quantity of dynamite would produce sufficient gases of CO and N_2O_2 to produce asphyxia. Here we get the cyanosis and other symptoms of simple asphyxia, and we may get nausea and vomiting; but not the same disturbance of the sympathetic system, nor the continued chronic spasm of the vagus, nor the persistent headache pathognomonic of nitroglycerin poisoning.

Treatment.—In the way of prophylactic treatment the use of such apparatus or machinery, whether by blowing or by sucking, that will rapidly clear the tunnel or cavity from noxious gases or fumes, is to be recommended. When steam drills that are worked with an air compressor are used, they contribute largely to this end. It has also been found that the use of a large cap will explode a greater percentage of nitroglycerin than a small one, and this, to a certain extent, obviates the trouble. In certain cases, however, a cartridge—for some reason or other—does not explode, but burns like a candle, with considerable spluttering. In such an instance the amount of nitroglycerin volatilized is much greater than if an explosion had taken place, and consequently the effects are more deleterious.

For immediate treatment, such measures as are generally used in cases of asphyxia are of service. In addition, the use of cold to the head or the subcutaneous administration of atropine, ergotin, or other vaso-motor stimulant, is of necessity indicated and very efficacious. There is little doubt that the effects of nitroglycerin are produced by its decomposition and the formation of a nitrite in the body. "Treatment with ammonia restores normal color and normal functional power to nitrite-poisoned blood." So the carbonate and aromatic spirits of ammonia should be used internally, and it is also well for those in charge of such works to recommend to the workmen employed to carry with them small vials of this remedy for use in such cases.

The effects of nitroglycerin are also antagonized by sulphur. I have therefore given to many of the workmen sulphide of calcium, and these seemed to do better than those to whom it was not administered. This result, however, may have been partly due to the beneficial effects of the sulphide of calcium *per se.*

III. Manner in which Accidents Occur.—The methods by which accidents occur, and their effect upon the workmen employed, can be best understood if I narrate a few actual occurrences. Thus, the fulminate of mercury will explode violently when compressed. As an illustration of such explosion one of the workmen under my care endeavored to bend a cap so that he might more easily attach it to a dynamite cartridge; and, being ignorant of the conditions under which it would explode, he tried to bend it between his teeth. The result was that he lost half of his teeth, his cheek, and a portion of his ear.

Exploders or caps will also explode when struck a slight blow. Sometimes they are not properly attached to the dynamite cartridge or to the wire connected with the electric battery, and therefore the charge is not exploded. Under these circumstances the cartridge must be removed from the hole and a new cartridge and exploder put in its place. The removal of this cartridge with the exploder in it is attended with great danger. It is done with a long rod, sharp on the point, and with a little cup near the end. Thus with the point the cartridge is broken up, and with the cup it is drawn out of the hole. Should, however, the point of the rod happen to strike the fulminative mercury cap, it is almost sure to explode.

Numerous accidents of this kind occur. One particularly more gross in carelessness or ignorance than the others I will relate.

In firing, in the heading of a tunnel, it frequently becomes necessary to break up the large rocks that are brought down with a blast, so that they can be handled by the workmen. To do this, a single hole is drilled in the centre of the rock and a cartridge placed therein. This is fired when the heading is fired; but sometimes the cartridge becomes loosened and does not go off. On one such occasion a Norwegian seeing one of these holes in a rock that had not been broken up, he placed a bar in the hole and told his companion to hit it to see if there was a cartridge inside. He happened to strike the exploder, and both men were instantly killed, while a third lost his eyesight.

Compression in other ways may explode both the cap and the nitroglycerin; thus, on one occasion when a charge failed to explode, the foreman took a hose attached to the air compressor, and turning it into the hole endeavored to blow it out; the result was that it immediately exploded, his companion was instantly killed, and he himself died later from the injuries received.

