

ably suspect the Addison-Biermer type of pernicious anemia. My mind is so fixed in that belief that almost it has to be disproved by subsequent investigation to persuade me that it is not a case of the Addison-Biermer type of pernicious anemia.

In those cases which do not present anemia, and there are only a few of them, and where they present definite neuritic complications, I have to have pellagra eliminated, and in these cases usually the neuritic symptoms do not manifest themselves in the form of a stocking or glove anesthesia, but simply numbness and tingling and burning sensations in the bottom of the feet, which are particularly experienced at night after the patient has been covered up for a time.

There are other forms of gastrointestinal type in which stomatitis is present, and in which diarrhoea supervenes from time to time, in which one suspects at once pellagra, particularly with the nervous complications. But I have never seen in those cases any pigmentation of the skin that had any appearance that simulated the cases of pellagra.

A few years ago in this Association I read a paper on the diagnosis of pellagra and called attention to the fact that one had to be careful not to mistake for pellagra certain cases of pernicious anemia, with gastrointestinal complications, and we had to depend symptomatologically upon the erythema or an actual dermatitis, or upon the blood picture and the duodenal catheterization for the pigment.

I recall very definitely a patient who died following a splenectomy, who developed a beautiful case of the Addison-Biermer type. He was a very healthy and robust stock man in western Texas, a man six feet, three inches high, a man of intelligence and of deliberation in his replies. In asking him about the symptoms that first manifested themselves in his case, I was astonished at his reply. He said, "Doctor, the first symptom I experienced was about three months ago. I became short of breath while lifting a cow into a wagon." The patient had none of the nervous manifestations, but did have a beautiful picture of pernicious anemia.

I have seen other cases in which merely vertigo and a sense of weakness were the predominating symptoms in the patient for a long time, and when anemia exhibited itself the picture became that of pernicious anemia.

Dr. G. Cunby Robinson, Baltimore, Maryland.—A recognition of pernicious anemia is a simple matter after the blood picture has become characteristic. I feel that Dr. Schneider has presented a very valuable paper since he has emphasized the symptoms of pernicious anemia and pointed out to us those symptoms that may occur before the typical anemia, so that when they are encountered the question of pernicious anemia is kept in mind.

Dr. J. P. Schneider (closing).—In the series of cases I presented, there were three patients who had been operated on for cholelithiasis, the underlying pernicious anemia having been completely overlooked. The error came about through mis-interpretation of the attendant attacks of

nausea and vomiting which were without severe colic, and the icteric features. The finding of an achylia lent additional weight to the diagnosis of chronic biliary tract disease. While the stones found are not of the inflammatory type, being bilirubin-cholesterin in content and round or oblong instead of angular and faceted, when severe colic is present the condition becomes a distinct surgical complication.

During the last four months I have seen three patients who were referred to me for supposedly pernicious anemia. These patients had non-hemolytic streptococci endocarditis.

In a case of carcinoma of the colon, there was an extremely puzzling blood picture with leukopenia, very likely to be held as being a primary anemia except for the fact that homolytic phenomena were entirely absent. The duodenal pigment values were low, and later chemical blood in the stool became positive, and only after 3 months had elapsed did symptoms of obstruction occur.

In glandular tuberculosis involving the glands of the mediastinum the picture of malignant anemia may successfully defy detection unless one bears the possibility in mind. Here again the blood-derived pigment values will be low unless the spleen is also involved in the tuberculous process, when they may give values of 4000 or 5000 units.

THE DIRECT ASPIRATION OF THE CONTENTS OF THE BILIARY TRACT THROUGH THE DUODENAL TUBE: CLINICAL APPLICATION AND THERAPEUTIC POSSIBILITIES OF THE METHOD*†

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The subject of the direct aspiration of the contents of the biliary tract through the agency of the duodenal tube has been thrust into the limelight of medical interest only within the very recent past. All previous efforts for obtaining the bile through the duodenal tube for diagnostic purposes has stopped with the simple aspiration of the duodenal contents. In a series of recent articles, however, Lyon has directed attention to a new method of securing the biliary secretion direct from the ducts. This method involves the introduction of a solution of magnesium

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sulphate in varying strengths through the duodenal tube which it has been shown has the effect of producing a prompt evacuation of the bile previously stored in the biliary tract.

Lyon's first paper appeared in September, 1919, and included observations made upon 100 cases of biliary disease with the total number of drainages reaching 1000. In summing up his early impressions with the method, Lyon became convinced: (1) that no difficulties were offered in its technical application; (2) that it afforded an additional means of great value in diagnosing obscure disease conditions of the biliary passages and gall-bladder; and (3) that it possessed great possibilities for future exploration in the therapeutic field.

