through the air. It is large enough, however, to be worthy of attention and, if possible, prevention. During this month I have seen, in consultation, three cases of abdominal tuberculosis in infants living under the best possible conditions and having the best possible care. The only common source of infection which could be gotten at was that they all had been taking the same milk. This milk came from one of the best dairies in Boston, but one which is not certified. It is impossible to know, therefore, whether the cows have been tested for tuberculosis, as they should have been, or not. There would be no question about it if the farm was under the control of a milk commission.

Everyone will admit the importance of accuracy in the preparation of modified milks for babies. It is impossible to obtain accuracy unless the milk used in the preparation of the food is of constant composition. It is hardly possible to get milk of a constant composition except by the use of certified milk.

It is not uncommon for people to get certified milk for their babies during the first year, then to give it up because of expense, feeling that after the first year the character of the milk supply is not of as much importance. This is wrong, because children during their second year are almost as easily infected as during their first year, and are relatively easily infected throughout early childhood. It is almost as important to have a pure milk for young children as for babies.

It is very evident from what has been already said to-night that the price of certified milk must be much greater than that of ordinary milk. It is well worth, however, the difference in price. People should be willing to give up some of their small luxuries in order to get certified milk for their babies.

I can only emphasize what has been said by previous speakers as to the lack of appreciation of physicians of the importance of pure milk. The small attendance here to-night shows their lack of appreciation. If the subject was some obscure surgical condition which few of those present would see except very infrequently and which not one in ten would be competent to operate upon, the room would be crowded. It seems to me that they should be more interested in procuring pure milk for their own children and for their patients whom they see daily than in an obscure surgical condition. Further evidence of the lack of interest of the physicians in this subject is the fact that a certain milk dealer recently sent around a circular throughout the Back Bay stating that certain physicians, whose names were given, used his milk and recommended it. Many of these physicians are members of this society. As a matter of fact, the conditions at the farm in question are such that it could not, by any possibility, be certified by a milk commission.

**Malaria.**

The cultivation of the malarial parasite by Bass and Foster is reported in the *Journal of Experimental Medicine*, Vol. 26, No. 4. The authors have cultivated two types of parasites; the plasmodium vivax and the plasmodium falciparum. So far but two confirmatory reports have been made, that by Thompson and McLellan (Annals of Tropical Medicine and Parasitology, Vol. 6, No. 4) and that by Surgeon C. H. Lavinder, United States Public Health Service (Journal American Medical Association, Vol. 60, No. 1). Thompson and McLellan and Lavinder cultivated the plasmodium falciparum. A note by Major Sir Ronald Ross, which is appended to Thompson and McLellan’s paper, confirms the evidence of cultivation both in specimens sent by Bass from New Orleans and by Thompson and
McLellan in Liverpool. The method employed is to withdraw blood from a vein of a patient, and to add 1-10 of a c.c. of a 50% solution of detergent for each c.c. of blood obtained. The blood is then quickly debrinated and is placed in the incubator. The parasites live and develop at the top of the column of precipitated red cells. If it is wished to maintain the parasites for more than one generation, it is necessary to transfer them to blood from which the leucocytes have been removed by centrifugation. The plasmodium grows only within the red cells. If the leucocytes are not removed from the blood, they quickly destroy the parasites.

This work is of great importance, as hitherto all attempts to cultivate malarial parasites have failed, and it is quite possible that the study of the cultures, which represent, of course, the asexual cycle, will be of aid in the differentiation of species of malarial organisms.

SCARLET FEVER.

"Inclusions in Leucocytes in Cases of Scarlet Fever," first reported by Döhle in 1911 and again in 1912 (Cent. f. Bak., Abt. 1, Orig., Bd. 65, Heft 1-3), have attracted a great deal of attention all over the world. These inclusions are minute bodies which stain blue by Giemsa's and Wright's stain. They are most easily demonstrated by ordinary alkaline methylene blue stains. In Döhle's second paper he described a spirouche in a leucocyte, which he believed to be connected with the presence of these bodies, and possibly the cause of scarlet fever. A perfect flood of papers has appeared on this subject. The unanimous conclusion is that these bodies, while more common in scarlet fever than any other disease, are not pathognomonic of scarlet fever, and naturally not parasitic. The finding of spirouchets in scarlet fever has not been confirmed.

SPOROTRICHOSIS IN THE UNITED STATES.