Dynamite will not easily explode when frozen, but it can be made to explode even then under some circumstances. As an illustration, the powder man at one of the shafts on the Croton Aqueduct left half a cartridge in a pail of warm water in which he had been thawing it one evening. On the following morning, as it had been a cold night, the water in the pail was frozen with the cartridge at the bottom. Wishing to get the cartridge out of the ice in the pail, he placed it over the blacksmith's fire and blew upon it with the bellows. Both he and the blacksmith were thrown from the building, and from the powder man I removed more than eighty pieces of zinc from the pail.

Under proper conditions in the open air a dynamite cartridge will burn like a candle; but if heated rapidly beyond 306° F. it will explode. Thus, in the Park Avenue tunnel a number of papers, the packing from the boxes, and other inflammable articles were around the powder house. By some means these caught fire and a hot flame was instantly developed about the dynamite, the result being that the whole deflagrated.

A similar accident occurred at Spuyten Duyvil, where some powder, intended for use in making a new road, was stored in a small house. Some children playing in the neighborhood set fire to the grass near the powder house, and the result was an explosion.

In some parts of the country, as in certain mines in the West, where it is not desired to use a large amount of dynamite at any one time, instead of firing with electricity it is customary to use a powder fuse. Where the climate is warm the fuse is often kept with the dynamite, and then it sometimes happens that the nitroglycerin will exude from the cartridges and as a result the fuse which is kept with it will become soaked. Such a fuse will explode instantly, and sometimes even when kept separate from the cartridges they will get covered with machine oil and will then burn more rapidly than is intended. In an accident of this character in Arizona the explosion followed so rapidly the lighting of the fuse that one man could not get away at all, and his assistant had just time to turn his back, from which I later extracted many small pieces of stone.

In the case of nitroglycerin perhaps more accidents occur with the empty can than in any other way. Thus the foreman in a tunnel, who had just filled some holes with nitroglycerin and had emptied the can, set it down in such a manner that the tin in the bottom of the can bent with a slight snap. An explosion immediately followed, and it then became evident that sufficient nitroglycerin had remained in the can, adherent to the sides and the bottom, to drive the major part of the metal into his thigh and hip.

Illustrations of such accidents might be recorded indefinitely, but from many such the following rules have been formulated:

Always remember that the function of an explosive is to explode.

That accidents as a rule are due to carelessness and ignorance.

Workmen who handle nitroglycerin and dynamite should be provided with rubber gloves, to prevent absorption.

Powder for transportation should not be enclosed in a tight or metallic case.

Explosives should be stored at a sufficient distance

from works not to be affected by concussion or by flying débris.

Tools and fuse or caps should be stored or transported separately.

The floor of the powder house should be covered with sawdust and sulphur to absorb and decompose any nitroglycerin that has leaked from a cartridge.

Smoking should not be allowed.

Explosives and powder house should always be marked "dangerous."

Caps must always be examined before attaching them to a cartridge.

In firing by electricity be sure that the wire is disconnected from the battery before attaching the cap or fuse.

Never attempt to remove a charge that will not explode.

Wooden ram rods should be used for charging holes.

Other rules can be formulated from the above article.

Thomas Darlington.

TURMERIC. See *Curcuma.*

TURNIP, WILD or **INDIAN.**—*Arum, Jack-in-the-Pulpit.* The corm of *Arisæma triphyllum* Torr. (American arum) and of *Arum maculatum* L. (European arum). Both these species are very common vernal plants in their respective countries, growing in swamps, along streams, and in other damp and shady places. The American corm is depressed, globose, very much wrinkled, and has a dense circle of curly roots, which arise from the top, around the stem, and descend about the corm. The European is oblong or ovoid, and has the roots at the base. Both usually are found in the market cut into transverse slices, which are white and very starchy. Both are pervaded by an intensely acrid and stinging juice when fresh, but which gradually disappears with drying and keeping, and is dissipated by heat. Small doses of the drug, before this change occurs, act as a very powerful abdominal stimulant, but afterward it is nearly inert. The dose is 0.5–1 gm. (gr. viij.–xv.). It should be given well diluted with mucilage or honey, to mitigate its sharpness. Its use has almost ceased.

