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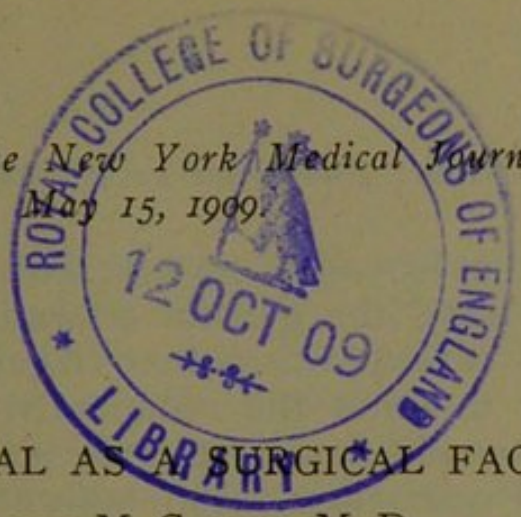

THE INDIVIDUAL AS A SURGICAL FACTOR.

By Antonio M. Crispin, M. D.,
New York.

The following remarks have been prompted by the recent discussion on the preparatory treatment of patients. The diversity of opinion among the honored chiefs in surgery is such that a review of the facts seems to be worthy of our attention. They are divided into two camps, those who advise a thorough and extended course of preparatory treatment and those who condemn everything in the nature of delay, and who rush patients into the operating room, probably after a mere cursory examination of the urine.

During many years I collected notes on the reciprocal influence of diseases and traumatism, either produced accidentally or intentionally, not with the intention of publishing them but for my own guidance. Finding now such disparity of opinion it is manifest that it may interest others.

It is a dangerous error to undervalue the constitutional disturbances which underlie many surgical diseases, and it is a useless nicety to establish a distinction between a diathesis and the lesion which they produce; it is a well known fact that wounds are very dangerous in persons who are suffering from certain general diseases, such as diabetes, malaria, syphilis, general intoxications, either from internal or external sources, as those from the intestines, alcoholism, saturnism, etc., conditions all, which may eventually cause alterations of the liver, heart, or kidneys. Alcoholism has only to be mentioned to

evoke that dreaded postoperative sequel, delirium tremens, and the general alterations of the organism, for it is a truism that chronic alcoholism profoundly modifies the recuperative process. These morbid conditions have a decided influence on all surgical operations, even before the lesions which they produce become appreciable.

To trust blindly in our perfect asepsis and in our excellent technique, overlooking other factors which are of no less importance and influential in the final outcome, does not seem to comply with that exactitude which modern surgery demands. Any treatment, to be perfect, and we are all striving to attain perfection, must take in consideration the individual's physical and psychic peculiarities; his temperament, his sex, his age, his ideas, and habits; in one word his personality. Remembering that a patient is not merely a subject of interest as the victim of some morbid process, offering opportunity for the display of surgical audacity, but an organism possessing the attributes of humanity, that a patient is a man for a' that, and as such he should be treated and studied in his manifold variations and individual traits.

The great progress of modern operative surgery has been accomplished by close attention to minute details, and a more extended recognition of the laws of causation is essential to its further advancement. The modern surgeon has to be a "superman," he must know all, seek all, control all that relates to his patient. Nothing left to chance. Surgery must take cognizance of all details, however trivial they may appear, before, during, and after operations. There are several motives for this undue haste, the first is the *pruritus operandi* so prevalent nowadays, and secondly that "interesting and ever present question," as Dr. H. C. Coe would say; for if it be

a paying patient, the sooner he is out of the hospital, the quicker will he show his gratitude to the surgeon, and if a charity one, the earlier he be discharged the better for the institution.

This preoperative preparation of the patient has reference to those cases which are to undergo a major operation and in which time is at our disposal. Of course it does not include the emergency operations, the so called imperative operations, where the nature of the cases is such that we have to interfere immediately to save life. The constitutional states which have to be corrected or eliminated if possible before attempting any surgical procedure, are here given in the order in which it appears their gravity demand.

Renal Insufficiency.

Probably no other function is of so much importance to the surgeon, if we except the heart, than the renal elimination, and surely nothing has been more radical, nay, almost revolutionary, than the advances recently made in the conception of its pathology.

It has been demonstrated that the excretion by the kidneys offers an invaluable guide to the condition of the system in general, and that the estimation of the functional capacity of this great emunctory is of vast importance in determining the conduct of the surgeon. Not only in diseases classified as nephritic but in every other disease, even without any demonstrable lesion of the kidney, is the estimation of this function of value. The urine may be absolutely negative as to albumin or cast, but suppression of urine may supervene after operations, especially in persons who have a weak or fatty heart, or in whom the system is below par as the result of any chronic disease or inflammatory condition of the liver.

