady, becomes frequently a source of great danger, and is often followed by death. It is thus that measles presents quite a formidable death rate, death occurring most often during the second week—that is, after the course of normal measles would have been completed. The rate of mortality varies within wide limits. Ranke, in Munich, records a rate of 1.7 per cent. Of 844 cases Pott noted a mortality of 24, or 3 per cent. In St. Joseph's Children's Hospital, in Vienna, observations, extending over twenty years, showed a mortality from the disease of 8 per cent. On the other hand, a mortality of 44 per cent. was observed in the Hospice des Enfants Assistés, in Paris, during the years 1882 to 1885. In an epidemic in Sydney, reported by Carroll, in which there was a tendency toward malignancy, 54 of 900 measles cases perished. Fleischmann records 162 deaths in 740 cases; the minimum annual mortality was 2.3 per cent., the maximum rate was 31 per cent. His cases were classified as follows: Under one year, 35 cases, 18 deaths, 51 per cent.; from one to four years, 355 cases, 123 deaths, 34 per cent.; from five to eight years, 350 cases, 21 deaths, 6 per cent. Under five years there were 390 cases with 141 deaths, or 36 per cent. Every fifth child had pneumonia. Of these, 66 per cent. died. This high rate of mortality is due to the bad hygienic surroundings of children previous to their admission to hospital—conditions favoring the development of fatal inflammations. In malignant epidemics a much higher death-rate may be attained. At Lippe, in Hungary, in 1856, 50 per cent. of those attacked succumbed. In some epidemics there is developed a greater tendency toward dangerous complications than in others. The prognosis is always incomparably more favorable in patients whose surroundings accord with the best hygienic conditions. It has already been shown that the high death rate in certain races and localities is mainly attributable to want, exposure, foolishness, and not to especial malignancy of the epidemic. The great mortality from measles in camps results from the necessarily exposed life of the victims. (See article on *Camp Diseases*, in Vol. II.) Under nearly all conditions the prognosis will depend upon the presence or absence of complications. Of these pneumonia most often destroys life. Lobar pneumonia, it is true, most often runs a favorable course, but catarrhal pneumonia is of much greater gravity, both immediately and remotely, as serving to initiate the processes leading to pulmonary tuberculosis. The extent and intensity of the pulmonary inflammation will serve as an index to the gravity of the case. Catarrhal croup is usually of not great importance, unless accompanied by oedema and spasm of the glottis, in which event death may ensue at once. Diphtheria, whether attacking the laryngeal and tracheal and pharyngeal mucous membrane, or any other portion of the respiratory or general mucous surface, is not very uncommon, and usually leads to a fatal issue. Convulsions occurring at the outset of the attack add but little gravity to the case, but occurring during the eruptive stage, or that of decline, they are most ominous, as denoting the occurrence of dangerous complications that commonly end in death. The development of gangrene or of tuberculosis augurs unfavorably for the patient, the first usually, the latter always. In certain cases, and in certain epidemics, there is a tendency toward inflam-

mation of the bowels. This may develop into severe complications, and may prove fatal. The persistence of high fever beyond the usual period, the occurrence of delirium, of great rapidity and difficulty of respiration, of uncontrollable diarrhoea, and of convulsions, the sudden, premature recession of the rash, copious and repeated epistaxis—all increase the gravity of the situation. Measles occurring in a person already suffering from a serious disorder is very apt to terminate unfavorably. In delicate and feeble children, especially those whose respiratory organs are feeble; in persons exhausted and broken down by exposure, hunger, insufficient nourishment, prolonged marching, etc., measles may prove a most dangerous malady. Children of less than two years stand in more danger, when attacked, than those of greater age. Adults are more liable to fatal complications only when their conditions of life are especially unfavorable. Pregnancy is said to add greatly to the dangers of measles, and abortion may ensue. This statement is true only in a limited sense, and cannot be made of general application.