Henry H. Rusby.

TURPENTINE.—*American Turpentine* (*Terebinthina,* U. S., P. G.; *Thus Americanum,* Br., *Galipot,* Cod. Med.). A concrete oleoresin obtained from *Pinus palustris* Miller, and from other species of *Pinus* (fam. *Pinaceæ* or *Coniferæ*). The species of pine here referred to form large forests in the Altantic and gulf belts of the Southeastern United States, where the turpentine is collected on an enormous scale. By the carelessness of the Government in permitting the present ruinous methods of collection, the destruction of the sources of this article is a question of a very short time only.

Deep gashes are cut in the trunks of the trees, near the ground, and hollowed out at the bottom so as to hold a pint or more of liquid, and, above these, slight cuts are made in the bark, from which the turpentine flows, and, running down, is collected in the "boxes," as the excavated gashes are called; from these it is ladled out from time to time as the boxes fill, and fresh hacks are occasionally made in the bark above to keep up the flow. The freshly collected turpentine is then filled into barrels and carried to the still, where the oil is distilled off, being the spirit of turpentine, as it is commonly called, of commerce.

Turpentine is described as occurring in yellowish, opaque, tough masses, brittle in the cold, crumbly-crystalline in the interior, of a terebinthinate odor and taste. The alcoholic solution has an acid reaction.

As indicated in its definition, turpentine consists of oil of turpentine and resin. A small amount of bitter substance is also present. Its properties, medicinally, are wholly those of the oil, considered below, which is present to the extent of from fifteen to thirty per cent., weakened by the resin, also considered below. The uses of all three of the articles, as well as their preparations, are considered together at the close of this article:

Oil of Turpentine (*Oleum Terebinthinæ,* U. S.; Br., *Spirit of Turpentine*) is defined as a volatile oil distilled from turpentine, and is thus described:

A thin, colorless liquid, having a characteristic odor and taste, both of which become stronger and less pleasant by age and exposure to the air.

Specific gravity: 0.855 to 0.870 at 15° C. (59° F.).

It boils at 155° to 170° C. (311° to 338° F.).

Soluble in three times its volume of alcohol, the solution being neutral or slightly acid to litmus paper; also soluble in an equal volume of glacial acetic acid.

Bromine or powdered iodine acts violently upon it.

When brought in contact with a mixture of nitric and sulphuric acids, it takes fire.

If a little of the oil be evaporated in a small capsule on a water bath, it should leave no more than a very slight residue (absence of *petroleum, paraffin oils,* or *resin*).

There is a rectified form of it (*Oleum Terebinthinæ Rectificatum,* U. S., P. G.) made by shaking up the crude oil with six times its amount of lime water and redistilling, which is thus described:

A thin, colorless liquid, having the general properties mentioned under oil of turpentine (see *Oleum Terebinthinæ,* above).

Specific gravity: 0.855 to 0.865 at 15° C. (59° F.).

Boiling point: about 160° C. (320° F.).

Its alcoholic solution should be neutral to litmus paper.

If about 10 c.c. of the oil be evaporated in a capsule on a water bath, no weighable residue should be left.

Upon treatment of oil of turpentine with hydrochloric acid, and some similarly acting substances, a kind of camphor, closely resembling ordinary camphor, can be produced.

Rosin (*Resina,* U. S., Br.; *Colophonium,* P. G., *Colophony, Common Resin,* or *Rosin*) is defined as the residue left after distilling off the volatile oil from turpentine, and is described as a transparent, amber-colored substance, hard, brittle, pulverizable; fracture glossy and shallowly conchoidal; odor and taste faintly terebinthinate. Specific gravity 1.070–1.080. Soluble in alcohol, ether, and fixed or volatile oils; also in solution of potassium or sodium hydrate. Rosin varies considerably in its appearance, according to the extent of its distillation. If the water with which it was distilled has not been entirely boiled out, it is opaque and yellow; if it contains no water, it is clear; if overheated, it is dark brown or black, if not, it is bright and clear. The abietic acid in the opaque "thus" is a product of hydration of rosin, and may be produced in ordinary rosin by treating with diluted alcohol.