In subsequent studies published by Lyon, further additions were made to his original observations, and, in a recent article appearing in the *American Journal of the Medical Sciences*, October, 1920, he has given us a thorough resume of the clinical impressions obtained by him in a complete study of 309 cases, with a total number of biliary taps reaching to date as high as 2,240. My own experience with the method dates only a few months back (June, 1920); and, while my opportunity for observation has been necessarily limited, I feel that the great importance of the subject constitutes sufficient justification for my bringing it before you at the present time.

THE PHYSIOLOGICAL PRINCIPLES UNDERLYING THE DRAINAGE OF THE BILIARY PASSAGES BY THE LYON METHOD.

The inspiration for the original study of this method was furnished to Lyon by Meltzer in an article published in April, 1917, from the Department of Physiology and Pharmacology of the Rockefeller Institute. In the course of a general discussion of the pathogenic factors underlying diseases of the bile ducts and gall-bladder the following happy suggestion was made by Meltzer in an apparently insignificant footnote to the article:

"According to the view taken in this paper some cases of jaundice and of biliary colic have their origin in the fact that the sphincter of the common duct is abnormally contracted and does not become relaxed, as it physiologically should,

during the contraction of the gall-bladder. In experiments with magnesium sulphate, I observed that the local application of a 25 per cent solution of that salt upon the mucosa causes a completely local relaxation of the intestinal wall. It does not exert such an effect when the salt is administered by the mouth, that is, when it has to pass through the stomach before it reaches the intestines. The duodenal tube, however, apparently has reached an efficient practical stage. I make, therefore, the suggestion to test in jaundice and biliary colic the local application of a 25 per cent solution of $MgSO_4$ by means of the duodenal tube. It may relax the sphincter of the common duct and permit the ejection of bile and perhaps even the removal of a calculus of moderate size wedged in the duct in front of the papilla of Vater. Twenty-five cubic centimeters of the solution as a dose for an adult will bring no harm. For babies the dose should not exceed 4 c.c. The procedure could be developed into a practical useful method."

In order to attain a clearer understanding of the mode of action of magnesium sulphate on the biliary apparatus when brought into contact with the duodenal mucosa, it is necessary to obtain an insight into the *modus operandi* of the law of contrary innervation, as described by Meltzer. This law represents a fundamental principle in physiology which manifests itself in all functions of the animal body. Every form of muscular movement in the body is attended, for example, by the operation of two contrary nerve impulses, each necessarily interdependent upon the other. This is strikingly illustrated in the mechanism of locomotion. Here, with each contraction of the extensor group of muscles, an inhibition of the flexor group must necessarily take place simultaneously or else movement would be impossible. The same fundamental principle of reciprocal nerve impulses underlies the mechanism of respiration and deglutition, and is likewise present in the alternating phases of relaxation of the sphincter muscles of the urinary bladder and the rectum with tonic contractions of the detrusor muscles during the act of urination and defecation, respectively.

The function of the discharge of bile into the duodenum at intermittent periods during digestion is another example, according to Meltzer, of the application of the law of contrary innervation. At the termination of the common bile duct in the duodenal wall, there is a small circular bundle of muscle tissue known as Oddi's

muscle which acts as a sphincter for the temporary retention of bile in the gall-bladder and gall ducts. The contraction of Oddi's muscle is sufficient to resist the normal expulsive pressure of the musculature of the bile ducts. These two groups of muscles are to be considered as antagonistic and respond to stimuli originating in the duodenal mucosa. The normal stimulus for the discharge of bile into the duodenum previously stored up in the gall-bladder is derived from the peptones and albuminoses present in the acid chyme. These chemical messengers or hormones give the signal for the ejection of bile by causing a relaxation of Oddi's muscle at the same time that the musculature of the gall-bladder and ducts is stimulated to active contraction.

It is important to grasp the normal physiologic function of bile storage and bile discharge as explained in this manner for the reason that the application of magnesium sulphate to the duodenal wall produces an effect similar to that of the protein end products during the regular course of digestion. When placed in contact with the duodenal mucosa in an approximate strength of 25 per cent, the magnesium sulphate produces a prompt inhibition of the common duct sphincter with a simultaneous contraction of the gall-bladder and duct musculature resulting in the expulsion of the accumulated bile. The effect of the drug has been found by Lyon to last as long as one hour, a time certainly sufficient to produce a complete drainage of the entire biliary system.