Ruediger (Journal of Infectious Diseases, Vol. ii, No. 2) has collected and summarized cases from the United States. Ten years ago, infection of the human with sporotrich fungus was so rare as to be a pathological curiosity. At that time only three cases had been discovered in America, and no cases had been recognized in any other country. In this respect, the history of sporotrich infections reminds one of the history of blastomyecosis and coccidoidal granuloma, which was first discovered in America, and whose existence was for a long time denied by European workers, although recently accepted. During the last six years more than fifty cases of sporotrichosis have been reported from France, a few in Germany and 44 cases from different parts of the United States. Ruediger brings additional cases, making a total of 57 cases observed in the United States. The distribution of these cases are as follows: Missouri 3, Kansas 12, Iowa 1, Nebraska 5, South Dakota 3, North Dakota 23, Minnesota 1, Illinois 3, Pennsylvania 1, New York 2 and California 1.

Ruediger draws attention to the fact that five-sixths of the total of 57 cases occurred in the Missouri valley. The disease resembles somewhat the disease in horses. There is usually a primary ulcer, followed by subcutaneous nodules along the course of the lymphatics and enlargement of the lymph nodes. The subcutaneous nodules may break down and form abscesses and ulcers. The lesion is of the granulomatous type, closely resembling tuberculosis. The presence of the parasite in endothelial leucocytes and giant cells makes the diagnosis easy. The cases are rapidly cured with potassium iodide.

LEPROSY.

In spite of numerous publications during 1911 and 1912 on the cultivation of the leprosy bacillus, our actual knowledge of the bacteriology of leprosy has not been materially advanced. This statement is made in view of the fact that since 1903 there have been 19 publications dealing with the cultivation of the leprosy bacillus, and of these 19 reported isolations, hardly two agree.

Duval and Wellman (Journal of Infectious Diseases, Vol. ii) report two different cultures, both occurring with considerable constancy in leper tissues. One is a chromogenic organism with marked morphological variations; the other is not chromogenic and is more uniformly acid-fast. Lesions are said to have been produced in Japanese waltzing mice and possibly in monkeys.

Liston and Williams (Scientific Memoirs, India, No. 51) report the finding of a chromogenic organism which differs from that of Duval and Wellman. The organism is variable in its behavior to acids after staining with carbol fuchs. It shows marked pleomorphism in cultures, varying from short bacilli to streptothrix forms.

Reenstjerna (Deutsches Med. Woch., 1912, No. 38) reports the cultivation of an acid fast, extremely pleomorphic bacillus, pathogenic for monkeys, and Machow (Cent. f. Bak., No. 67, 1913) claims to have cultivated an acid-fast organism which does not produce colored colonies, although the cultures sometimes show coccoid and streptothrix-like forms. This culture is said to be pathogenic for mice.

The publications during 1912 show the same lack of uniformity in results that previous years have brought forth, and the whole question of the bacteriology of leprosy remains decidedly confused.

EPIDEMIC STREPTOCOCCUS SORE THROAT.

The epidemics of sore throat which occurred during 1911 in Boston, Chicago and Baltimore have been reported in considerable detail by C. F. A. Winslow (Journal of Infectious Diseases, Vol. 10, p. 113); Capps and Miller (Journal of the American Medical Association, Vol. 58, p. 1848); and a report of the Johns Hopkins.
Hopkins Hospital, Vol. 24, No. 263). Rosenow (Journal of Infectious Diseases, Vol. 11, p. 388) has worked on the bacteriology of the Chicago epidemic. Winslow in his paper summarizes the reports of twelve outbreaks of a similar disease in Great Britain. Hamburger gives some details from the report of an outbreak in Norway, and the study of eighteen epidemics in Great Britain, made by Savage—"Milk and the Public Health, 1912."

There is no reasonable doubt that these epidemics, occurring in different parts of the world, are of the same disease; a severe type of sore throat, with or without tonsillitis, and apt to be followed by severe, often fatal, metastatic suppurative processes. Suppuration of the cervical lymph nodes is particularly common. Other frequent complications are multiple arthritis, otitis media, phlegmon and peritonitis. It is thoroughly proved by the studies made in America and Great Britain that the disease is distributed by milk. The type of streptococcus, wherever studied, in Boston, Chicago and Baltimore, shows the same peculiarities which distinguish it from other streptococci. The colonies are larger and more watery in appearance. This is due to the formation of abundant capsular material, and the capsules may be demonstrated by ordinary stains. It acidifies and coagulates milk; insulin is not fermented, and the organisms are not dissolved by bile salts. It is much less hemolytic than streptococcus pyogenes, either in blood agar plates, or in fatal cases of septicemia. Long cultivation on artificial media causes the loss of some of these characteristics, namely, the appearance of the colonies and capsule production.