TREATMENT.—There is no specific treatment for measles. Its management will depend upon the type and the intensity of the attack, the nature and character of various symptoms and complications, the condition and surroundings of the patient. Very little need be done for a case of simple, uncomplicated measles. Most cases will do very well without any medicinal treatment whatever. Upon the appearance of prodromal symptoms, the child should be confined in a comfortable, well-ventilated room, free from draughts and dampness, at a temperature ranging from 69° to 70° F. during the colder months. Until the increasing severity of the symptoms destroys the desire to be up and about, the little patient need not be kept in bed. As the stage of eruption approaches, he will usually become so uncomfortable that he makes no objection to confinement in bed. During this period, a warm bath may allay the highly irritable condition of the nervous system so often observed. It also certainly favors the evolution of the eruption, if given toward the end of the third or during the fourth day. As the eruption develops most copiously about a locality where active hyperæmia has been artificially induced, as by a sinapism, so the general cutaneous hyperæmia induced by a hot bath will facilitate the evolution of the general eruption. The child may be immersed in a bath of from 90° to 100° F. for from three to five minutes, and when removed should be immediately wrapped in blankets, when, without the use of towels, it will soon become dry enough to be dressed in its night-dress. Warm drinks are, in the writer's opinion, a very useful agent in inducing gentle diaphoresis and in promoting the normal development of the eruption. Of these, hot lemonade and flaxseed tea are probably the most satisfactory. Though the temperature during the prodromal stage may already reach a high degree, it will very infrequently be necessary to employ cold bathing or other active antipyretic treatment at this period, or, indeed, at any period of normal measles. In ordinary cases the use of cold water externally, while probably not harmful, does not offer any especial advantages, in view of the usual natural tendency toward recovery. Although cold bathing is recommended by Thomas and others, with cold compresses and packs, whenever the temperature reaches 103° F., its employment can be considered important only in pronounced hyperpyrexia, a rare condition in measles. Should there be insomnia, restlessness, or premonitions of convulsions, one of the bromides will prove invaluable.

As the eruption begins to appear, all active medication may in most cases be neglected. Ordinary vigilance in controlling the movements and behavior of the patient, the administration of proper food, the maintenance of proper ventilation and temperature, will be all that is required in many cases. Very often, however, certain symptoms become unduly prominent and call for alleviation. The catarrhal symptoms, for example, may be distressing. Bronchitis may be severe and associated

with more or less troublesome cough, and even with the signs of spasmodic croup. An expectorant, with or without a bromide, will here prove of great assistance. Tartar emetic, which might otherwise be most serviceable, is here inadmissible on account of the diarrhoea so frequently present, which it might tend to aggravate. Squill, ipecac, senega, in various combination, in the ordinary popular cough syrups, may be given with or without small doses of opium. The vomiting, which is sometimes very annoying, may often be relieved by drop doses of dilute hydrocyanic acid, by crushed ice, by small quantities of brandy or champagne, or by any of the agents usually employed to control nausea and vomiting; or it will often quickly subside spontaneously, if the stomach be allowed to remain at rest until the desire for food has returned. The use of purgatives should be avoided, if possible, as, from the habitual tendency toward diarrhoea in measles, this may be suddenly aroused and become troublesome. When decided constipation is present, it is better to use enemata or the milder laxatives and purgatives, such as castor oil, rhubarb, or magnesia. When the eruption prematurely recedes, as from the occurrence of grave complications, it is useless to attempt to effect relief by efforts to recall it. Attention should be concentrated upon the intercurrent malady. Epistaxis is not apt to produce alarming consequences. The application of ice to the nose under these circumstances is not advisable. Compression of the facial and nasal arteries will often control the hemorrhage. Remedies ordinarily influencing epistaxis—ergot, turpentine, sulphuric acid—and the various appropriate external applications must be employed. The diet should be of the simplest character. Indeed, during the first few days, anorexia is so complete that all nourishment is refused. Since the course of the disease covers only a few days, this is of small importance, and the patient may be spared the importunities of over-anxious mothers and nurses. Milk, alone or with lime water, will often be acceptable, and may be given to the exclusion of everything else. Malignant measles will require the energetic administration of alcohol, carbonate of ammonia, and other stimulants. Under the use of such remedies a not insignificant proportion of these cases will recover.

Complications originating in the respiratory apparatus call for special treatment. Croup, whether catarrhal or diphtheritic, requires the same treatment as when primary. Capillary bronchitis, catarrhal and lobar pneumonia, should be treated in the ordinary manner, but with especial reference to their debilitating consequences as complications. Counter-irritation and warmth must be applied to the chest. The oiled-silk jacket here serves an excellent purpose. Poulices, when properly applied over the affected lung, serve admirably, but the dangers from improper management, the tendency to dampen the clothing and chill the surface when unskillfully used, may well deter one from their use. Expectorants containing the chloride and carbonate of ammonia, quinine, and such agents should now be employed, and especial attention paid to the diet, since the illness will now be protracted beyond the usual period. Diarrhoea does not often call for interference, as it will nearly always spontaneously cease after a day or two. A dose or two of opium, with subnitrate of bismuth, or a few grains of Dover's powder, or some drops of camphorated tincture of opium, will, in nearly all cases, prove effective. Catarrhal affections of the eye and ear require some attention. For most cases the simple exclusion of light, or an eye wash of tepid water or milk, is all that is required. More severe inflammation requires especial treatment in accordance with its intensity. If the eyelids adhere, they must be separated by bathing in warm water and anointing with cold cream. The more severe disorders of the eye demand more energetic and special treatment. Aural inflammations spread from the buccal and nasal cavities, and often excite violent earache, which must be combated with warm opiated instillations through the external auditory canal. Atropine frequently acts charmingly in this condition, administered

in two- or three-drop instillations of a two- or four-percent. solution. In the more severe cases of inflammation of the middle ear it will be found necessary freely to incise the membrana tympani. Hyperpyrexia will not occur in uncomplicated measles. When it occurs it should be treated upon general principles. Great relief is often afforded patients affected with measles by inunctions of camphorated oil, cold cream, or other fatty substance. Milton has highly extolled this method of treatment.