Before proceeding to the discussion of the clinical possibilities involved in this method, it is necessary to record in detail the various steps employed in the procedure. As a preliminary, thorough asepsis should be secured of all the apparatus used. Prior to the introduction of the duodenal tube, the mouth and throat should be rinsed with a 1:10,000 solution of permanganate of potash, and, when the tube has reached the stomach, this organ should likewise be irrigated with the same solution, care being taken to aspirate the full amount of permanganate solution introduced. The tube is now fed to the patient very slowly until the required length

has been reached. Usually within a space of fifteen minutes to two hours, the tube will have found its way into the first portion of the duodenum. The entrance of the tube into the duodenum is signalized, as a rule, by the appearance of a clear, light yellow fluid of sirupy consistency.

We have adopted the plan of collecting this secretion into a sterile glass container which we have labeled "Bottle Number 1." With positive evidence at hand that the tube has entered the duodenum, the patient is now ready for the next step in the procedure, namely—the introduction of 100 c.c. of a 25% solution of magnesium sulphate, properly sterilized and heated to a body temperature. After a lapse of approximately five minutes, aspiration is now begun into another sterile glass flask labeled "Bottle Number 2." The first fluid obtained in this flask is usually of a pale yellow, canary color from an admixture of bile with the magnesium sulphate solution, but, within the space of a few minutes, the color is observed to suddenly deepen to a darker shade, merging finally into a dark brownish hue. There is also a perceptible increase noted in the viscosity of the two fluids. The amount of this darker bile obtained varies from 20 to 150 c.c., and, judging by its physical character and other criteria is undoubtedly representative of the biliary contents of the gall-bladder. The time consumed in collecting this concentrated dark bile varies from five to thirty minutes, and this is followed by the secretion of a much paler fluid of considerably less viscosity. This latter secretion which, according to Lyon and other observers, represents the freshly produced bile direct from the liver cells, is collected into a third flask which is labeled "Bottle Number 3." The procedure which I have followed differs slightly from that of Lyon's in that no provision is made by him for the collection of the duodenal contents, as represented by Bottle Number 1 in our series. Because of the need of comparison in the bacteriological studies, we have thought this a necessary step in the procedure. The contents of the three flasks are first set aside for bacteriologic study, after which they are subjected to cystological and chemical investigation. It would require too much

space to enter into all the various details of these examinations. However, the more grossly interesting facts may be mentioned. While the normal bile varies in color and consistency, depending upon the segment of the biliary tract from which it is obtained, it is always clear and transparent, and of homogeneous character. In the presence of disease, these characteristics are often perverted.

This perversion takes the form of a diffuse, flocculent precipitate or of an increased secretion of stringy mucus, producing a 'cloudy' opaqueness resembling very closely the admixture of pus. Occasionally, one may note and feel gritty particles especially in the contents derived from the diseased gall-bladder. This would signify the possible presence of a calculus or of a flaky inspissation of bile that might ultimately lead to formation of stones.

In the cystological studies, we have been impressed by an increase of deeply bile stained epithelial cells in various pathological conditions. The presence of pus cells, in increased number, of course, tells its own story.

In this connection it might be stated that a mere cloudiness of the aspirated bile does not necessarily imply an admixture of pus cells or of epithelial debris. This is caused by the contact of free hydrochloric acid from the gastric chyme with the chemical contents of the bile, resulting in a turbid precipitate of lecithin, neutral fats and mucin. Turbidity in itself therefore, without microscopic control, is not to be considered a trustworthy guide to abnormal conditions.

A question of considerable importance in contemplating these studies as a whole is whether the dark, viscid bile collected in Bottle Number 2 really comes from the gall-bladder. The reasons for believing that it does are manifold, whereas a denial of this fact would completely controvert the law of contrary innervation upon which this method rests. In color and consistency, this secretion stimulates the type of highly concentrated and static bile so frequently seen at the operating table when the gall-bladder is drained of its contents. Besides, what other explanation could be given for the presence of from

one to six ounces of dark colored bile interposed between the lighter colored secretions represented by Bottles Number 1 and Number 3. As a further argument, Lyon has demonstrated that in ten cholecystectomized patients studied post operatively, the characteristic type of dark bile from the gall-bladder was not recovered, but, on the contrary, the typical secretion from the ducts passed rapidly to the pale yellow limpid bile freshly produced from the liver cells. This latter point I myself have verified in a post-operative case recently observed by me.