Rosenow has come to the conclusion that it is impossible to determine whether the streptococci of these epidemics are of exclusively bovine or human origin. He has shown that they may be of both, and that butter and cream may contain virulent streptococci, even when the milk has been drawn from cows under aseptic conditions. He also believes that streptococcus pyogenes grown in unheated milk assumes the characteristics of the cultures from these throat epidemics, and that these characteristics may be accentuated by passage through animals.

Considering the confused state of our knowledge regarding the differentiation of streptococci into strains or species, the only points worth emphasizing in regard to cultures from these throat epidemics is that they are at least fairly characteristic when first isolated, and that clinically they behave differently from the ordinary streptococcus pyogenes infections, and that the milk-borne streptococci sore throat is essentially a clinical entity.

PERTUSSIS.

Bordet and Gengou in 1906 reported the discovery of a bacillus in whooping cough, which they were able to isolate in pure cultures from sputum. This bacillus is an extremely minute one, and has some points of similarity with the bacillus influenza. Their evidence for assigning it as the causative factor in pertussis is based upon its presence in the sputum and the complement deviation test which the serum of the patients give, the antigen, of course, being a specific one made from the bacillus.

Mallory and Horner (Journal of Medical Research, Vol. 27, No. 2, November, 1912) report the discovery of the characteristic lesion of whooping cough, and the locus of the bacillus. The bacilli occur in large numbers between the cilia of the epithelial cells lining the trachea and bronchi, and possibly the nose. They believe that the action of the organism is largely mechanical, and that by its presence in large numbers, it interferes with the normal movements of the cilia. The tissue reaction is very slight, and consists of an infiltration of the submucosa with lymphocytes, including plasma cells, and a moderate degree of inflammation of the epithelium, evidenced by invasion with polymorphonuclear leucocytes. They have been able in subsequent work to reproduce the same lesion in dogs and monkeys. This piece of work completes the chain of evidence necessary to establish the bacillus of Bordet and Gengou, as the cause of whooping cough.

BERIBERI.

A number of papers have appeared in the last few years, showing that beriberi could be experimentally produced in birds, fowls and pigeons by feeding with polished rice; at least a paralysis is produced due to peripheral nerve lesions, similar to those found in human beriberi, and cures could be produced by the addition of substances obtained from the rice polishings. Experiments on man have been done by a number of investigators in a number of different places, but these experiments are open to criticism in that they were conducted in regions where beriberi is endemic, so that two theories have been in force regarding the etiology: one that beriberi is due to the lack of certain substances in the diet; the other that deficiencies in diet only predispose, and the real cause remains unknown, and possibly is of infectious origin.

Strong and his associates in Manila (Philippine Journal of Science, Section B. Vol. 7, August, 1912, No. 4) have greatly extended the knowledge of beriberi, and confirmed the results of animal experimentation on the human. These experiments were carried out in Bilibid Prison, the subjects were volunteers, and were prisoners under sentence of death. The conditions were practically ideal, being conducted in a region free from beriberi, and protected against sources of infection, granting that these existed. They could find no evidence that beriberi is an infectious disease. On the other hand, they were able to produce the disease in individuals fed with special diet, while the control individuals, although intimately associated with the others,
did not contract the disease. A special diet formed the basis of the meals for all the subjects of the experiments, and included such food as bread, coffee, sugar, bacon, onions, lard and bananas. Four groups were formed, which were fed as follows. Group 1, white rice and extract of rice polishings and special diet; Group 2, white rice and special diet; Group 3, red rice and special diet; Group 4, white rice and special diet.

It is inadvisable to go into the details of the experiment, but the results show conclusively that beriberi develops because of the absence of some substance or substances in the diet. Such substances are evidently present in red rice, rice polishings and in the alcoholic extracts of rice polishings. The rigid isolation of the prisoners undergoing the test would seem to exclude the possibility of the introduction of an infectious agent through any other individual, or by the introduction of any article. These experiments of Strong and his associates are of great importance because they show that even with the diet containing all the physiological requirements, beriberi may result, owing to lack of certain unknown substances.