Action and Uses.—Oil of turpentine is one of the most irritating of its series. Applied to the skin and prevented from evaporating, it quickly causes smarting and redness, and after a quarter of an hour or more is liable to destroy the surface and cause ulceration. In large doses, 10 or 15 gm., taken internally, it is a quick irritant, causing prompt action, but is unsafe. Used with suds or other vehicle, as a rectal injection, it is promptly rejected, and in consequence is a useful stimulating evacuant of the lower bowel. Oil of turpentine is readily absorbed in vapor by the lungs, as well as in its liquid condition by the stomach. It is excreted also by the lungs as well as by the skin and kidneys, the latter principally in the course of its elimination; it is, if in large quantity, an irritant to the whole urinary system, causing strangury, frequent micturition, hæmaturia, etc. The urine has a rather pleasant violet-like odor. Like all essential oils it is an antiseptic. In small doses (a few drops) it is stimulant and hæmostatic, and is frequently given with good effect in the hemorrhage of typhoid and phthisis. In large amounts, 2 or 3 gm. and upward, there are mental exhilaration, intoxication; and in poisonous doses dulness, coma, and convulsions, with muscular weakness and heart failure.

The oil is frequently employed as an irritant application (turpentine stupe); a flannel pad wrung out from hot water, and freely sprinkled over the surface with oil of turpentine, acts the same as a mustard paper. It is also a very useful injection (15 gm., in a litre or less of warm soapsuds, and stirred in while being administered). Internally, as above indicated, it may be given in doses of from three to ten drops.

Turpentine itself is not much employed in this country, but may be given for chronic diarrhœa, ulceration of the bowels, chronic rheumatic joints, sciatica, etc., as well as in leucorrhœa and gonorrhœa, under conditions indicating copaiba, over which it probably has no advantages; it may be made into pills and a gram or two be given at a time.

Resin possesses but little activity. It is employed only externally and occasionally.

Preparations.—Of turpentine there is no official preparation unless the oil and the resin might be so considered. Of the oil we have the *Linimentum Terebinthinæ* or *Turpentine Liniment*, of 65 parts of resin cerate dissolved in 35 parts of the oil. This is a very irritating application. *Resin Cerate* (*Ceratum Resinæ*, U. S.) is made of 35 parts of resin, 15 of yellow wax, and 50 of lard. *Resin Plaster* (*Emplastrum Resinæ*, U. S.) is made of 14 parts of resin, 80 of lead plaster, and 6 of yellow wax. *Cantharides Cerate* (*Ceratum Cantharidis*, U. S.) contains eighteen per cent. of rosin and fifteen per cent. of oil of turpentine.

Allied Plants and Products.—The genus *Pinus* is the most important of its family and comprises about seventy living species, distributed through the cooler regions of the earth. Turpentines are found to some extent in all species, and they agree closely in their general properties. Similar substances, some of them known commercially as turpentines, are found in related genera. *Venice Turpentine* is the product of *Larix Larix* (L.) Karst. (*Pinus Larix* L.; *Larix Europæa* D.C.) of southern Europe. *Strassburg turpentine* is obtained from *Abies Picea* (L.), Lyons (*Pinus Picea* L.), the European Silver or Strassburg pine. *Pitch*, *Canada* and *Burgundy*, as well as their turpentines, have been considered under those titles. *Tar*, *cade*, and *juniper oils* have also been duly considered. All agree in their general composition and properties with the subject of this article.

Besides these, a number of oleoresins derived from other families (copaiba, Chian turpentine, etc.) are commercial and medicinal products of similar nature.

W. P. Bolles.

TUSCAN SPRINGS or **LICK SPRINGS.**—Tehama County, California.