It has been conclusively shown within the last few years, that our knowledge of the functional insufficiency of the kidneys, as disclosed by the total output of urine in the twenty-four hours, is by far more important in estimating their true condition than the presence or absence of albumin or cast. The great merit of having first directed the attention of the profession to this important question is due to the late Dr. James E. Etheridge, of Chicago, who some years ago noted "the close relation, even that of cause and effect, existing between renal insufficiency and pelvic disorders." He also had compiled excellent working tables, for clinically estimating the functional efficiency of the kidneys, which I reproduced in an article on Renal Insufficiency published in the *New York Medical Journal* of August 20, 1904. Since then this fact has received additional corroboration from the observations of Dr. R. C. Cabot,[1] of Boston, who says: "What I wish to especially emphasize is that the *evidence of irritation albumin and cast,* is not evidence of nephritis which may or may not be present. Hence the folly of sending a urine to a laboratory or to a urologist for diagnosis, or for anything more than a description of what he finds." And in the notable contribution of Dr. Charles P. Emerson of Johns Hopkins, who presented them to The American Medical Association, at the meeting in Portland, Ore., in July, 1905, and published in the *Journal of the American Medical Association* of January 6, 1906, Dr. Emerson, who has especially attended to this subject, bases his conclusion on 1,000 cases with 500 autopsies of supposed diseases of the kidney, has demonstrated the great difficulty in diagnosticating a nephritis from the characteristics of the urine alone. Of diseases grouped under the term Nephri-

[1]Cabot, *New York Medical Journal,* May 12, 1906.

tis, Dr. Emerson found that out of eleven cases of extreme chronic, passive congestion without any microscopic evidence of nephritis postmortem, eight were clinically diagnosticated as nephritis. Thirteen out of 109 cases of acute nephritis were recognized first at autopsy. One in every four was wrongly diagnosticated. In forty-six of 104 cases of chronic incurable nephritis (or forty-three per cent.), the diagnosis was not made in life. The presence of cast and of albumin in the chronic interstitial nephritis has been much overrated. Dr. Emerson continues: "The cast may be a good index of the present state of the cell . . . . but gives absolutely no clue to the process behind that condition of the cell. In fact, it seems as if the cell of a normal kidney could give a more brilliant demonstration of their disturbed condition by a more brilliant output of cast than could those of a diseased kidney: Diseased kidneys seem to become accustomed to their condition."

These facts show decisively that the methods generally employed merely give the roughest sort of information, and how difficult it is to predicate the actual condition of the kidneys by the customary examination now in vogue.

The question which the surgeon has to answer is How are the kidneys functionating? Is there renal inadequacy? The cumulative evidence since that question was propounded is of such a nature as to serve rendering the facts more clear. The surest way to know whether the kidneys are working properly, and that there is any toxic retention with its consequence, is by the quantitative valuation of the solids voided in the twenty-four hours. In the irritation of the kidneys, as Dr. Cabot calls it, in inflammations, be it acute or chronic, or in insufficiency from whatever cause, there is retention of

the excrementitious products, and the solid materials of the urine are represented by lower figures; according to this falling it indicates the power or elimination of the kidneys and shows when oliguria or anuria are imminent. It is a well known physiological fact, that the amount of water in the urine voided is subject to great variations, depending on the quantity of water ingested, but the amount of solids in the urine has a certain fixity in health, and that any increase or diminution of which indicates some abnormality and is pathological. The proportion of solids in normal urine bears also a certain ratio to the normal body weight, below which it can not fall without indicating embarrassment of the renal function. Taking this as a basis, Dr. Etheridge had a physiologist to construct two tables of the relation of the body weight of healthy human beings to the total excretion of urinary solids. One of the tables was for women who naturally exercise less, and the limit was fixed at 500 grains for a woman weighing 90 pounds and 1,100 grains for one weighing 180 pounds, or at the rate of 35 grains for each additional five pounds or seven grains to the pound. Collecting and measuring the urine of the twenty-four hours, the total amount of solids can be easily reckoned by Haine's modification of Haeser's method, which consists in multiplying the last two figures of the specific gravity of the urine by the number of ounces voided in the twenty-four hours, and adding ten per cent. to the product. Thus, if the amount passed in the twenty-four hours was 36 ounces, and the specific gravity 1.021 it would be 36x 21 = 756 + 10 per cent. = 831, the amount of grains of solids in the whole quantity. By referring to the tables it can readily be seen whether this is above or below the normal amount. This is an easy and accurate clinical procedure which can be convenient-

ly employed by all, superior to the cumbersome methods of the laboratory. It is superior to the von Norden's method, of large injections of water, although it can be used in conjunction with it, and also more certain than the employment of drugs, such as methylene blue or iodine, given with the purpose of testing the eliminative power of the kidneys. None of these means will answer as well and as faithfully as the one herein advocated. It is clear that if a patient is eliminating, let us say 150 grains of solids in the twenty-four hours, when he ought to pass 1,100 grains, there is a very serious condition present, and to subject such a patient to an operation under the circumstances is fraught with grave danger.