In experiments on fowls, Vedder (Philippine Journal of Science, Section B, Vol. 7, August, 1912, No. 4) found that fowls develop a polyneuritis when fed on a diet containing polished rice, cotton-seed oil, egg albumin, sugar, salt, magnesium phosphate, potassium phosphate and asparagin. Neuritis could be prevented by the addition of unpolished rice to the diet. A series of experiments have shown that the neuritis-preventing substance is not volatile, but is destroyed by heat; that it is not an inorganic salt, fat, protein or alkaloid. It is probable that it is an organic base.

It is thus seen that the substances which prevent polyneuritis or experimental beriberi in fowls are probably similar in nature to those which prevent experimental scurvy in animals.

Funk ("Etiology of Deficiency Diseases," Journal of State Medicine, Vol. 20, No. 6) has isolated a crystalline substance, which he calls beriberi vitamin, and which he believes to be the active principle of the protective substance found in rice polingish. This substance, which has the formula C₆H₄N₂O₂, has a curative action for the experimental beriberi or polyneuritis in birds. He is inclined to think that vitamin is necessary for the metabolism of nervous tissue. The lack of vitamin in food stuff forces the animal to get this substance from its own tissue, the result being an enormous loss of weight, after which the available stock begins to be scarce. There is a consequent breaking down of the nervous tissues, with the result that nervous symptoms, such as are seen in beriberi, manifest themselves.

SCURVY.

The last year has seen material advance in our knowledge of scurvy. Baumann and Howard (Archives of Internal Medicine, Vol. 9, No. 6) report the first accurate study of the metabolism of scurvy. They do not attempt any general conclusions from the study of their one case, but their findings are of great interest. They found that the loss of the various food constituents through the feces was less when fruit juice was added to the diet. The total sulphur metabolism was abnormal throughout the experiment, the quantity eliminated being in excess of that ingested. Chlorine and sodium were retained during the fruit juice period, but were excreted in excess of the intake during the preliminary period. More potassium, calcium and magnesium were retained during the fruit juice period than during the preliminary period.

The experimental production of scurvy in animals reported during 1912 opens up, of course, great possibilities for the future investigation of scurvy.

Holst and Frölich (Zeitschrift für Hygiene, Bd. 72, Heft 1) found that they could produce scurvy in guinea-pigs by feeding them exclusively with grain or bread. They produced the characteristic lesions of scurvy: the loosening of the teeth; hemorrhages into the gums and joints; loosening of the epiphyses and changes in the bone marrow. Guinea-pigs that were fed exclusively with cabbage, carrots and dandelions did not show these changes, even though they lost greatly in weight, thus showing that scorbutus is not due to simple inanition. The animals which developed scorbutus could be cured by feeding with a number of vegetables. The anti-scorbutic power of certain vegetables was diminished or destroyed by long drying or cooking, but the juice of acid fruits retained their anti-scorbutic power even after heating.

Fürst (Zeitschrift für Hygiene, Bd. 72, Heft 1) found that feeding guinea-pigs exclusively with plant seeds would produce scorbutus, though not so easily and regularly as with exclusive grain feeding. Plant seeds that produce scurvy would acquire anti-scorbutic properties when infected with fungi. His attempts to identify the anti-scorbutic powers with specific substances, as fat, albumin, carbohydrates, cellulose, salt and enzymes failed.

Frölich (Zeitschrift für Hygiene, Bd. 72, Heft 1) found he could produce scorbutus in guinea-pigs by exclusive feeding with raw or cooked milk, although not so perfectly as by exclusive grain feeding. When fed with oats and raw milk, they did not develop scurvy; when fed with oats and cooked milk they did.

From these papers we may infer that the anti-scorbutic property of a food stuff depends on a substance destroyed or modified, to a large extent at least, by heat. The nature of the anti-scorbutic substance is unknown. That profound changes in metabolism in man have been demonstrated, and that the possibility of isolating the substances, the lack of which produce these changes, seems assured, offers reasonable ground for some interesting speculation.
PELLAGRA.

Sporadic cases of pellagra have been reported in many of the northern states in this country, and it seems that with greater familiarity with the disease, the total number of cases recorded from different parts of our country, is rapidly increasing.