CLINICAL ASPECTS OF THE METHOD

If these various hypotheses rest upon a sound basis of reasoning, a number of attractive clinical possibilities are immediately made available. Lyons sums up these possibilities in an admirable manner under the following headings:

"(1) As a means of diagnosis of biliary diseases to supplement the usual clinical methods of diagnosis and the great help given us in many cases by the roentgenologist; (2) as an alternative method of treatment of many types of gall-bladder and duct diseases in which there arises a question of opinion as to whether surgery is or is not emphatically and immediately indicated, and (3) as a supplementary method of postoperatively continuing the surgical principles of drainage in those cases incompletely cured by surgical measures alone."

It is interesting to note that the first clinical use made of this method was in the treatment of simple catarrhal jaundice. Not satisfied with the usual plan of treatment employed in this group of cases, Lyon made use of a course of biliary taps in seven cases observed by him in a base hospital in France, in 1918, and found that the average duration of the jaundice was only 17 days, whereas, in 9 cases handled in the ordinary manner, the jaundice was found to persist for an average of 35 days.

He concluded from these studies that not only was the duration of the disease shortened and the symptoms more promptly ameliorated, but future danger to the biliary apparatus from the presence of static or infected bile was, to a great extent, avoided. In two of the cases, it was found possible to unplug the Ampulla of Vater at the first treatment, and in the other cases, this was accomplished not later than

the third treatment. Biliary drainage was effected in these cases every day until the bile ducts were rendered free of obstruction, and then, every two or three days until a complete clinical cure was established.

Since successful results can be thus achieved in catarrhal jaundice or simple choledochitis of the larger ducts, it is not difficult to conceive of further possibilities of the method when applied to infectious conditions in general affecting the entire biliary tract. The value of gall-bladder drainage in infections of the gall-bladder and ducts has become an established principle in surgical practice. The object sought in the surgical procedure is twofold, namely, (1) the immediate removal of the static, infected bile and (2) the gradual clearing up of a persistent infection by a constant drainage of the bile covering a period usually of several weeks. In the virulently acute infections, cholecystostomy is undoubtedly the operation of choice, and this is especially true when evidence is at hand to indicate that the infection has extended upward into the smaller biliary radicals.

Indeed, under such circumstances, removal of the gall-bladder might be productive of serious consequences, since it would prevent a ready means of egress for the infected biliary secretion. This should not be interpreted as an argument against the surgical removal of the gall-bladder, when clear-cut indications exist for this procedure, but certainly an actively acute inflammatory condition of the gall-bladder and ducts does not represent one of these indications. It is in this particular field where non-surgical aspiration through the duodenal route should find its widest scope and application. The forcible expulsion of bile into the duodenum induced by the instillation of magnesium sulphate if repeated daily over a period of two to three weeks furnishes a means of drainage simulating to an almost proportionate degree that obtained by surgical procedure.

Again, I am taking the liberty of quoting from Lyon, who believes "that by this method we can adopt in a non-surgical way the generally accepted surgical principles of free drainage as applied to some of the early catarrhal and infective conditions of the biliary tract, and I believe do it thor-

oughly and effectively, with a far better check on how effective it really is and with an avoidance of certain definite surgical risks. It cannot and need not supersede surgery—the very necessary surgery—for the removal of calculi, for the drainage of acute or chronic empyema, for the removal of the gall-bladder in gangrenous cholecystitis or when its wall or lymphatic glands are the seat of a chronic focus of infection, or of carcinoma, or for the relief of mechanical obstructions produced by adhesions, although it might be well used to supplement some of these operations and to further ultimate recovery of the patient."

Among the 30 cases in which I have employed this method to date, in ten there was a prompt amelioration of pain and other local symptoms, along with the removal of toxic features. In one case, the temperature curve receded from a height of 103° to normal after the second aspiration. (This case, incidentally, has remained free of further disturbances for a period of three months.) In one other case coming under my observation—a lady who had been a victim of chronic arthritis for several years and who had been deprived in due course of her teeth and tonsils without effect upon the arthritic condition—a ten-day non-surgical drainage of the gall tract produced immediate and apparently permanent relief. Other illustrations might be cited of clinical benefits derived among the series of thirty cases, would time permit. The purpose sought at this time, however, is merely to focus attention upon the diagnostic and therapeutic possibilities involved in the method with the hope that a more general interest and a wider application of the procedure might be stimulated among the profession at large.

The bacteriological studies made by Dr. Lanford will be made the object of an especial review. In seven of the cases followed by us autogenous vaccines were prepared by Dr. Lanford and applied in the usual manner. Our experience with the vaccine therapy in this field does not appear promising, although we do not feel justified as yet in formulating any definite conclusions in this regard.