There are certain symptoms occurring during pregnancy, of a menacing nature to the life of the mother, in which the question of the induction of premature labor may have to be considered. Symptoms which the chemical and microscopic uranalysis fail to announce, but in which the total valuation of the solids, together with other symptoms which denote an impending eclampsia, may throw a flood of light as to the indication of inducing labor.

Renal insufficiency is one of the predisposing causes of shock, and close attention, before operation, to the eliminating power of the kidney, will do much toward guarding against this calamity.

Asthenia.

The apparently inexorable character of economic laws, which condemn thousands of laborers to a cramped and miserable existence, and thousands more to semi-starvation, is responsible for many of the failures encountered by the surgeon in his work. For in the nature of things, most of our patients are recruited from the ranks of the tired and underfed.

The evil effect of overwork and poor feeding, although known, has not received the attention it deserves, specially in the way of the previous preparatory treatment of the patient who is to be put to the crucial test, undergoing a severe strain on his already exhausted reserve forces.

The question of the nitrogenous equilibrium is of great importance, especially among the poorer classes of the community in whom the output of nitrogenous matter from the system far exceeds that taken in by way of food. This nitrogenous waste is so great that it lowers the individual to a physiological misery, in which he is hardly able to withstand any additional strain upon his powers. In the well fed, healthy person, the store of glycogen within the organism is kept at a level amply sufficient to meet the requirements of the system, and even if on any occasion the daily supply falls short, there is the fat stored within the body, which can be easily drawn upon as occasion requires. The experimental researches of Schulz have shown that the amount of fat in the body is no measure of the resistance of the organism when the food is insufficient. In every case it is the lack of proteids that causes death of starving individuals. In the poorly fed organism, when the other two sources of supply are exhausted, the daily expenditure is met by drawing from the nitrogenous tissue of the body with great diminution of energy and strength. The normal output is from fifteen to twenty grammes daily (Grainger Stewart), and in this case it rises to thirty or forty grammes.

Overwork by lowering the resistance of the tissue favors microbic infection, and is thereby a surgical factor of no mean importance.

It was demonstrated long ago, by Charrin and Roger, that fatigue diminishes the resistance to mi-

crobic diseases, and this they proved by the simple experiment of subjecting several guinea pigs and rats to excessive work. They constructed a drum or cylinder, similar to those attached to the cages of squirrels, forty centimetres in height by one metre in diameter, carefully protecting its interior so that the animals could not injure themselves. It was arranged so that the animal had to walk in the opposite direction to the movement communicated to the cylinder, which moved at the rate of 2,260 metres per hour. In this way they were made to undergo fatigue. Different species behaved differently, and showed an unequal resistance to the exercise.

Thirty-six rats were used in this experiment, sixteen of which served as controls; the other twenty-one were subjected to excessive labor. Two microorganisms were employed to inoculate, the bacterium of carbuncle and the bacterium of symptomatic carbuncle. After the lapse of twenty-four hours, those which had been overworked died, while the controls lived to the fifth day, and to kill them, they had to be injected repeatedly and very large doses used. The dead animals presented the following lesions: The intestines were congested and full of diarrhœal liquid; the urine contained albumin, and in some cases the parenchyma of the liver hardly contained any glycogen. These animals are normally refractory to this bacteria, nevertheless they were found even in their tissues.

Fatigue has a very marked influence on the structure of the nerve cells, which was investigated by Guido Guerini, *Lancet,* October 21, 1899. His experimental study in dogs showed extensive alteration in the nerve cells, with increase of the pericellular lymphatic spaces and decomposition of the pigment mass.

These are weighty physiological reasons which emphasize the great importance of the proper preparation of the patient in the way of rest and food. It is of moment to-day, when the "gospel of strenuousness" has been preached on all sides.

There are those who advocate immediate operations, ambulatory treatment of fractures, and quasi ambulatory treatment of laparotomy cases, which they state ought to be out of bed on the second or third day, forgetting the danger of hernia, phlebitis, and thrombosis. Rest is as essential before as after operation, for at both times it is highly conducive to the repair of wounds. In this connection we can well recall the advice of Dr. H. Cushing, that patients of advanced years be kept in bed a few days before operation, to test their ability to endure recumbency and to train them to void urine in this position. This practice ought to be followed with every patient, be they young or old. With the feeble it is imperative as with all, for if nothing else, it will increase their postoperative comfort. There is no better cardiac tonic than rest, it is a balm to the overwrought nervous system, the best regulator of the circulation and thereby increasing the function of the kidneys. It husbands the forces of the organism, and is an invaluable aid to aseptic surgery.