Post-Office.—Red Bluff. Hotels and cottages.

The Tuscan Springs, about fifty in number, are located about eight miles northwest of Red Bluff, two hundred miles north of San Francisco and one hundred and thirty-five miles north of Sacramento. They cover an area of about ten acres, and are situated at an elevation of 900 feet above the sea-level. No complete analysis seems to have been made, but the waters resemble in medicinal properties those of the Kentucky Blue Lick Springs. A partial analysis of the Red Spring water was made by Dr. F. W. Hatch a number of years ago. It contains: Sulphuric acid,* hydrochloric acid, lime, sodium chloride (20.72 grains per United States gallon), lithia, iodine (4.50 grains per United States gallon), carbonic acid, iron bicarbonate, potassium chloride, magnesia, alumina. Temperature of water, 78° to 80° F.

The White and Black Springs are also in use, but they have not been analyzed. Most, if not all, of the springs contain sulphureted hydrogen in considerable quantities. The temperature of the springs varies from 67° to 94° F. Their action is tonic and alterative, laxative or cathartic, according to the amount taken. Ample facilities for bathing are furnished to guests. There is also a plunge bath thirty by sixty feet, four feet deep at one end, and thirteen feet at the other. The waters have considerable reputation on the Pacific coast in the treatment of syphilitic skin affections, scrofula, rheumatism, liver and kidney troubles. They are used commercially, having a considerable sale on the coast. *James K. Crook.*

* Probably in combination.—J. K. C.

TUSCARORA LITHIA SPRING.—Juniata County, Pennsylvania.

Post-Office.—McCoysville.

We are informed by Mr. W. A. Middleton, mineralogist, of Harrisburg, that this valuable lithia water was discovered by prospectors a few years since while boring for oil. The spring flows about four hundred gallons per hour, and is heavily charged with carbonic acid gas. It contains the following solids: Potassium bicarbonate, calcium bicarbonate, lithium bicarbonate, magnesium bicarbonate, magnesium sulphate, sodium sulphate, silica, alumina. The water is of the alkaline class, and is free from nitrates and nitrites. As far as can be learned, the spring is not yet fully developed as a resort, but the water is sold. *James K. Crook.*

TUSSILAGO. See *Coltsfoot*.

TUSSOL.—antipyrin mandelate, antipyrin phenyl-glycolate, $C_{11}H_{12}N_2O.C_6H_5.CHOHCOOH$—is a salt of antipyrin which is especially recommended in the treatment of whooping-cough. To a baby four weeks old Kennedy gives 0.03 gm. (gr. ss.) twice a day, and to a child of seven years 0.2 gm. (gr. iij.) four times a day. Rehn and Blum speak of its efficiency in pertussis, notable change in the cough ensuing in from three to ten days after beginning the treatment. *W. A. Bastedo.*

TYPHOID FEVER.—(τῦφος, smoke; secondarily, stupor.) (Synonyms: English, *Enteric Fever;* German, *Abdominaltyphus;* French, *Dothiénentérie* or *Dothiénenthérite*, or *Fièvre Typhoïde;* Italian, *Tifo Enterico;* Spanish, *Fiebre Continua*, *Tifo*.)

History.—There can be no doubt that this disease has prevailed extensively from very remote periods, but its authentic history, like that of so many other infectious diseases, is of quite recent date. Indeed, for this there are especially good reasons in regard to typhoid fever, for the intestinal lesions are the essential and distinguishing characteristics of the disease, and these would be described carefully only after frequent autopsies. Ingenious attempts have been made to associate passages in the works of Hippocrates with this disease, but such have hardly carried conviction to others than their originators. Typhoid fever, as we know it, is not distinctly recognizable in any of these descriptions, and it is not until the seventeenth century that the clinical conditions ending in death, and followed by autopsies revealing intestinal lesions, are to be found in medical literature.