DISCUSSION

Dr. John A. Lanford, New Orleans, La.—The bacteriological study of material obtained by duodenal aspiration offers many difficulties to accuracy as well as not a few surprises; and, although I have studied more than 25 cases, I am not yet prepared to make any positive statement as to the value of the work done.

As soon as possible after the collection of the fluid, it is sedimented and cultures are made on blood agar plates, and melted agar plates are poured in order to separate the various types of organisms. These plants are incubated and colonies studied after 24 and 48 hours. Smears are made from the sediment and studied both after simple and Gram staining, and the findings compared later with the colonies obtained on culturing.

Despite the fact that the method of collecting the fluid is open to many avenues of outside contamination, it is rather surprising that the number of viable organisms found on culturing is relatively small; so much so, that I had to change my method in an effort to better assure the growth of the bacteria, namely, by having a few drops of the material transferred directly to tubes of neutral broth from the duodenal tube. This gave me better results, but in one case all patients were negative. The explanation probably is that most of the bacteria have been killed, (1) by digestive juices remaining in the duodenum; (2) by the bactericidal action of the hormone used; and (3) by the bactericidal action of the bile itself.

In looking over the records, it is noted that the predominating organisms in the smears and cultures are staphylococci, streptococci, Gram negative bacilli of the colon type, yeasts, and a diptheroid bacillus. Pus cells were present only in about a fourth of the cases studied.

In practically all cases studied in addition to the Gram positive cocci and Gram negative bacilli, there is noted a Gram positive bacillus of the diptheroid group which may or may not have a bearing on the persistence of the irritation and infection. These diptheroid organisms are similar in morphology and biological characteristics to organisms widely distributed and found in the eye, mouth, genitalia and in tissues which are the seat of low grade inflammations and even in neoplasms. These organisms are of low grade pathogenicity and possibly gain access to the tissues only as the result of the invasion of the part by more pathogenic bacteria. Being of low grade irritation, they do not stimulate the tissues to antibody formation with the result that they persist in their growth producing only a low grade reaction but sufficiently weakening the tissue as to produce a *locus minoris resistentiae*, the result of which is that other bacteria find favorable soil. This possibility was brought forcibly to my attention by the study of a recent case in which the gall-bladder was removed. Smears and cultures were made from the scrapings from the walls with the finding only of bacteria of this group. The histological changes present were principally thickening of the wall by new connective tissue together with a small

amount of lymphoid and plasma cell infiltration in the mucosa.

The rationale of the use of vaccines in these conditions is the same as for any other low grade type of chronic infection in which the system is unable to stimulate sufficient antibodies to destroy the bacteria. It is, therefore, well founded. The great difficulty is in determining the particular organism that is the basis of the infection.

The selection of one particular type of organism having a bearing on the etiology of the condition was arrived at after noting the predominating organisms in the smear and culture and after the agglutinating property of the patient's serum had been made and clumping of the bacteria obtained with dilutions as high as 1 to 80. But even the latter test does not prove that this organism is the cause of the cholecystitis.

In those cases in which a vaccine was tried, a suspension in saline containing one billion bacteria per cubic centimeter was made and injections given at 5 to 7 day intervals beginning with the $\frac{1}{2}$ c.c. at the first dose and gradually increasing to 1 or $1\frac{1}{2}$ c.c., depending upon the reaction obtained.

It is my opinion that the direct aspiration of the biliary tract offers a means of studying the bacteriology of gall-bladder diseases and places in the hands of the clinician two methods of treatment non-surgical drainage and vaccine.

Dr. A. L. Levin, New Orleans, La.—A short time ago I read a paper on the same subject at a combined meeting of the Charity Hospital organization of New Orleans and the Orleans Parish Medical Society. In that paper I pointed out that the subject is not only of great value to the internist but to the surgeon as well, and that it is time to call a halt, so to speak, and not operate upon every case of gall-bladder disease. I believe that with this method of gall-bladder drainage, which I have tried out for nearly a year, with very promising results we can accomplish a great deal of good from a therapeutic and diagnostic standpoint. I am watching the cases which were absolutely relieved for the last eight months and there has been no recurrences so far.

With regard to the history of this method, we must give great credit to Einhorn, who demonstrated the usefulness and ease with which the duodenal contents and also bile can be obtained. He stated then that healthy bile was a golden color and as transparent and clear; that turbid or green bile designates disease. This he did in 1909. In May, 1918, Einhorn gave us an index chart of the various abdominal colors of the bile. He simplified then the method of entrance into the duodenum, and work started since then on the secrets of that part of the duodenum.