The patient should be kept in bed until all fever has subsided, and should not be permitted to leave his room until the disappearance of all symptoms, normal or abnormal. During convalescence appropriate tonics, ferruginous and otherwise, will prove valuable. Cod-liver oil should be administered to weakly persons or those who continue to have weak lungs after the attack.

PROPHYLAXIS.—Measles is so intensely contagious that nearly all persons are attacked by it before adolescence. Unfortunate results so often follow the disease, however, that no one is justified in not placing unprotected persons beyond its influence. With measles the difficulty of accomplishing this is especially great, since it is already intensely contagious during the prodromal stage, when accurate diagnosis is often impossible. A person with measles should be separated from those who are unprotected, in a room into which only the attendants should be allowed to enter. Communication with the rest of the household should be as restricted as possible. All soiled linen should be soaked in disinfecting watery solutions and boiled separately. During the eruptive period the contagion will be much less disseminated if the whole surface of the body be systematically oiled once or twice daily. Isolation must be practised until all symptoms have subsided. Recent investigations make it very doubtful whether the disease can be communicated during desquamation. Some writers assert that a month should elapse before the patient be permitted to mingle with unprotected persons. Others (Girard) claim that quarantine is not necessary after the eleventh day of the disease. A hot bath administered at this time will remove nearly all desquamated epidermis, and along with it the contagious principle. Inoculation with the contagion-bearing particles from patients with measles has heretofore always educed unmodified measles, but it is not impossible that procedures may ultimately be discovered whereby prophylactic measures similar to those employed against smallpox, by inoculation, may be made available.

J. E. Atkinson.
Revised by R. J. E. Scott.

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⁶ Carroll: Dublin Quarterly Journal Med. Sci., 1868.
⁷ Squire: Archives of Dermatology, vol. VIII., p. 225.
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¹² Gazette des Hôpitaux, 1870, 37, 38.
¹³ Fleischmann: Arch. f. Dermatol. u. Syphilis, 1872, p. 227.
¹⁴ Charité-Annalen, 1874, Bd. I., 1876.
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¹⁶ Loc. cit., p. 202.
¹⁷ Dorpater med. Zeitschr., III., 1873.
¹⁸ Home, 1757; Speranza, 1812; Katoni, 1842.
¹⁹ American Journ. Med. Sciences, 1862.
²⁰ Maladies Infect., 1872.
²¹ British Medical Journal.
²² Annales de Dermatol. et de Syphilogr., III., p. 404, 1882.
²³ Hirsch: Geograph. and Histor. Pathology. New Sydenham Soc. Transl.
²⁴ Hirsch: *Loc. cit.*
²⁵ Hebra: Skin Diseases. N. Syd. Soc. Transl., vol. I., p. 177.
²⁶ Wien. med. Jahrb., 2, 1882.
²⁷ Koplik: Archives of Pediatrics, 1890, vol. XIII., p. 918.

MEAT INSPECTION.—Since the flesh of different quadrupeds, birds, and fishes constitutes an important part of the food supply of man, the importance of requiring that it should be furnished for this purpose in a sound and healthy condition is sufficiently apparent. For this purpose a system of inspection is necessary, in order that

healthy animals may be selected for slaughter, and that, after being killed, the meat may be submitted to such further inspection as may be deemed necessary.

While the inspection of meat is often conducted under the supervision of a sanitary authority, or by some other department, this inspection is usually entrusted to a different set of officials from those who are charged with the duty of inspecting other articles of food. All flesh foods, whether of meat, fowl, or fish, are rapidly perishable, and require different methods of inspection from those which apply to groceries and articles which deteriorate slowly.

The Slaughter of Animals.—The occupation of killing animals, dressing the meat, and preparing it for food should be under careful regulation, in order, first, that proper animals be selected for slaughter; second, that the slaughtering be performed in a humane and proper manner, and so that the food shall be in a clean and wholesome condition; and third, that the business may not become a nuisance to the neighborhood, as it is very liable to become under careless methods of operation.

