

THE UNIFICATION OF CLINICAL LABORATORY METHODS.

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The extremely diverse findings so frequently revealed in various clinical laboratory reports have become so conflicting of late that criticism has been called forth and the need for a reform at the earliest possible date advocated. This would be desirable, at least in-so-far as methods and technics are concerned, so that some sort of agreement in the results could be obtained through a standardized set of tests for this line of work.

Speaking from experience, it seems almost impossible to secure reports on the same specimen from two or more independent laboratories that will agree on the essentials. This is particularly true in cases where confirmation or checking of results are desired. There appears to be no end to discrepancies, because of the fact that there is no attempt made to co-ordinate technics, nor a desire to establish a recognized set of methods by which to conduct the work.

Physicians, who, as a rule, depend upon the absolute truth of the results of analyses of this kind, have found so much fallacy in the work of a few "commercialized laboratories," that their suspicion has been aroused against practically all privately owned concerns. This condition of affairs has become aggravated within the last few years, because a few "contract laboratories" have abused their contract privileges by turning out unreliable work. Contracts, such as have been in vogue in recent years, constitute the greatest menace that confronts legitimate laboratory work. Physicians fell easy prey to the idea, because it looked like an innovation and a convenience, hence they readily accepted the proposition. But they have been constantly deceived, because they, or no one else, have had any satisfactory means with which to check this kind of work. For the present, any laboratory has a right to qualify their methods as being the best, because there are no other means of standardization than personal say-so. But so glaring have become the methods pursued by a few enterprises of this sort, that the Kings County Medical Society in conjunction with the New York County Medical Society, of New York city, have given wide publicity to a certain institution, which not only bids for contract laboratory work, but issues rebates, as well. Unfortunately, the law gives these medical societies no power to investigate such institutions, but by virtue of their code of ethics they can do much good by warning their members against such evils, and to that end, a movement is under way.

That private laboratories are a necessity cannot be denied, but they should endeavor to perform a well defined function, and be the equal, if not the superior, in their work of the public health laboratories. A public health laboratory is no guarantee against mistakes because it is dominated by civil service employees, but it does strive to obtain a condition of uniformity, which permits of its work being checked. This does not obtain with all privately conducted laboratories, owing to the lack of a desire to secure uniformity. It is for this reason, that sooner or later, the health department will see the need of controlling or regulating this line of work through legislation, or by a set of recognized methods of analyses. This is a project that should be encouraged. As to the purely commercialized clinical laboratory, we are aware that it is commonly accepted that "much shame has been committed in its name"; therefore, regulation of them may very soon be attempted.

While legal regulations may be necessary, they will act only as an expedient, and will not bring about the desired improvement unless there are means at disposal for checking such work. This is essential for arriving at truth and reliability, for

the continued success of laboratories depends on whether they do honest work or not, and the reliability of their methods. Such regulation would in a large measure curb contract activity, for unregulated contracts foster inaccuracy. Concerns of this kind, working only for the dollar, cannot afford to give the time sufficient to insure accuracy; frequently they do not see the need of it; chiefly because it is too expensive. Slipshod methods of inexperienced technicians will not be corrected by costly chemicals. Let us work to the end that clinical laboratory work will be accepted with the same degree of confidence in which an iron or a coal analysis is now received.

Some physicians have come to the conclusion that all laboratories "are tinted with the same pigment." If the laboratory methods for clinical purposes were harmonized, such views would be dispersed, and would serve as an incentive to the honest worker, and afford a means of assurance to those who are served by the laboratories. Under such conditions, no such a test as the "sink test" would survive the "acid test." The estimation of glucose in urine, from its specific gravity, would suddenly become obsolete. Such methods as detecting elements by the odor or color would not obtain very long under such conditions of checking. Discrepancies will continue, unless some means is adopted which will guarantee the use of reliable methods.

In support of the contention here advanced, reflect on the conditions prior to the inclusion of well established methods of identification in the Pharmacopœia. Within recent years, order has arisen out of chaos, so that to-day we can expect agreement in many things, and it matters not whether the drugs are examined in San Francisco or New York. As examples of unification of laboratory methods, the official methods of the Bureau of Chemistry of the Department of Agriculture may be cited; also the standard methods of water analysis and standard sewage analysis of the American Public Health Association; the Hygienic Laboratory methods for the determination of phenol-coefficients. By reason of these methods, there is some hope of checking the results, regardless of location of the laboratory, provided experienced workers made the examinations. There is no reason why this same condition should not exist with clinical laboratory work, when so much depends on the truth of the findings.

During the last fourteen years, I have experienced some amusing, yet sorrowful, instances, which vividly bespeak the need of some such reform as here advocated. During my connection with the laboratory of the Equitable Life Assurance Society of New York City a few interesting and hitherto unknown tests were encountered. I recall a few that were never known before, and have since been forgotten. One came from a western medical examiner who was constantly reporting glucose in urine. Tests made in the home laboratory proved the contrary in 98 percent of the cases. On asking for information as to his technic, he promptly replied that he used "Dr.—(?) test, which was a test in which blue litmus was used." He qualified his test by stating "If the color changed on boiling the mixture of urine and litmus, it was due to sugar, but if the color remained the same after boiling, there was no sugar present." Evidently he had confused his litmus test (?) with either that of Bremer's (methylene blue) or Fehling's test, impressed by the color, without looking up details. Another came from a Kansas examiner who used Fehling's solution for testing both for albumin and glucose in urine. His description of the test was, "that if on boiling the urine with Fehling's solution the color turns purple, it is due to albumin, but if it turns orange in color it is due to glucose," and he added, "there is no doubt about either." He was non-committal when asked how he would apply his test in the event both albumin and glucose were present in the same sample of urine.