Spigelius, Lancisi, Baglivi in Italy; Friedrich Hoffmann in Germany; Willis, Sydenham, and Huxham in England, all described cases of typhoid fever with such exactness as to leave no doubt of the identity of the disease. Morgagni in France, in the eighteenth century, gave a particularly clear delineation of the course of the disease, and of the intestinal lesions. It still remained, however, for the nineteenth century to define its distinguishing characteristics, and to differentiate typhoid fever from all other diseases.

The Germans are disposed to attribute priority of recognition and determination of the distinctions between typhoid and typhus fevers to Hildenbrand, of Vienna, who published a treatise on "Contagious Typhus" in 1811 (translated into English by Dr. S. D. Gross in 1829). It is true that he distinguished between "contagious typhus" and what he calls "originary typhus," but his ideas about his "originary" typhus were extremely misty, and I think the impartial reader of his treatise will find much difficulty in identifying it with typhoid, although the "contagious" disease answers fairly well to typhus fever.

Bretonneau, Petit and Serres, Louis and Chomel in France, during the first thirty years of this century, did more, by their careful observations at the bedside and

their patient labors in the autopsy room, to elucidate the symptoms and course of the disease, to connect these with the pathological lesions, and to place the whole in the clear light by which we regard this very important disease to-day, than any or all of their predecessors. Even after the publication of their observations a good deal of confusion prevailed for another ten years between typhoid and typhus fevers, the one being more common in France, the other in England, the symptoms being by no means very dissimilar in exceptional cases, or at least sufficiently alike to throw doubt upon the recently promulgated pathology.

This doubt it was the privilege of American pupils of Louis to be instrumental in dispelling. James Jackson, Jr., of Boston, published in 1830, 1833, 1834, personal observations confirming the occurrence of intestinal lesions as the result of typhoid fever. Gerhard, of Philadelphia, in 1835, reported cases of typhus fever occurring during an epidemic at the Philadelphia Almshouse, which marked out plainly the characteristics of that disease; and in 1837, in association with Pennock, Gerhard established clearly the fact that typhoid and typhus were distinct diseases. This was further brought out the following year (1838) in Paris, and in 1840 in this country, by George C. Shattuck, of Boston, as the result of observations in the London Fever Hospital, at the request of and following the teaching of Louis. Stillé, of Philadelphia, who had previously been under Gerhard at the Philadelphia Hospital during the typhus epidemic, and who was in Paris at the same time with Shattuck, was also instrumental in establishing before the Société Médicale d'Observation the anatomical and clinical distinctions between the two diseases.

As a result of these and subsequent studies and reports, the non-identity of typhoid and typhus fever was early recognized and accepted in the United States—earlier and more generally than in England. Dr. A. P. Stewart, of Glasgow, who, after studying fevers in the Fever Hospital of that place, resorted to Paris for the same purpose, accurately described the chief features of these two diseases before one of the Paris medical societies, in 1840, and was the first of his countrymen who did so. It was not, however, until ten years later (1849–51) that a general recognition of the quality of the two diseases, of their specific characteristics, was enforced in Great Britain by the authority of Sir William Jenner. Since that time typhoid fever has been everywhere accepted as a distinct morbid entity, and all difference of opinion as to its special characteristics may be said to have disappeared.

Etiology.—No sooner were the problems of the semeiology and pathology settled, and the conclusions generally accepted, than the equally important question of the etiology of typhoid fever took their place, and a discussion arose which lasted thirty years. The medical world divided into two parties: (*a*) those who held that typhoid fever is not only a distinct disease, but a specific disease having a specific poison, which is only produced by itself, and only reproduces itself; (*b*) those who though acknowledging its distinct symptomatology and pathology, still held that it at times arises autochthonously or spontaneously; that mere filth, or according to some who embraced this view, even depressing emotions which derange the digestion, may give rise to these special results. These two theories were propounded and actively supported by Drs. Budd and Murchison, respectively, and from the year 1850 were largely identified with their names. Both of these theories were of practical benefit, for it was largely due to the efforts of Murchison that the foundations of modern hygiene were instituted, and the influence of Budd was felt both in the care of the patient and his excreta and in the incentive to determine the specific poison. As early as 1871 attempts were made to identify definite organisms as constantly occurring with the disease, but not until 1880 was the germ discovered by Eberth, which has since been found to answer the requirements of a specific organism.