In small towns and in rural districts such work is usually done in private establishments, but in the neighborhood of large cities and in densely settled districts it is desirable that it may be permitted only in one large establishment in which the several firms or individual butchers may work together, under the best sanitary regulations. Such an establishment is usually situated as a matter of convenience near a line of railway, where the cattle, sheep, and hogs may be received into yards, pens, or enclosures, to await the time of slaughter. By this means the work of supervision may be readily performed under a competent authority. The cleanly and careful methods conducted at the great abattoirs of Berlin, Paris, Munich, and other European cities are in strong contrast with the old methods of work once conducted in the private establishments of the same cities.

Laws and regulations relating to the slaughtering of animals have existed for centuries. From the days of Moses down to the present, different nations have maintained systems of slaughtering and meat inspection of greater or less efficiency.

In England during the reign of Henry VIII., slaughtering was forbidden in walled cities, and in France as early as 1570 slaughtering was limited to places outside the city limits, and in the neighborhood of water-courses. By a law of 1815 slaughter-houses in France could be established only at a certain distance from dwellings in places of more than ten thousand inhabitants, and by a later law of 1838 this requirement was extended to all cities. The five model slaughter-houses of Paris erected about 1807 were replaced by a central establishment in 1867.

At present all meat, whether sold in slaughter-houses, markets, or butcher shops, in Paris must be submitted to inspection. The same obligation is in force for the offal and the products of manufacture. This inspection must be made in every shop at least twice a month. The inspectors of meat are also entrusted with the examination of poultry, game, and fish.

A large number of private slaughter-houses were built in the suburbs of Paris in consequence of these vigorous measures enforced in the city. These have been placed under the supervision of ten special inspectors since 1883. Their jurisdiction extends over the whole of the department of the Seine (Palmberg).

In several foreign countries, according to Schwarz in his work on public slaughter-houses, there is as yet no obligatory meat inspection by public officials.

In Russia until 1882 there was no public slaughter-house. In that year one was established at St. Petersburg, and in 1894 there were still only ten in the whole empire. Those of Warsaw are owned by private citizens.

Schwarz enumerates a list of five hundred and seventy-three municipalities in the German empire in each of which provision is made for an establishment for slaugh-

tering animals. The population of these, according to the last census, varied from as low as one thousand or even less to one and one-half millions in Berlin.

Inspection of Meat in England.—The Public Health Act of 1875 provides as follows:

"116. Any medical officer of health or inspector of nuisances may at all reasonable times inspect and examine any animal, carcass, meat, poultry, game, flesh, fish, fruit, vegetables, corn, bread, flour, or milk exposed for sale, or deposited in any place for the purpose of sale, or of preparation for sale, and intended for the food of man, the proof that the same was not exposed or deposited for any such purpose, or was not intended for the food of man, resting with the party charged; and if any such animal, carcass, meat, poultry, game, flesh, fish, fruit, vegetables, corn, bread, flour, or milk appears to such medical officer or inspector to be diseased or unsound or unwholesome, or unfit for the food of man, he may seize and carry away the same himself or by an assistant, in order to have the same dealt with by a justice.

"117. If it appears to the justice that any animal, carcass, meat, poultry, game, flesh, fish, fruit, vegetables, corn, bread, flour, or milk so seized is diseased, or unsound or unwholesome or unfit for the food of man, he shall condemn the same, and order it to be destroyed, or so disposed of as to prevent it from being exposed for sale, or used for the food of man; and the person to whom the same belongs, or did belong at the time of exposure for sale, or in whose possession or on whose premises the same was found, shall be liable to a penalty not exceeding £20, for every animal, carcass, or fish, or piece of meat, flesh, or fish or any poultry or game, or for the parcel of fruit, vegetables, corn, bread, or flour, or for the milk so condemned, or at the discretion of the justice, without the infliction of a fine, to imprisonment for a term of not more than three months.

"The justice who, under this section, is empowered to convict the offender, may be either the justice who may have ordered the article to be disposed of or destroyed, or any other justice having jurisdiction in the place."

Section 118 imposes a penalty of £5 upon any one who obstructs or hinders an officer, in the performance of the foregoing duties.

Section 119 provides for granting a search warrant to enable an officer to seize and carry away any of these articles that may be concealed, with a further penalty of £20 for obstruction.

Germany.—The German meat laws contain in brief the following provisions:

1. Common decrees relating to the introduction of requirements as to slaughtering.
2. Regulations for the examination of cattle slaughtered in slaughter-houses.
3. Police regulations relating to the use of city slaughter-houses.
4. Police regulations relative to the examination of pork for trichine.
5. Regulations for the examination of fresh meat brought in from abroad.
6. Police regulations relative to the sale of inferior meat at the "Freibank."
7. Regulations as to the sale of horse-flesh.