Hemmeter followed Einhorn in October of the same year and corroborated Einhorn's statement. Einhorn did not mention then that this can be used as a means of treating gall-bladder cases. He simply spoke from a diagnostic standpoint. He did not commit himself then as to the bacteriology of it. Hemmeter mentioned the bacteriological side of it and the possibility of a cure.

Meltzer, in 1918, demonstrated and advocated the use of magnesium sulphate. When food enters the duodenum it causes a relaxation of the sphincter muscle of Oddi and at the same time a contraction of the gall-bladder. A 25% solution of magnesium sulphate will accomplish the same act.

I have done considerable work the last year along these lines and have modified the method of entering into the duodenum, as described in my paper, "Medical Treatment of Gall-Bladder Disease Versus Surgical" (*N. O. M. & S. Journal*, Jan. 1921).

It is unnecessary to use in every case magnesium sulphate to cause relaxation as advised and demonstrated by Meltzer. I advocate the nasal route for the reason that it does not tickle the palate and does not give rise to any disturbance or extensive secretion of mucus, and it is easier to go in. I have also modified the tube and demonstrated it to the Gastroenterological Section of the Southern Medical Association. It is a simpler tube, and it is much easier to introduce than the Jutte tube. When the tube is introduced the patient is put first on the back, not on the side, and by means of massage the tube passes into the duodenum. It is not the water that carries the tube into the duodenum, but by massaging and stimulating the walls of the stomach to contract and also the region of the gall-bladder we get quicker results. The time allotted for the discussion does not permit me to go into further details. I wish to urge the medical profession to make further observations in this new field of medical endeavor, as my results are very encouraging.

Dr. Harvey G. Beck, Baltimore, Md.—Within the first few years the employment of the duodenal tube was largely a matter of research, but in the past few years the subject has become one of real clinical interest. Moreover, it has opened a new field in the domain of clinical medicine from the standpoint of diagnosis as well as treatment.

The history and evolution of the duodenal tube is quite as interesting as that of the stomach tube. All sorts of cumbersome and impractical appliances were resorted to before a simple stomach tube was finally adopted. Despite this fact, some difficulty was encountered in the development of the duodenal tube. As a matter of fact, it was twelve years from the time Hemmeter attempted to pass a duodenal tube by inflating a rubber bag in the stomach and passing the tube along the groove in the upper segment until the duodenum was successfully intubated. The curious fact is, after all these struggles to get into the duodenum, we hardly knew what to do when we got there, especially from a clinical point of view. However, eleven years later practical application was made in the diagnosis of diseases, the most important of which belong to the realm of the gall-bladder. In the early development of this method application was made of the tube in duodenal feeding and duodenal medication. Many years ago, when the tube was first introduced, I found it convenient to administer nauseating drugs, particularly ipecac, in amebic dysentery by means of the tube with con-

siderable satisfaction, and with comparatively little discomfort to the patient as compared with the older methods of oral administration of ipecac. The nauseating remedies, usually employed for intestinal parasites, were administered in a similar manner.

The results enumerated in Dr. Simon's paper represent the fruition of Meltzer's discovery of the fact that magnesium sulphate solution produced an effect upon the duodenal mucosa causing relaxation and evacuation of bile as described by the essayist.

Dr. Julius Friedenwald, Baltimore, Md.—I have examined the biliary secretion in about sixty cases in patients effected with gall-bladder affections during the past year according to the Lyon method and have been greatly impressed with the value of this procedure. In quite a number of instances in which cultures have been studied for me by Dr. Charles Simon, pure cultures of streptococci or staphylococci have been obtained and these have largely disappeared in a number of instances after prolonged treatment. But even more important than this is the diagnostic value of the appearance of the bile itself. The turbid dark bile containing mucus and pus, as well as cholesterol and bilirubin-calcium crystals, is indicative of biliary disturbance; and the absence of bile on thorough stimulation with the magnesium solution indicates complete obstruction of the common duct. In these cases it is interesting to note that very frequently by means of fractional analysis of the duodenal contents the pancreatic ferments are markedly diminished or absent.

A diagnostic measure, which I have observed, of considerable value, too, is the pain produced just at the time when the magnesium solution is injected which is much like a mild gall-bladder attack and is quite like the pain complained of in patients with Dietl's crisis when the fluid is injected into the pelvis of the kidney through the ureter.

