

literature, numerous cases of this kind which illustrate that the protective action of the abdominal spasm, the rapid emptying of the upper intestine by vomiting, the quick closure of the perforation by a plaster of fibrin and the usual formation of plastic adhesions have brought about a spontaneous cure. Sometimes the local abscess thus formed probably seeks a spontaneous exit through the intestine like those abscesses about the appendix. Sometimes it is opened by the surgeon in the epigastrium and the cause is not determined; sometimes, having extended down the outer side of the ascending colon, it simulates an appendix abscess exactly; sometimes it is simply slowly absorbed and leaves a legacy of periduodenal adhesions. One of its most common tricks is to locate between the liver and the diaphragm and cause subphrenic abscess. Probably the reason of this is that what gas escapes usually seeks this situation and in this way holds a space for the abscess to locate in, just as fluid gravitating to the pelvis leads to secondary abscesses after acute appendicitis. Occasionally these cases of subphrenic abscess perforate the diaphragm and cause "pneumonia" and "abscess of the lung" and are discharged through the bronchi, as in the case I have alluded to. Probably a good percentage perforate posteriorly or abut on the pancreas. Some cases of "pancreatitis" where the head of the pancreas feels thickened are perhaps cases of duodenal ulcer.

These atypical cases of duodenal ulcer are most interesting, but I must pass on, for my main intention in speaking of them is to carry on my argument about the probable frequency of this lesion. When we have included these cases they will still further reduce the proportion of 1 to 40, probably divide it.

The third division, those that are recognized by hemorrhage. These are the classical cases which have justified the clinical diagnosis.

I am inclined to think that those which bleed at all bleed freely because, on account of their situation, they happen to erode the pancreaticoduodenalis artery or one of its large branches, while if they are situated farther from this artery they will wall themselves off by a dense inflammatory wall of cicatricial tissue which controls the smaller vessels.

I have two specimens which to a certain extent indicate this. One is a portion of the wall of an ulcer of this type which I removed from a patient whose symptoms had existed for many years without hemorrhage. The guaiac test was negative. I excised the base of the ulcer and at the same time did a modified Finney operation. The result has been most satisfactory.

In the excised portion of this ulcer you may see under the microscope the dense sharply defined wall of cicatricial tissue which existed in this case. One can easily imagine why the guaiac test was negative in such a case, for it seems as little likely to bleed as certain old dense ulcers of the leg which need scarification. I have recently been told by Dr. Franklin White

of a large indurated stomach ulcer which gave no guaiac reaction in the feces or stomach washing.

The other specimen is from a patient whose history was marked by the tendency to hemorrhage. Death was due to a tremendous hemorrhage immediately following gastro-enterostomy, which I did with the desire of being conservative. Presumably my manipulations started the bleeding. The specimen shows very clearly why. An artery is exposed in the base of the ulcer, and from the fact that it stands out in the wall of the ulcer in relief, I take it that it had been exposed for some time before the final hemorrhage occurred. (Fig. 9.)

I want also to present two old dried stomachs from the dissecting room, a glance at which shows how important the accidental situation of the ulcer may be in regard to hemorrhage. Although these stomachs were tied off at the pylorus, the arrangement of the vessels of the stomach and duodenum are not unlike and show the same anemic intervals. If we may judge anything by these specimens, we may say that hemorrhage as a symptom depends on whether or not there happens to be an artery of considerable size within the radius of the ulceration. If the artery is not of considerable size, it is possible that, owing to cicatricial limitation, the ulcer will cause no appreciable bleeding, not even enough to show with the guaiac test.

(To be continued.)

## ON THE PRESENCE OF TUBERCLE BACILLI IN THE BLOOD IN TUBERCULOSIS.

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RECENTLY, attention was called by Rosenberger to the value of examination of the blood for tubercle bacilli as a diagnostic procedure in tuberculosis. At the instigation and under the immediate direction of Dr. Thomas Ordway, I decided to test this method, for if the bacilli could be found in the blood, it would be of great aid in diagnosis, prognosis and treatment.

The material used consisted of two cases with presumably normal blood, one normal blood (5 ccm. in 5 ccm. of citrate normal salt solution, inoculated with a platinum loopful of known tuberculous sputum), two cases of miliary tuberculosis seen at autopsy, fifteen clinically advanced cases of tuberculosis, in the sputum of all of which tubercle bacilli had been found, and which were running a temperature.

The normal bloods, and the normal blood inoculated with tubercle bacilli, were used simply to develop technic. In the latter specimen, a tubercle bacillus was found after three quarters of an hour's search.

\*I am indebted to the courtesy of the pathological staff, of the visiting physicians and surgeons of the Boston City Hospital and to Drs. Tileston and Holmes, of Long Island Hospital, for many favors and help granted me.