These laws, regulations, and ordinances are too lengthy and minute to be quoted in full. They consist of a series of enactments extending from 1850 to the present. The laws relating to pork inspection have been the subject of more discussion than any other topic, since they were, for many years, aimed at the exclusion of American pork. That of 1880 prohibited the importation of American sausage and chopped meat, and that of 1883 excluded all American pork. By a later circular of 1891 American pork was again admitted to Germany. Notwithstanding the large army of inspectors of pork maintained in Germany there were reported in that country 6,329 cases of trichinosis among its population from 1881 to 1898, and 318 of these proved fatal, and these were all due to the eating of German pork. On the other hand, according

to Dr. Stiles,* "a compilation of all the evidence fails to show that a single case of trichinosis has been traced to the 200,000,000 pounds of American pork exported to Germany in the fiscal years 1892-98." These were the years in which American pork was admitted to that country. The unusual prevalence of trichinosis among the German population is due to the extremely unsanitary custom, so common in that country, of eating raw or half-cooked pork, ham, or sausages.

Austria.—The sale of the flesh of uninspected animals is punishable by law. Inspection is performed by special officials who superintend the slaughter of animals whose flesh is exposed for sale. These animals are examined before and after slaughter. Those which come from a distance are placed under inspection for ten days before they are killed. A special course of instruction is provided for inspectors of meat in the veterinary schools.

Sweden.—In Sweden, or at least in Stockholm, bureaus for meat inspection exist under the charge of veterinary surgeons. Inspection is not compulsory except for pork. Tradesmen find it to their advantage to have their meat inspected, since such meat commands a higher price. If trichine are found in pork upon examination, the meat is confiscated and destroyed.

In 1866 a demand arose for the improvement of the modes of slaughtering in the town of Brighton, then a suburb of Boston, where most of the meat supply of the city was prepared for the market. A large number of butchers conducted their work in separate establishments, and, as usually happens under such conditions, many of them proved to be extremely offensive to the surrounding neighborhood. Dr. H. G. Clark, in a report to the selectmen of Brighton, condemned the methods of slaughter in the strongest terms and said: "Any description of the slaughter-houses must fall far short of the perfectly disgusting reality, which can only be appreciated by a personal inspection."

Upon the organization of the State Board of Health in 1869 the board took up the subject in earnest, and recommended the construction of an abattoir with the following requirements:

1. A pavement of stone, or of some material impervious to blood.
 2. An abundant supply of water.
 3. Complete drainage.
 4. Vats for the "rendering" of fat and offal on the spot, before putrefaction can attack them.
 5. The means for converting blood into blood albumen.
- It was also claimed that the sanitary advantages of such a system would be:
1. The removal of existing offensive odors.
 2. The removal of slaughter-house pork from the markets.
 3. The ready inspection of meat, thus insuring the rejection of that which is unfit for food.

The following economic advantages were also claimed:

1. Diminished liability of having meat spoiled by exposure to the emanations from the putrid pig-pens.
2. The value of the blood, which would be saved and utilized.
3. The savings which must always accompany order, system, the division of labor, the avoidance of transportation, and the doing any business on a large scale.
4. The greatly increased value of land in the neighborhood of existing slaughter-houses.

Experience has shown that all these claims have been fully realized. The result of the agitation was the enactment of a law in 1870 providing for the incorporation of an organization for the construction of an abattoir, and requiring that all persons conducting the business of slaughtering within certain prescribed limits (within six miles of Faneuil Hall Market in Boston) should carry on such business upon the premises of the abattoir.

A further movement in the following year secured the

* "Trichinosis in Germany." Department of Agriculture, Washington, 1901.

enactment of a general law regulating the business of slaughtering and other noxious and offensive trades throughout the State. Under this law of 1871 action was taken against twenty-three parties, resulting in the promulgation of orders requiring seventeen of these parties to "cease and desist" from the business of slaughtering, rendering, etc., or to discontinue certain processes of work.

The Brighton abattoir was completed in June, 1873, and during the following six months 14,194 cattle, 2,700 calves, and 150,000 sheep had been slaughtered in it, or about one-half of the meat supply of Boston for that length of time.*

Modes of Slaughter.—The principal modes of slaughter are practically two in number.

1. The stunning of the animal, or rendering it insensible either by a blow on the head with an iron hammer, by driving a bolt into the brain, or by shooting through the forehead.

2. Direct bleeding by severing the carotids, and other blood-vessels of the neck (the so-called Jewish mode).

The different societies for the prevention of cruelty to animals advocate the former. Dr. Dembo recommends the latter, claiming that death ensues in three to five seconds.† He also states that the quantity of blood remaining in the meat by the former method increases its weight to the butcher's advantage and the consumer's loss. "A government that has to victual an army of a half million men would be cheated by its contractors to the extent of \$125,000 per year."