In regard to the therapeutic value of this method, there can be but little doubt. In certain forms of cholecystitis and in catarrhal jaundice this form of treatment is of great value. It is especially useful, too, following gall-bladder operations when the pain or discomfort has again returned.

Dr. Harry C. Schmeisser, Atlanta, Ga.—The problem presented by Dr. Lanford of determining which one of the bacterial types isolated by him from the duodenum might be the cause of the existing acute cholecystitis, has been, it seems to me, very scientifically approached. He has applied the method which was first used so successfully by Shiga at the suggestion of Kitasato, the great Japanese bacteriologist, when the former searched the stool of cases of acute dysentery for a micro-organism which could be specifically agglutinated with the blood serum of the patient and establish thus the etiological significance of the *B. dysenteriae* of Shiga to the disease. Dr. Lanford tells us that he made use of the same procedures in this series of cases. It would seem that he is on the right track. If Shiga succeeded when isolating the organism

from the colon, why should not the method be equally applicable with organisms draining from the biliary tract into the duodenum?

One might suggest that Dr. Lanford apply the further steps which Shiga used if he has not done so, namely, determining whether the suspected organism is found in the duodenum of patients suffering of other diseases or in that of normal individuals and if it can be agglutinated by the blood serum of such people.

The technic of Shiga applied as stated might bring some light upon the etiology of acute cholecystitis.

Dr. C. G. Lucas, Louisville, Ky.—I have had the opportunity of making use of this method that has been described in thirty cases. Two of these cases have had the gall-bladder drained. In two other cases we had secondary infection of the gall-bladder following appendectomy. In all cases where this has been done the stomach relief has been wonderful.

I have been much impressed with the fact that in all these cases where chronic constipation was a marked feature great relief has been obtained by this method. Attention has been called to the fact that "biliousness" is a condition to which we have paid very little attention, and yet the introduction of the transduodenal tube will give great relief. In cases of chronic constipation we see following cholecystectomies we have a method of treatment that is of great value. I know in Dr. Simon's case with an acute gall-bladder condition, which I had the opportunity of discussing with him, the results were wonderful by this method; and it opens up possibilities that we should not lose sight of.

Dr. I. I. Lemann, New Orleans, La.—I am very glad that Dr. Lanford has approached his bacteriological results with so conservative a statement, for it seems to me as valuable as we may consider the method from a therapeutic standpoint we should look with considerable skepticism upon the statement that we can actually determine the bacteriology of the gall-bladder through the duodenal tube. Some of the difficulties Dr. Lanford has already described may be due to the inhibiting action of the bile and of the gastric juice upon the cultures. Added to that, it seems to me, we must consider the difficulty of obtaining cultures direct from the gall-bladder uncontaminated by the bacteria which necessarily are in the saliva, and I do not think this objection can possibly be overcome by the irrigation of the mouth and the stomach with any antiseptic solution. I can hardly look upon this procedure as analogous to that of the three-glass test of urine, where the diagnosis depends upon the finding of macroscopic shreds. That is quite a different matter from determining the bacteriology of the urine after voiding it in three different glasses for collecting bile or duodenal contents in three different bottles.

Another aspect to which I would like to direct attention is the fact that the use of salines, magnesium sulphate and sodium sulphate is not new; that there is perhaps no great difference between the putting of saline solution through a tube into the duodenum and putting the saline in by way of the mouth and stomach directly into the duo-

denum, which is a well known and very old method. It would seem, therefore, any value the old treatment had might be explained according to the newer ideas of physiology regarding the relaxation of the sphincter in the duodenum. What I have said, however, is not to be interpreted as meaning that I am at all skeptical as to the value of the new method. The small experience I have had leads me to believe that the method is of great advantage, and that it has more advantages than the administration of salines by the mouth. The only place where I part company with the gentlemen who have spoken is that I do not believe we can obtain any valuable information as to the bacteriology of the gall-bladder, so that we can attempt to treat these conditions successfully by a vaccine. I do believe we can get valuable results by internal non-surgical drainage of the gall-bladder.

Dr. Simon (closing).—I rather expected to find more objection voiced to a method so new as this is.

In regard to this method of treatment, I would not detract from Einhorn's great labor in devising the duodenal tube or from his early investigation upon examination of the duodenal contents. However, Einhorn's work in attempting to determine the state of disease in the biliary system to the gross infection of the aspirated bile as obtained directly from the duodenum I think was not based upon so strong and definite a scientific basis as is the new method of Lyons. Einhorn depended entirely upon the physical character and particularly upon the cloudiness of the aspirated contents for his determination of diseased conditions of the biliary tract. It has been since determined that cloudiness of the aspirated contents in itself has no special significance, but it is due to the precipitation of certain chemical elements in the bile by the contact of the hydrochloric acid of the gastric juice with the bile in the duodenum.