Surgeon C. H. Lavinder (United States Public Health Report, Vol. 20, No. 50) has made a systematic attempt to collect statistical information relative to pellagra in the United States. A peculiarity of the disease here is a comparatively large number of cases occurring in people of easy circumstances. As in Italy, it is found that there is constantly but one case in any house or family. The author considers that pellagra during the last five or six years has affected no less than thirty thousand individuals, and that the matter has reached the dignity of a public health question of national importance.

A very extensive report of the Pellagra Commission of the State of Illinois has appeared. It is quite impossible to make a fair review of this report. Some of the salient points, however, are that the disease is essentially similar to that of Europe and Egypt. There are some slight differences in the distribution of the skin lesions. The lesions of the central nervous system in general are similar to those described by Adolph Meyer, under the name of central neuritis. The pathology consists of changes such as the axonal reaction and chromatolysis in the Betz cells of the motor cortex, and of the larger pyramidal cells in the praecentral convolutions, and in the cells of the nuclei in the cerebellum, pons, medulla and cord, as well as posterior root and sympathetic ganglia. In some cases there is more or less overgrowth of neuroglia along blood vessels and around nerve cells. These lesions are interpreted as being simply the reaction upon the part of nervous tissue to the general effect of a deleterious substance, occurring in the disease, and are in no way specific for pellagra. Other lesions are slight inflammatory reactions in the connective tissue structures of the liver, intestinal ulcerations and secondary kidney lesions. The skin lesions pathologically give the general picture of angio-neurotic processes, and resemble to a marked degree the lesions found in erythema multiforme. Attempts to obtain a specific reaction in pellagra cases have failed. Cutaneous extracts of maize and complement fixation experiments have given negative results. Attempts to produce pellagra in healthy individuals by a corn diet has failed in the hands of this Commission; likewise attempts to transmit pellagra to monkeys and other animals, by feeding and inoculation experiments, have failed. The general conclusions are that pellagra is a disease due to infection with a living micro-organism of unknown nature, and a possible location for this infection is in the intestinal tract. Deficient animal protein in the diet may constitute a predisposing factor in the disease. The Commission was not able to identify the nature of the association of the intestinal bacteria and protozoa investigated in a rather exhaustive series of experiments, with the disease.

Attempts made by Anderson and Goldberger and C. H. Lavinder (Public Health Report, Vol. 26, No. 26) to transmit pellagra to monkeys by injection of blood and spinal fluid and nervous tissue from pellagrins have failed.

Devoto (Wiener Klin. Woch., Vol. 63, No. 1) says that in eight Italian provinces there has been a diminution since 1859 of 75% of pellagrines individuals. This diminution he claims is due to the lessening consumption of maize, brought about by edicts prohibiting the use of bad maize, and to improvement in economic conditions.

In spite of the voluminous literature of pellagra, definite conclusions as to the etiology are impossible. It is even difficult to form an opinion as to the value of the evidence for and against the infectious theory. The pathology of the disease throws very little light upon the nature of the underlying or causative processes. Such evidence that we have points to a similarity with certain nutritional disorders, such as buckwheat poisoning, beriberi and scurvy. In spite of these factors, however, we must remember that the infectious theory has many supporters, and among them, the Illinois Commission.

BRAIN LESIONS PRODUCED BY ELECTRICITY, AS OBSERVED AFTER LEGAL ELECTROCUTION.

The finding of constant and characteristic lesions in the brain, after death by electrocution, is of interest. Spitzka and Radash (American Journal of Medical Sciences, Vol. 144, No. 3) had an opportunity to study five brains which were preserved in formaline, shortly after death by electrocution. Peculiar areas, which gave a vacuolated appearance to the sections, were found in all. These areas, which are unlike anything seen in any other condition, ranged in diameter from 25 to 300 microns. They consist of two parts, a central rarefied and an outer condensed zone. The most characteristic contain a small blood vessel, surrounded by a delicate meshed reticulum, representing the central four-fifths of the area, and a condensed peripheral zone. The explanation of these areas can only be guessed. The bead-like vacuoles along the vessels and the condensed peripheral zone seem to show that the sudden liberation of gas, due to electrolysis, best explains their origin. Spitzka and Radash note that similar lesions have been experimentally produced by Sir Victor Horsley and R. H. Clarke. It is quite probable that these lesions will have considerable forensic importance.