Meat Inspection.—The principal kinds of meat eaten by mankind are the meat of cattle, sheep, swine, poultry, and wild game. The importance of meat as an article of food is due to the relatively large quantity and easily digestible form of the albumen which it contains. In addition it also has fat and salts, but has no carbohydrates. The good quality, savory taste, and nutritive value of meat depend on the class of animal, age, sex, and kind of feeding, as well as on the part of the body from which it is taken. That of young animals is usually soft, tender, and light red in color. That of older animals is poorer in fat, tough, and darker in color. By certain kinds of fodder the proportion of fat is increased, and the water in the meat is reduced. The flesh of calves and fowls (usually called "white meat") as well as venison and tender, lean beef, are easily digested, while other kinds of meat are digested with greater difficulty, especially very fat and sinewy meat. The heart, tongue, liver, kidneys, and brains are digested without great difficulty.

The eating of those portions or organs of animals which are specially subject to disease, such as the lungs of cattle and the fattened and diseased livers of geese, should be condemned.

Objects of Meat Inspection.—The chief objects of meat inspection are the exclusion of meat which is unfit for food, on account: (1) of the presence of diseases dangerous to man, and (2) on account of decay, putridity, or such causes as may render it unfit for food.

Examination of Meat. Color.—The normal color of sound flesh varies with its origin, ranging from white, as in many fish, to dark-purple as in horse flesh.

Abnormal Colorations. Melanosis.—Sometimes this is only local. The black pigment is probably a derivative of hæmoglobin. In Germany such meat is sold at a low price.

White Flesh.—This is found normally in certain animals. Sometimes the flesh of a cow or ox does not acquire the usual amount of hæmoglobin, and has the appearance of veal. White flesh is occasionally found in certain diseases, such as the anæmia of dropsy, and is probably caused by insufficient oxidation of the blood.

Yellow flesh is sometimes due to certain colored foods, and in disease may be caused by absorption of bile.

Dark Purple.—This color may indicate that the animal has suffered from acute fever, and has been met in ani-

* Fifth report of the State Board of Health of Massachusetts, p. 155.
† "The Jewish Method of Slaughter," London, 1894, p. 4.

mals which have died of rinderpest and tuberculosis. It may also be due to insufficient bleeding after death in animals which have died from natural causes.

Dark Reddish-Brown.—This color is due to imperfect oxidation of the blood, and is seen in animals which have been drowned, or suffocated in smoke. It is also occasionally seen in the flesh of overdriven or hunted animals.

Green or Violet.—This color is due to the beginning of putrefaction, or to the diffusion of vegetable coloring matter through the walls of the stomach after death.

The Consistency of Meat.—The consistency of flesh food is an index of its soundness. Good meat is firm, while unsond meat is usually flabby and exudes moisture. Coarse-grained meat which cannot be cut evenly is inferior to fine-grained meat.

Lehmann has devised an ingenious apparatus for determining the degree of toughness of meat (*Zeitschrift Fleisch- u. Milch-Hyg.*, 1898, viii, p. 32). It consists of a balance with arms of different lengths, the shorter being made on the plan of a pair of scissors with one fixed blade. The weights are placed in the pan of the longer arm, and the force required to cut through a layer of the meat 1 cm. thick is expressed in grams. By this means Lehmann found that the skin muscle of beef is two and one-half times as tough as the fillet. Flesh which contains much collagenous tissue becomes more tender on boiling, while meat which contains but little remains about the same as before boiling.

Lehmann obtained the following results:

FORCE REQUIRED FOR DIVISION EXPRESSED IN GRAMS.

	Raw.	Boiled.
Fillet of beef.....	83.4	84.0
Skin muscle of beef.....	236.4	88.8
Heart.....	104	88
Liver, ox.....	42	8
Liver, calf.....	35	6.6
Kidneys.....	40	24
Brain.....	7	2.4

The Odor of Meat.—Aside from ordinary rough inspection by the sense of smell, which is much more acutely developed in some persons than in others, the odor may also be observed by boiling fragments of flesh with water, and also by mixing the flesh with dilute sulphuric acid, distilling about one-fourth of the liquid, and noting the smell of the distillate; it may be:

1. The normal odor, characteristic of the animal.
2. The characteristic odor intensified, as in the case of uncastrated male animals. This is more marked with the flesh of the he-goat and boar than with that of the ram and bull.
3. An abnormal odor due to the substances eaten by the animal.
4. An odor due to chemical alteration or decomposition, as, for example, that of the volatile products formed during the putrefaction of flesh.
5. An odor of foreign substances, chloride of lime, carbolic acid, etc.