My objection to nasal intubation as a routine measure is based to a great extent upon aesthetic grounds.

I do not quite agree with Dr. Lemann that some degree of sepsis can not be reached by thoroughly rinsing the mouth with 1/5000 solution of permanganate of potash. Dr. Lanford will bear me out in saying that we have reduced septic infection of our biliary secretions to a considerable extent by the procedure of washing out the mouth and rinsing the throat thoroughly with antiseptic solutions of permanganate of potash.

Dr. Lucas mentioned the term "biliousness," and Dr. Lyon, in taking that old term up in a serious and most interesting way, has shown that biliousness, after all, means static bile and has no direct relationship with the evacuation of the bowel as was formerly believed. It would take too long to go into and elaborate that part of the subject. I would suggest a careful reading of Dr. Lyon's article which appeared in a recent number of the *American Journal of the Medical Sciences*.

In regard to the use of salines by mouth, Meltzer originally called attention to the ineffective-

ness of salines upon the biliary system as administered by mouth. In subsequent observations which I have made, among others, I have found that the swallowing of magnesium sulphate by mouth does not produce the effect of dilating Oddi's muscle and simultaneously contracting the gall-bladder musculature, such as obtains from direct instillation of the magnesium sulphate in the duodenum, nor does sodium sulphate act in the same way as magnesium sulphate. The latter has a specific action in that respect which is not shared by any other salt. Meltzer devoted a good deal of time in studying the effect of magnesium sulphate on the human economy, and this represents one of the practical results of his studies.

PEDIATRIC PRANKS*

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Except to the observant, experience is not much of a teacher. After eighteen years of specializing, fifteen of which have been devoted exclusively to pediatrics, the writer feels that he would indeed have been a passive individual had he not arrived at opinions which are at variance not only with the opinions of some of his colleagues, but also at variance with opinions previously held by himself. I have no desire to be regarded as the Nestor or as the Scold of Southern pediatrics. I can at least claim to be one of its pioneers.

I.

I started into the practice of pediatrics with the rather cock-sure conviction in regard to infant feeding that God or Nature or whatever you may choose to call Him was easy of imitation. The artificial feeding of infants was a difficult problem only for the untrained in ingenious methods of modification or the unschooled in mathematics.

The learned pediatrician, by a sliding scale test, could calculate the digestive capacity of each infant with such nicety that he knew even to the tenth decimal fraction the amount of any given food element which should be used in his formula.

It was a beautiful system! For a long time it seemed to me that nothing else could be so perfect, nothing else so scientific.

It looked so good and it worked so well for so large a number of babies that I felt sure the very last word in infant feeding had been said. It is true that I occasionally met a baby whose stomach rebelled at being regarded as a test tube. At first I was inclined to believe that this was due to his perverse nature. As practice grew, however, I came in contact with more and more of these perverse or perverted stomachs. I became puzzled. I began to observe other pediatricians—men whom I regarded as being almost as good as myself—and I discovered that they, too, were having troubles.

Some of the babies were passed along from one to the other of us with the parental hope that somebody would be able to get the baby's number, whether it be .05 per cent fat or an equally infinitesimal amount of protein which was causing the formula to misfit.

Discouraged and perhaps disgusted with doctors, the parent sometimes turned these difficult cases over to a negro mammy, supposed to be either wise in the feeding of babies or able to conjure the infant's digestive apparatus.

Any one who is intimately acquainted with the Southern negro mammy and who knows her bizarre methods of feeding is compelled to admit two things:

First, in the feeding of infants she is a worthy competitor of the erudite and scientific pediatrician. She is as competent as he both in hiding failures and in advertising successes. She gets by with almost an equal number of cases. Any reflection on her ability or any question as to her knowledge will arouse the same resentment as is displayed by the doctor who suffers a like indignity.

Second, many babies are born which are hard to kill. Even after passing through the intricacies of percentage feeding and then on into the mysteries of voodoo and hoodoo, many of them live to become sturdy little individuals of pink and roly-poly happiness! I can verify the authenticity of a case which, after having been tried by many doctors on many and various formulae, persistently continued on its marantic career until all other food was stopped and the baby was fed on the oil off canned sardines!

*Read in Section on Pediatrics, Southern Medical Association, Fourteenth Annual Meeting, Louisville, Ky., Nov. 15-18, 1920.