ABSTRACTS FROM CURRENT MEDICAL LITERATURE.

MEDICINE.

Further Studies on the Presence of the Tubercle Bacillus in the Circulating Blood. By Randle C. Rosenberger, M.D. (New York Medical Journal, 19th June, 1909).—Following the preliminary report of 50 cases of pulmonary tuberculosis in which the tubercle bacillus was demonstrable in every instance in the circulating blood (vide Glasgow Medical Journal, Abstracts, July, 1909), Dr. Rosenberger has continued the study until at the present time the number is over 300.

In the present study, along with pulmonary types of tuberculosis, glandular, osseous, peritoneal, nervous (both spinal and cerebral), genito-urinary, and pleural cases are included, in all of which the result of the blood examination was positive.

In three cases where tubercle bacilli were present in the blood of a tuberculous mother, the organism was demonstrated in the blood of the child. The children were aged 1 month, 2 months, and 8 months. In the first and third, as no autopsy was allowed, the blood was withdrawn directly from the heart; in the second, from a vein in the arm.

The technique was by the citrated blood method. Sometimes the specimen was centrifugalised, but usually it was allowed to deposit a sediment by standing in a refrigerator over night. After spreading some of the deposit on a clean new slide and drying it, it was thoroughly laked, then dried, fixed, and stained by the ordinary routine technique as for sputum. In some preparations, the organisms were easily detected in a short time, but in others the search lasted from one hour to three days before bacilli were found.

A diagnosis of a tubercle bacillus was never made unless it was absolutely acid-fast. In Dr. Rosenberger's own series of 312 cases, an acid-fast bacillus, which was indistinguishable from the tubercle bacillus, was demonstrable in every case. No attempt has yet been made to grow the organism from the blood.

In the first series of 50 cases in which tubercle bacilli were found in the blood, of 48 specimens of faeces obtained, 45 were positive; of 56 specimens of sputum, 33 positive and 23 negative; of 6 specimens of urine, 5 positive and 1 negative; of 23 specimens from miscellaneous materials—pus from joints, sinus, empyemata—22 were positive and 1 negative.

In a second series of 42 cases in which tubercle bacilli were found in the blood, 19 specimens of faeces submitted for examination all showed the organism.

Thirty-two autopsies were held, and all showed some tuberculous lesion or lesions.

From 50 cases, 2 or 3 c.c. of the sediment of the citrated blood solution was inoculated into the peritoneal cavity of guinea-pigs.

Results.—One died in a month with miliary tuberculosis of the spleen and lungs; three died in two months, one showing miliary tuberculosis of spleen and lungs, another a pneumonia due to a tuberculous condition of upper lobe of the right lung—the third is not mentioned; four pigs showed a few scattered tubercles in the lung as well as in the liver. The remainder of the animals did not show any gross lesions, but the blood of all of them showed an acid-fast bacillus resembling those found in human blood. A study of the blood of normal guinea-pigs failed to demonstrate any acid-fast bacilli.

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A number of other animals were sacrificed at the end of two months, but, although the bronchial glands were apparently enlarged, no other macroscopic changes were noticed. It was decided to allow the remaining pigs to live for a month or longer, to see if this apparently avirulent bacillus will eventually cause the appearance of tuberculosis.

Histological examination of the organs of the animals sacrificed up to this time show the lungs to be generally the seat of some cellular proliferation. This is chiefly seen round the smaller blood-vessels, while upon the periphery of the lung structure are accumulations of small round-cells which strongly suggest the commencement of tubercles.

The only reason which Dr. Rosenberger can advance for the almost general condition of avirulence of the organism found in the blood is the part played by the bacteriolytic substances in the blood. The continued circulation of the organism in the blood, and the bacteriolytic action exerted may possibly account for the irregular morphology of the organism.

As the result of these studies, he believes that tuberculosis is a bacteriæmia, and that the bacillus can be demonstrated in the blood of every case where there is an active tuberculous process, that it is also present in the blood of a certain percentage of healthy people at some period, and may be present in an attenuated form for years, and if the general resistance, or resistance in some particular organ, is lowered, the bacillus becomes pathogenic, at once lodges at this point, and brings about tuberculosis. If the bacillus is not present in the blood, how can instances of the disease be explained as resulting from injuries or some surgical operations? Surely the greatest care is exercised as regards antisepsis, and yet tuberculosis is said to follow operations for appendicitis where absolute cleanliness is exercised.