The Diseases of Animals Used as Food.—Animals should be inspected within twenty-four hours before slaughter. The principal diseases for which the inspecting officer should watch are:

1. Among cattle, 1. Pleuropneumonia; this disease is not easily recognized at first. The temperature soon rises to 104° or 105° F. and the animal refuses food. A short, dry cough develops and the breathing becomes labored and painful.
2. Cattle plague (Rinderpest). Recognized by early prostration, shivering, discharge from nose, eyes and mouth, cessation of rumination, abdominal pain and scouring.
3. Anthrax. This may be general or localized. If boils, pustules, or carbuncles form they are recognized at once. The peculiar organism of anthrax may be detected in the blood.

4. **Tuberculosis.** This disease has attracted more attention than any other, but the question whether it may be transmitted from animals to man does not yet appear to be fully settled. In cattle it may be acute or chronic. At first there may be no emaciation nor diminution of the milk; later, emaciation supervenes, and there are loss of appetite, shortness of breath, and cough, and these become intensified.

Three royal commissions have reported in England upon the subject of bovine tuberculosis, those of 1890, 1895, and 1898. The conclusions of the latter commission (1898), so far as meat is concerned, were as follows:

"We recommend that the Local Government Board be empowered to issue instructions from time to time for the guidance of meat inspectors, prescribing the degree of tuberculous disease which, in the opinion of the board, should cause a carcass, or part thereof, to be seized.

"Pending the issue of such instructions, we are of the opinion that the following principles should be observed in the inspection of tuberculous carcasses of cattle:

- "a. When there is miliary tuberculosis of both lungs.
- "b. When tuberculous lesions are present on the pleura and peritoneum.
- "c. When tuberculous lesions are present in the muscular system, or in the lymphatic glands, embedded in or between the muscles.
- "d. When tuberculous lesions exist in any part of an emaciated carcass.

The entire carcass and all the organs may be seized.

- "a. When the lesions are confined to the lungs, and the thoracic lymphatic glands.
- "b. When the lesions are confined to the liver.
- "c. When the lesions are confined to the pharyngeal lymphatic glands.
- "d. When the lesions are confined to any combination of the foregoing, but are collectively small in extent.

The carcass, if otherwise healthy, shall not be condemned, but every part of it containing tuberculous lesions shall be seized.

"In view of the greater tendency to generalization of tuberculosis of the pig, we consider that the presence of tubercular deposit in any degree should involve seizure of the whole carcass and of the organs. In respect of foreign dead meat, seizure shall ensue in every case where the pleura have been 'stripped.'

5. **Actinomyces.** Attacks by preference the lower jaw and tongue, also the lungs and bones. It leads to general malnutrition and is sometimes fatal.

6. **Texas Cattle Fever.** In this disease there is intense fever with a temperature of from 105° to 110° F., with great weakness and prostration. The ears and head droop, the hind legs are advanced under the body, giving the animal a characteristic attitude. The urine becomes deep colored, like undiluted venous blood. The liver and spleen are congested and enlarged, the kidneys also are congested and show numerous blood extravasations.

Sheep. In addition to the foregoing diseases sheep are subject to splenic apoplexy, or "braxy." The meat in this disease is dark and sometimes dropsical, and the weight of the spleen is increased, often to double its normal weight. When attacked the animal staggers, stretches out its head, and breathes rapidly.

Sheeppox is known by the high fever, especially in the pustular stage, by the flea-bitten appearance of the skin in the early stage, and by the rapid appearance of nodules or vesicles.

Liver flukes are large parasites, an inch or more in length, and about three-eighths of an inch wide, which are found in the bile ducts of the liver, occasioning the disease known as the "rot." The principal symptoms are

sluggishness, followed by wasting and pallor of the mucous membrane, diarrhoea, yellowness of the eyes, falling of the hair, and dropsical swellings.

Swine. The principal parasitic diseases of the hog which unfit the meat for use as food are the "measles" and trichinosis. The former is known by the appearance of small, egg-shaped bladders about one-quarter of an inch in length containing the larvæ known as cysticerci, which when eaten uncooked or nearly raw become tape-worms in human beings. In live hogs these little bladders may occasionally be seen beneath the tongue, or in the loose folds near the tail. Perroncito found that a temperature of 50° C. (122° F.) maintained for a minute or more destroyed the vitality of cysticerci.

Trichinosis. Trichinæ are found chiefly in the muscular tissue, though occasionally in the fat of swine. They are usually most abundant in the pillars of the diaphragm. With a low magnifying power they may be easily detected in a thin shaving of infected pork, either encysted and coiled up in the cyst or free and living. Swine affected with this disease do not necessarily present noticeable symptoms during life. Examinations made by the State Board of Health of Massachusetts showed that swine fed upon city offal, or garbage, and especially upon the entrails of infected animals, were far more subject to the disease than those which are fed upon healthy food (grain, vegetables, or cooked food).