It has been the predominating idea in this work to take a fair number of cases and work them out thoroughly from all possible points of view.

The methods of work were patterned exactly after those of Rosenberger. Absolutely new slides, new syringes and new pipettes were used. Tested, freshly-made stains were employed. Pipettes were cleaned in concentrated nitric acid. Syringes were boiled in caustic soda. Syringes, pipettes and citrate solutions were sterilized by means of the autoclave. Three slides from every case, except one in which two slides only were examined, four slides in most cases, were looked over for a half hour or more each.

The slides were stained in three ways: by the Koch-Ehrlich method (in the cold for twenty-four to forty-eight hours), by the Ziehl-Nielsen method (in an oven at 56° C. over night), or heating over a burner to steaming for a minute. They were decolorized by Gabbet's or by Pappenheim's method, or by 20% HCl in 70% alcohol, followed by methylene blue as a counter-stain. These different methods of staining and decolorizing were adopted to obviate the possibility of not finding the bacilli by any one method.

Five cubic centimeters of blood were taken from each patient, or from the heart's blood at autopsy in the two cases of miliary tuberculosis mentioned, and smears were made from the sediment which collected over night in the 2% citrate normal salt solution. Seventeen guinea pigs were inoculated with from 1 to 2 ccm. of sedimented blood (fifteen with the blood from advanced tuberculosis cases, and two with the heart's blood from autopsy on the general miliary cases).

**Results.** — Microscopically from the smears: In every case, unquestionable artefacts, that is, bodies retaining the red stain, were found. In three cases, a single body was found in each which could not be differentiated microscopically from the tubercle bacillus. In no case could a positive diagnosis of a tubercle bacillus be made.

Macroscopically, from the autopsy on the guinea pigs: All the pigs had to be killed. All except two were allowed to live over thirteen weeks, these two being killed at twelve weeks. All the pigs gained in weight and were in good condition. Many of them bore young; one of them at the time of killing was delivered of two young pigs by Cæsarean section, both of which are alive and healthy. Notice was taken at autopsy of glandular enlargement; none was present in any case. Sections from spleen, liver and kidneys were preserved in formaline for microscopical examination in all cases; sections of suprarenals, placenta, heart and lungs in some cases. In no case could a diagnosis of tuberculosis be made at autopsy; in only one case was a doubt present, and that in a spleen, in which certain nodules could be ruled out.

Microscopically, sections mounted in celloidin and stained in hematoxylin and eosin. Sections

showed not even a suggestion of a tuberculous lesion, except in one case, where a small focal inflammatory lesion was found in the fat tissue adjoining the pelvis of a kidney; a stain for tubercle bacilli proved negative.

**Summary.** — Blood from seventeen cases of tuberculosis (two of miliary and fifteen of advanced tuberculosis) inoculated into guinea pigs failed in every instance to produce the slightest evidence of the disease. Stained smears of the blood from the seventeen cases showed occasionally bodies resembling tubercle bacilli.

**Conclusions.** — The only reliable test for demonstrating tubercle bacilli is animal inoculation and the production of the characteristic tuberculous lesions with the bacilli in them. This test applied to the blood of seventeen cases of miliary and advanced tuberculosis failed in every instance to demonstrate tubercle bacilli. It is reasonable to conclude, therefore, that virulent tubercle bacilli are not ordinarily demonstrable in the circulating blood of tuberculous patients.

Staining tests (on which Rosenberger bases his arguments and conclusions) are not reliable. The results he obtains may be explained in at least three ways: (a) as attenuated tubercle bacilli; (b) as artefacts; or (c) as acid-fast bacilli of some sort introduced as a contamination in some one of the steps employed in staining, or deposited on the slide by the fingers in the process of cleaning or manipulation.

This further conclusion seems warranted: that the demonstration of tubercle bacilli in the blood by means of staining methods is wholly unreliable and hence of no clinical value.

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### THE DESIRABILITY OF FURTHER EXTENSION OF UNDERGRADUATE NURSING SERVICE.\*

BY FRANK W. PATCH, M.D., FRAMINGHAM, MASS.

CONSERVATION has become a watchword of the new century. The late President of our great country succeeded in arousing the nation to some realization of the waste of natural resources, and now even the city of Boston is pledged to a forward movement which, among many other plans, proposes to see to it that the public property of the city, schoolhouses, parks, churches and other municipal effects, shall be put to a broader usefulness and made to serve the community along new lines. Millions of dollars are invested by the city in schoolhouses which are for the most part closed during two months of every summer, not to speak of two days of every week throughout the entire year. In churches, the showing is even worse:

\*Read before the New England Association for the Education of Nurses, May 27, 1909.