The Eberth-Gaffky bacillus, or bacillus typhosus, was of constant occurrence in typhoid fever and absent in health. It was finally isolated, and after much experimentation grown in pure culture. Owing to the apparent insusceptibility of animals to the disease all attempts at inoculation of animals with typhoid have been unsuccessful, though lately Remlinger has claimed to have caused the disease in rabbits, but his work has not yet been confirmed. The organism has, however, been accepted. Its viability in the human body, before and after death, and its duration in different media, liquid and solid, under varying conditions of heat and cold, have been more or less definitely determined.

It is a short, thick rod, about three times as long as wide, and with rounded ends. The length equals one-third the diameter of a red blood corpuscle. It is somewhat variable under different conditions, and may be thicker or thinner according to circumstances, and may become arranged end to end, forming threads. In hanging drop it has motility due to numerous flagella, which may be seen by careful staining. The other characteristics and growth under different conditions belong to bacteriology and need not be discussed here. It is of practical importance, however, to know that these bacilli may live indefinitely under favoring circumstances, and they have been shown experimentally to exist as long as three months in milk, water, and in a dead body, and five and one half months in soil, and to resist freezing, though they succumb quickly to a temperature of 167° F. The practical value of these facts will appear.

By this discovery of the bacillus typhosus by Eberth in 1880 the etiology has been placed upon a definite basis.

Predisposing Causes.—Age. This is the most important of the predisposing causes. It is essentially a disease of youth, the great majority of cases occurring between fifteen and thirty years of age, and this holds true in general of all countries. Statistics on this and other points are generally made up from hospital patients, but would probably not vary much as to age if applied to those treated at home. Murchison deals with the largest figures, extending over a period of twenty-three years at the London Fever Hospital. He states that persons under thirty years of age are more than four times as liable to typhoid fever as persons over thirty. Of 5,911 cases admitted to the London Fever Hospital, between the years 1848–70 (twenty-three years), 56.70 per cent., more than one-half, were between fifteen and thirty years of age; 28.58 per cent., more than one-fourth, were under fifteen; 13.30 per cent. were over thirty; while only 1 in 71 cases exceeded fifty. The contrast between typhoid and typhus fevers in this respect is shown by the same tables, only 24.87 of the typhoid cases being over twenty-five years of age during a period of years when 50.66 per cent. of the typhus cases were over that age.

For five years preceding 1870 in Berlin, Zuelzer reports the following table of cases of typhoid among every 10,000 inhabitants of all classes:

From 8 to 10 years of age.....	18	From 35 to 40 years of age.....	13
" 10 to 15 " " "	22	" 40 to 45 " " "	16
" 15 to 20 " " "	32	" 45 to 50 " " "	13
" 20 to 25 " " "	31	" 50 to 55 " " "	27
" 25 to 30 " " "	20	" 55 to 60 " " "	7
" 30 to 35 " " "	14	" 60 to 65 " " "	10

This table gives the usual ratio up to thirty years, but betrays some singular discrepancies in the later years. Liebermeister found that seventy-seven per cent. of the typhoid patients in the hospital at Basle, from 1865 to 1870—a period of five years—were between fifteen and thirty years of age; and Fiedler reported that in Dresden eighty-one per cent. of all the typhoid patients were between those ages.

The average age of 291 cases which occurred at the Massachusetts General Hospital was about twenty-two years. Other statistics in this country are of the same tenor.

It should not be forgotten that typhoid fever does occasionally occur in the aged, and by no means infrequently in the very young. Undoubted cases in infants under a year old are on record. In fact, recent investi-