This disease has assumed an international importance, as shown in a recently published pamphlet of the United States Department of Agriculture entitled "Trichinosis in Germany."

The danger to man lies in the eating of raw or imperfectly cooked pork, ham, bacon, sausages, or other meat of swine, and consequently the thorough cooking of such meat will prevent its occurrence.

Hog Cholera. Animals affected with this disease have fever, shivering, unwillingness to move, loss of appetite, a temperature of 106° to 107° F. They appear stupid and dull, and hide in the litter. The bowels may at first be constipated, but later there is usually a liquid and fetid diarrhoea, exhausting and persistent. There is rapid loss of flesh. The animal grows weak, stands with arched back and abdomen drawn up, and walks with tottering gait.

Horse Flesh. A law was enacted in England in 1889 which defines horse flesh to be such flesh cooked or uncooked, alone or mixed with other substances, and includes the flesh of asses and mules. This act provides that the flesh of horses, asses, or mules must not be sold or kept for sale as human food, except in a shop or stall over which is placed conspicuously, in legible characters four inches long, a statement that horse flesh is sold there. It also prohibits the sale of horse flesh for human food to any purchaser asking for other meat, or for a compound article not usually made of horse flesh.

There is no evidence that sound, healthy horse flesh is less wholesome than that of beef.

The Use of Preservatives.—For the purpose of preserving fresh meat, fish, canned meats, hams, and sausages various chemical agents are employed, and the tendency to use these substances appears to be increasing. Various opinions are expressed as to the propriety of using such agents as salicylic and boric acid and formaldehyde. Although the harm arising from the constant use of such substances may be less than that which might arise from using meat in a state of incipient putrefaction, the possibility still remains of harmful effect to the consumer from the frequent use of preservatives in meat and other kinds of food. The substances in most common use for this purpose are boric acid and borax, salicylic acid, sulphites, and formalin. The following are the recommendations of the recent British Parliamentary Commission upon this subject. This report was made to Parliament in 1901:

1. That the use of formaldehyde or formalin, or preparations thereof, in food or drinks, be absolutely prohibited, and that salicylic acid be not used in a greater proportion than one grain per pint in liquid food, and

one grain per pound in solid food. Its presence in all cases to be declared.

2. That the use of any preservative or coloring matter whatever in milk offered for sale in the United Kingdom be constituted an offence under the Sale of Food and Drug Acts.

3. That the only preservative which it shall be lawful to use in cream be boric acid or mixtures of boric acid and borax, and in amount not exceeding 0.25 per cent., expressed as boric acid, the amount of such preservative to be notified upon the vessel by a label.

4. That the only preservative to be used in butter and margarin be boric acid or mixtures of boric acid and borax, to be used in proportions not exceeding 0.5 per cent., expressed as boric acid.

5. That in the case of all dietetic preparations intended for the use of invalids or infants chemical preservatives of all kinds be prohibited.

6. That the use of copper salts in the so-called greening of preserved foods be prohibited.

7. That means be provided, either by the establishment of a separate court of reference, or by the imposition of more direct obligation on the Local Government Board, to exercise supervision over the use of preservatives and coloring matters in foods, and to prepare schedules of such as may be considered inimical to the public health.

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MEDIASTINUM, DISEASES OF THE.—The mediastinum is a space left in the median portion of the chest by the non-approximation of the pleuræ; it is bounded in front by the sternum, behind by the vertebral column, and on either side by the pleural surfaces. It may be divided into two parts, the anterior mediastinum, including the space in front of the pericardium and trachea, and the posterior mediastinum, including the space behind these. The structures found in the anterior mediastinum are: the heart surrounded by the pericardium, the ascending aorta and the lower parts of its branches, the lower part of the superior vena cava, the greater azygos vein, the innominate veins, the pulmonary artery dividing into its two branches, the right and left pulmonary veins, the bifurcation of the trachea and the two bronchi, the phrenic nerves, the anterior mediastinal lymph glands, the bronchial lymph glands, and, in early life, the thymus gland.

The posterior mediastinum contains: the descending aorta, the greater and lesser azygos veins, the pneumogastric and splanchnic nerves, the œsophagus, the thoracic duct, and the posterior mediastinal lymph glands. In considering the diseases of the mediastinum, however, the heart and pericardium are not included, nor are the trachea, bronchi, œsophagus, blood-vessels, and nerves, except so far as they are secondarily involved. The structures in this region which chiefly concern us are the