He also believes that the bacillus is transmitted from mother to child through the placenta, as examination of the blood from a large number of umbilical cords shows the presence of the same acid-fast bacilli as are obtained from the mothers’ blood.—J. R. C. Greenlee.

Human and Bovine Tubercle Bacilli: a Study of their Relationship and Intertransmissibility, with Special Reference to Infection and Immunity. By Gilliford B. Sweeney, M.D. (New York Medical Journal, 19th June, 1909).—Discussing the intertransmissibility of bovine and human tubercle bacilli, Dr. Sweeney says that it has been proved beyond all cavil that it is possible to infect cattle by feeding them on food impregnated with human tubercle bacilli. He also holds that the conclusion of Koch and his followers, that human beings were not infected by bovine tubercle bacilli, based on the absence of intestinal lesions, is fallacious, because it is possible for the bacillus to pass through the intestinal wall and leave no trace behind, and to migrate to other organs and there set up their characteristic lesions. Spengler found that bovine bacilli grew best on culture media when surrounded by but little oxygen, while human bacilli grew best when surrounded by abundance of oxygen. In children, the glands, meninges, and joints are most commonly attacked; in adults, the lungs; and Dr. Sweeney believes that Spengler’s deduction from the above facts, that most infections in children are due to bovine bacilli, while those in adults are due to human bacilli, will be more fully confirmed when fuller data becomes available.

Raw, acting independently of Spengler, came to practically the same conclusions.

While working with Professor Behring at Marburg, Dr. Sweeney made the following observations:—

1. That the immunity conferred on cattle through the use of sterile emulsion of living tubercle bacilli was effective.

2. That this immunisation was accompanied by less disturbance to the bullock when the emulsion was made with human bacilli than when it was made with bovine bacilli.

Pottinger offers the following explanation of the above fact:—“Each host, whether bovine or human, presents physical conditions favourable to the
propagation of tubercle bacilli belonging to its own species, and therefore offers very little resistance to infection; but where the infectious bacilli are derived from another host, while primarily derived from one stem, they have changed physical characters to such a degree as to make little impression on the new subject other than to stimulate phagocytic activity."

Dr. Sweeny holds that clinical data are not at variance with this theory, and points to 50 cases reported in 1907, and 150 cases successfully treated during the last year with anti-tuberculous lymph (A.T.L.) derived from the lymph reservoirs of a young bullock previously immunised by Von Behring's method.

In order to render his observations on the relative merits of human and bovine tubercle bacilli as immunising agents more reliable, he has for the past five years kept two herds of cattle apart from one another, one immunised with bovine tubercle bacilli, the other with the human type. The lymph from the former he calls A.T.L. No. 1, that from the latter A.T.L. No. 2.

It was at once apparent that there was a marked difference between the action of the two lymphs when administered to tuberculous patients, and even more in most cases where A.T.L. No. 1 improved the patient, in that a change to A.T.L. No. 2 would be followed by untoward symptoms. He gives four cases as illustrative of some points of special interest.

**Case I.**—Male, aged 30. History of several haemoptyses, cough, expectoration, loss of weight, and night sweats, extending over 3 years.

*Present condition.*—Consolidation right upper lobe, bronchial breathing, increased temperature, and recurring diarrhoea.

*Treatment.*—Injection of 15 minims A.T.L. No. 1 daily.

A month later the temperature was persistently normal, night sweats had ceased, cough and expectoration lessened, lung much improved, diarrhoea still persisted, and loss of appetite. A.T.L. No. 2 tried for fourteen days, resulting in return of night sweats and cough, diarrhoea unchanged. A change back to original treatment, A.T.L. No. 1, was followed by rapid improvement, the digestive symptoms gradually abating, with a return of appetite and gain in weight.

This was a case of simple infection from the human tubercle bacillus. The change from A.T.L. No. 1 to A.T.L. No. 2 was made because the persistence of the diarrhoea suggested the possibility of a mixed infection (human type in lungs, bovine type in intestine). The aggravation of the pulmonary symptoms with A.T.L. No. 2 looked as though this conclusion was correct, but its failure to check the diarrhoea negatived this, and the final disappearance of all symptoms with A.T.L. No. 1 finally cleared up the diagnosis.

