THE COLLECTION OF MATERIAL FOR THE CLINICAL LABORATORY.*

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An outline of proper methods for the collection of specimens, also an effort to impress the necessity of delivering material that will reveal the real conditions.

That the laboratory is an indispensable adjunct to the modern practice of medicine must be admitted. The bacteriologist is able to identify and accurately label morbid processes. The various tests enable one to verify and make positive diagnosis. Unfortunately, the amount of assistance that the laboratory can render is often curtailed by the lack of skill and caution with which the specimen is procured, and very often the reputation of the worker is placed in jeopardy by the want of knowledge of the one who collects the material. The conscientious physician of to-day cannot protect those who depend upon him for life and health, except he uses the laboratory; yet, the laboratory is worthless to the man who fails to get a specimen that will reveal the real condition.

The authors[1] of one of our textbooks on bacteriology begin the chapter on the bacteriological examination of material from patients, with the following remark: "In making bacteriological examinations of material taken from patients the validity of results is as fully dependent upon the technique by which the material is collected, as upon the proper manipulation in the later stages of the examination." This is indeed a true statement, appreciated by a small part of the medical profession and worthy of consideration by the pharmacist. It is apparent, without discussion, that the collector of a specimen should make use of his scientific knowledge in obtaining the material; nevertheless, the few remarks presented are of timely interest.

URINE.

Two fluid ounces are sufficient to send to the laboratory. If examined in a reasonable time, or in cool weather, no precaution, other than collection in a clean bottle, is necessary for chemical and microscopical examination. When urine is sent a long distance, more especially in warm weather, the writer suggests the use of a small piece of gum camphor. Many other preservatives have been recommended, among which may be mentioned chloroform, solution of formaldehyde, salicylic acid, and thymol. Chloroform preserves the specimen well from a chemical standpoint, but renders the sediment unfit for microscopical examination, and gives a deceptive precipitate with Fehling's solution. The addition of a few drops of formaldehyde solution has been suggested but it may cause the reduction of the copper solutions, which may be taken for glucose; it also distorts and shrinks the casts and cellular elements. Salicylic acid renders the tests for indican with Obermayer's reagent more difficult, as well as the diacetic acid reaction, giving a coloring with the iron salts in these reagents. The most convenient preservative

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for the patient to obtain is camphor, which is sufficiently efficient. Therefore this is recommended.

Saxe[2] is responsible for the statement that the best time to obtain a sample of urine when we do not want the twenty-four hour quantity, is during the day, about three hours after a meal. The reason for this is that the morning urine, which is commonly collected, is least likely to contain slight amounts of albumin, or glucose.

The collection of urine for a bacteriological examination is a different matter and the specimen must be so collected as to avoid contamination with extraneous organisms. In women the proper method is catheterization. In men this is rarely necessary. The glans penis and meatus are thoroughly washed with soap and water, then with diluted alcohol (50 percent); the first portion of urine voided should be rejected, and the last portion collected in a sterile receptacle. Care is necessary, as many cases of colon infection reported are no doubt due to careless technique.

Not only infections of the urinary tract can be detected from examination of a carefully collected specimen of urine, but also infections of the throat, heart, and joints. In rheumatic conditions the joints should be massaged before the urine is obtained. It is much easier to culture urine than blood, and a bacteriological examination of the urine may give us the desired information and furnish the organisms for an autogenous vaccine.

SPUTUM.

Many specimens of sputum sent to the laboratory consist entirely of saliva or, more frequently, of secretions from the nasopharynx. It should be insisted that the sputum be raised by a pulmonary coughing act. The morning specimen should be collected in a clean wide-mouth bottle, corked tightly and the outside washed with alcohol or phenol solution.

PUS.

Pus, for microscopical examination, may be spread upon a glass slide and allowed to dry in the air. For the preparation of an autogenous vaccine the material may be collected upon a sterile swab, placed in a sterile tube and sent at once to the laboratory. Soap followed by alcohol or ether should be used for cleansing the surfaces of boils or abscesses before puncturing them for material, never phenol or mercuric bichloride, which kills the organism or prevents its growth.

GASTRIC CONTENTS.

The test meal usually recommended is the Ewald breakfast, consisting of two slices of dry toast and two cups of weak tea, or preferably water. After one hour the meal is extracted. The meal must be taken on an empty stomach. The first thing in the morning the patient may be instructed to take the test meal at home and report for the extraction in less than one hour after eating it.

BLOOD.

Blood, for the Widal test, may be collected by allowing a couple large drops to dry upon a slide or piece of glazed paper.

Blood, for a differential count or examination for malaria parasites, may be spread upon a glass slide as described by Stitt,[3] who credits the method to Daniels, as follows: "Take a small drop of blood on the end of a clean slide, touch a second

slide about a half inch from end with the drop, and as soon as the blood runs out along the line of the slide-end slide it at an angle of 45° to the other end of the horizontal slide." The blood is pulled or drawn behind the advancing edge of the advancing slide.

It is usual to receive the blood for malaria test after a chill, although Wood[4] claims it is not necessary to obtain blood for the purpose of making a diagnosis of malaria at any particular time in relation to the chill, because if the patient has the disease the parasites will always be found if sufficient care is taken in searching for them, excepting only in the blood of persons to whom quinine has been administered and in some cases of black water fever when the parasites may not appear in the peripheral blood.

Blood for culturing, either for vaccines or diagnosis, should be taken from one of the large veins at the flexure of the elbow. Mallory and Wright[5] state that about 10 Cc. of blood should be taken and distributed directly by means of the syringe in quantities of 3 or 5 Cc. among flasks, each containing 200 to 400 Cc. sterile bouillon. The blood is thus highly diluted in order to obviate its bactericidal action. The strictest aseptic precautions must be observed in obtaining the blood and in mixing it with the culture medium.

When blood is wanted in quantities, as for the Wassermann and other serum tests, when desired, I furnish the Keidel tube together with instructions for obtaining the blood by venipuncture. This is not necessary as 3 mils of blood are sufficient and can easily be obtained from the fingers as described by Kolmer:[6]

(1) Wash the last joint of the middle finger with alcohol. If the hand is cold it should be warmed by immersion in hot water; before puncturing, compress the finger and squeeze in such a manner as to drive the blood toward the end of the finger.

(2) Prick deeply with a broad blood lancet, Hagendorn needle or scalpel across the lines of the skin.

(3) Collect blood in small test-tube, as blood may be lost on the sides of a large tube.

Sufficient blood can be obtained in this manner, and patients do not object to frequent tests when treatment is being guided by serum reactions. To obtain blood from small children the large toe may be punctured in the same way.

CONCLUSION.

The methods for the collection of material most often sent to the clinical laboratory have been given here. Those collecting material or advising the patients should never lose sight of the importance of proper collection.

In closing, I would recommend that the laboratory worker be frequently consulted, as to how he wishes the material collected and delivered to him, so that the value of the laboratory be increased and patients receive larger benefits at the hands of those in whose keeping they have placed their life and health.

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[5] Mallory and Wright, "Pathological Technique," Boston, 1915.
[6] Kolmer, "Infection, Immunity and Specific Therapy," Phila., 1915.