A more recent occurrence was the following: A sample of urine (sp. gr. 1.028) was divided into two samples, to be tested for the presence of sugar; a portion was submitted to a contract laboratory, the other was carefully examined in another laboratory. By a most extended and careful technic, not as much as traces of glucose could be detected by the latter. The former reported 2.4 percent of glucose. As the variation in the two reports was so great the client made an investigation. He reported back that he was told by the contract laboratory, "they had made a test for glucose with Fehling's solution, and on finding a slight reduction, they polariscoped it and obtained the above reading" (slight reduction, mind you). When asked if they still had the specimen in their possession, they said, "No, they had thrown it away." I do not venture an explanation, for it is too deep for the average chemist to fathom (?), but it does point out the fact that such things could not occur if regulations were provided by which we could check work, or reject work, on the claim that an official or standard method was or was not used. Conceive, if you will, the great difference that may follow microscopic work when one chemist uses only a drop of the sample for an examination and the other the same size drop after centrifuging. Surely no agreement can follow such technic, and in a sense both are acceptable.

One of the most glaring defects in our so-called "clinical laboratory work" is the ease with which reports go unchallenged. The following is a report sent out by a New York physician to a patient of another doctor, who requested that he make a careful examination of the urine specimen. I do not give this with any desire to cast a reflection on the medical profession, but what I am endeavoring to do is to champion a cause which will prevent dishonesty and carelessness in making examinations. There were no means of checking this analysis, but the result of the examination will speak for itself. This was the report taken verbatim.

Dr. Mc—.

Patient, Mr. B—.

Odor, urinous. Specific gravity, 1.020. Color, yellow. Reaction, acid. Sediment, large amount. Glucose, absent. Albumin, present. Bile, none. Urea, none. Chlorides, normal. Phosphates, normal.

Microscopically, few hyaline casts, numerous oxalate of calcium crystals.

Remarks: Great care must be exercised with diet, or stones may form.

[Signed] _____ M.D.

In all my experience of testing thousands of samples of urine yearly, I have never as yet seen a urine, such as this one purports to be, with a normal gravity, that did not reveal some measurable amounts of urea. What method was used in this examination I am unable to state, but I am much at sea to understand what became of all the urea. Granting the use of the accepted "hypobromite method," better figures should have been obtained, but it appears, from the report, all the urea had vanished. In support of this very remarkable finding, I have only two explanations to offer—one is dishonesty, the other carelessness—one or both are at fault.

To be brief, too many examinations are made inferentially and not chemically. With these few examples taken at random from a large number, one must realize the very great need of some form of uniformity. Just as to how this may be put into shape, I am not at this time prepared to state, but it occurs to me, that in the United States Pharmacopœia would be the proper place to make a beginning. As an initial step in this direction, I may add by way of reference, that I advocated, in a paper read at the fifty-seventh annual meeting of the American Pharmaceutical Association, held at Los Angeles, California, August, 1909, the inclusion in the National Formulary of a set or a list of recognized formulas that would be of special use in such distinct studies as bacteriology, hematology, pathology, gas-

trology and urinology. Something on the order of the Swiss Pharmacopœia, which contains a chapter of five pages on "Reagents for Medical Chemistry." The formulary of the Dresden Apotheker Verein gives solutions for the estimation of albumin, glucose, etc. The Russian Pharmacopœia gives a long list of formulas for use in medical chemistry. For a number of years, the United States Pharmacopœia has recognized Fehling's solution as a standard for the estimation of glucose and allied carbohydrates. Within the last year or so, the idea suggested above has been slowly assuming form. The U.S.P. IX contains a chapter in Part II on Diagnostical Reagents and Clinical Tests, giving formulas, etc., of reagents for examination of urine, gastric contents, and blood; also stains and accessories for bacterial study. In addition to this, the A. Ph. A. Recipe Book will contain other tests that have been and will be submitted by various correspondents. The question is, how can the good work begun be promoted?

Now that the United States Pharmacopœia has taken the first step, much has already been accomplished. It must be conceded, that to agree upon a set of standard methods will be no easy undertaking, and fraught with much discussion. It is reasonable to expect this, as each contributor will advance some particular method or test as being the best, by reason of his personal experience with it. Then again the test will be made somewhat difficult at the outset, because methods are constantly changing, undergoing revision, modification, improvement, or deletion. This should not impede the progress of the idea, since we would find many tests that could be selected for the purpose intended, by virtue of their long usage. These would form a working basis upon which to extend the subject, which would eventually lead to a set of standard methods that would certainly insure more uniform and reliable results in the examination of clinical specimens for diagnostic purposes.

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STUDENTS WHO MEAN BUSINESS.

Not long ago we were told that the enrollment for the summer classes at the University exceeded all expectations, and now comes the news that more than 8000 students have registered for the summer school of Columbia University, in New York. These figures are more than impressive. They stand for just that many young men and women who are terribly in earnest, which is only another way of saying that most of them intend to succeed in the world if it is possible to do so. It is no longer remarkable to go through school or college. In these days of compulsory education few escape the earlier grades, and those who are able to raise the price manage to get at least a smattering of what we call the higher education. Many of those who go to college come out not much better equipped for life.

But who can doubt the advantages that will be gained by the tens of thousands who are entering the summer classes of the various colleges throughout the United States. The fact that they are willing to undergo the sweltering discomforts of this season of the year is a proof that they have the stamina of which successful men are made. The competition of life grows more strenuous as the years go by, and it is obvious that the greatest prizes will go to these who are best equipped for the battle.

The day of opportunity has not passed in this country and none realize it more clearly than the ambitious, persistent young people who are willing to make any sacrifices in order to obtain the best education possible.—*Phila. Inquirer*.