**Case II.**—Pulmonary tuberculosis, and tuberculosis of the knee-joint. A month's treatment with A.T.L. No. 1 produced marked amelioration of pulmonary symptoms. A.T.L. No. 2 then used, producing marked increase of all lung symptoms, but with the opposite effect on the knee-joint, which rapidly improved. A month later A.T.L. No. 1 again given, and all tubercular symptoms rapidly improved. No further change was made in lymph, and in three months patient was dismissed free from all objective and subjective symptoms. This was a case of mixed infection by both human and bovine tubercle bacilli.

**Case III.**—Child, 11 years old. Cervical, axillary, and mesenteric glands all the seat of tubercular invasion. Two months treatment with A.T.L. No. 2 led to disappearance of fever and glandular enlargement.

**Case IV.**—Child, aged 12. Tubercular disease of hip-joint. Treatment by A.T.L. No. 2 injections for a month; sharp pneumonia caused cessation of injections. Tubercle bacilli then found in sputum, examination of which had been previously negative. A.T.L. No. 1 used for one month, with amelioration of pulmonary symptoms, followed by A.T.L. No. 2, which gradually led to improvement of condition of hip. Two months later, when injections ceased, suppuration had ceased, and patient's general condition was excellent. This case was treated three years ago, and at present time is in perfect health.

These cases are typical of the 200 studied during the past year for the
purpose of determining the character of the bacilli involved in the tuberculous process, whether human or bovine.

**Conclusions.**—(1) Human and bovine tubercle bacilli are distinctly different in most of their characteristics. (2) The human subject may become the host of either form of tuberculous infection. (3) Tuberculous infections of the respiratory tract will usually be found to be due to bacilli of the human type, while those of the bones, joints, and lymphatics are likely to be due to the bovine type.—J. R. C. Greenlees.

The Significance of the Diagnosis of Tubercle Bacilli in the Circulating Blood. By G. Treufel (Münch. med. Woch., No. 42, 19th October, 1909).—Of late there has been much writing about the presence of the tubercle bacillus in the circulating blood of tuberculous subjects, and quite recently Stäuble has devised a new and simple method for carrying out the examination. 1 to 2 c.c. of blood are withdrawn from a vein and mixed with 3 per cent solution of acetic acid, which dissolves the red blood cells but leaves the leucocytes and bacilli intact. After centrifugalising, the sediment is stained in the usual way for tubercle bacilli.

Treufel has used this method in the study of a series of 38 cases, with the following results:—In 34 cases of phthisis pulmonalis, tubercle bacilli were found ten times; in 17 cases of phthisis in third stage, tubercle bacilli were found eight times; in 1 case of phthisis in second stage, the bacilli were found twice.

In a case of general glandular tuberculosis without any pulmonary lesion, the result was positive, as also in one case of testicular and vesical tuberculosis, although after castration the bacilli disappeared from the blood.

He remarks on the importance of this search as an aid to diagnosis, and in this connection quotes two cases. In one case a diagnosis of enteric fever had been made, but the finding of the tubercle bacilli in the blood showed the true nature of the disease, and a condition of general tuberculosis was found post-mortem. In the other case the symptoms simulated closely those of general tuberculosis, but the search for the tubercle bacillus in the blood was negative, and the diagnosis of enteric fever was ultimately made and verified post-mortem.

The number of positive results is directly proportionate to the severity of the lesion, so that prognostically the finding of the tubercle bacillus in the blood is of some value. With one exception—the case of testicular tuberculosis mentioned above—all those giving a positive result died.

Theoretically it is interesting to note that, in spite of the frequency of the invasion of the blood-stream by tubercle bacilli, miliary tuberculosis occurs comparatively seldom. Most authorities are of opinion that for the production of a miliary tuberculosis a considerable infection of the blood-stream is necessary. In none of the author's cases were the bacilli more numerous than 2 to 5 per c.c. of blood, and the absence of miliary tuberculosis in his cases supports the contention that, when this condition occurs, it is the result of a sudden infection of the blood-stream by numerous bacilli. It is also evident that when the bacilli are not too profuse the tissues possess some phagocytic power to overcome the infection.—Leonard Findlay.

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**SURGERY.**

A Record of Eight Personal Cases of Volkmann's Ischaemic Paralysis. By M. Froelich (Gazette des Hôpitaux, May, 1909).—The affection was found in children, conforming with the statistics usually given in this condition. The ages varied from 3 to 11 years. (Jones, of Liverpool, in twenty-four cases, has not seen one over 14 years.)

The cause was always an appliance—usually a splint—put on too tightly.