Autointoxication.

Science is so correlated that progress in one branch is certain to influence the others. Surgery has profited by the stimulus given it by physiological advances, and we can truly say that it is now entering a new era. The tendency is in the direction of a better appreciation of physiological facts, and their application to the surgical art. Nowhere else is this so marked as in abdominal work. Here the due appreciation of the doctrine of phagocy-

tosis and opsonic reactions is swaying the conduct of surgeons, and the time is not far distant when patients will be prepared for operation by routine immunization with vaccines which control the causes of infection, or prevent their development. This is now done in those communities where tetanus is endemic.

With a better understanding of the ductless glands, due to the great work of Dr. Sajous, of Philadelphia, a new horizon is visible; and when we learn to control the function of these glands, a decided advance will be accomplished. The role played by microorganisms which normally inhabit the alimentary canal is becoming more appreciated. The two principal microbes with which we have to contend in the digestive tract are the *Bacillus coli* and the *Staphyloccocus aureus.* How to control their number and virulence is a problem of the greatest importance, specially in operations of the stomach and intestines.

Intestinal putrefaction is one of the most prolific causes of autointoxication and is one of the notable advances in pathology due to the admirable researches of Bouchard. This intestinal autointoxication is due to the action of bacteria both upon the proteids and the carbohydrates which induce putrefaction which may be either proteolytic or saccharolytic. In the proteolytic digestion certain ferments are obtained as byproducts forming indol, skatol, etc.; and in the saccharolytic fermentation no indol is produced but ethereal sulphates. Putrefactive organic matter produces at times certain alkaloids which are the most deadly known poisons, causing death even in infinitesimal quantities. Even in its milder forms, intestinal toxæmia predisposes to sapræmia, septichæmia, and even pyæmia, and in many instances the bloodpoisoning manifested by surgical

patients is not due to the surgical wound, or to the neglect of asepsis, but rather to the failure of having previously corrected this condition. We have to consider the enterogenic toxines as ætiological factors, but also the possibility of their being the causes of a continuance of the symptoms after the more generally recognized and accepted causes have been overcome. It is true that intestinal intoxication may sometimes be interpreted as an effort of elimination by the development of a skin disease, and also on another occasion as a choroiditis or uveitis.

The symptoms of intestinal autointoxication not unfrequently closely simulate other diseases, such as septichæmia and typhoid. In intestinal putrefaction these products of a toxic nature possessing a hæmolytic action prevent or retard the healing of wounds, and on other occasions exert their influences on the nervous system, according to the *locus minoris resistentiæ.*

The urine should always be tested for indican, and when it is present it should receive serious attention, although indicanuria may exist for years and be compatible with a perfect state of health, especially when the tissues are unimpaired and able to cope with them, the system eliminating rapidly all this toxic matter. The individual may establish a tolerance to these bodies, which may be interrupted or suspended when he suffers any severe traumatism.

Until now our resource for the control of these bacteria and toxines has been limited to the action of cathartics, regulation of diet, buccal asepsis, and intestinal antiseptics. Valuable means no doubt, but not wholly efficient.

The ingenuity of surgeons and specially of the American surgeon, who is to-day foremost in abdominal work, has been in the direction of prevent-

ing infection, by cleverly contrived devices to shut off the intestines between the parts which are to be resected by means of forceps, ligature, etc. A good deal is accomplished in this way, but an aseptic operative field is not obtained. The method proposed by Metchnikoff of substituting the noxious microbe with an inoffensive lactacid one, administered in the form of a scientifically soured milk to control and arrest intestinal putrefaction, deserves a more extended trial than what has been given it. It is easy of employment and it serves as a food and as a corrective to the intestinal flora.

In operations of the large bowels, an extended preparation of the patient is becoming more generalized, and in a recent number of the *New York Medical Journal,* September 5, 1908, Dr. J. P. Tuttle asserts that the lower mortality in his recent series of cases is more largely due to this than to improved skill in operating. He now prepares his patients a full week or more instead of three or four days, as previously.

In addition to the regulation of the diet, and of all the other means necessary to eliminate as many as possible of the colon bacillus, the recommendation of Dr. P. E. Truesdale, of Fall River, Mass., is full of promise. Dr. Truesdale advises an immunizing dose of stock vaccine to be given, basing his suggestion on the opsonic theory on which the vaccine therapy has been laid down by Wright and others. He advises that immunizing doses of from 0.5 c.c. to 0.25 c.c. of the vaccine be administered before operation in cases of acute infection of the bile duct, pancreas, and of the large intestines; for it is found that the colon bacillus is the common cause of the infection. We may thus, possibly, control the acute infection and operate during the interval.

The flushing of the system with water, days before the operation, is another effective means of diminishing the number of these organism. Water dilutes and aids in the elimination of the injurious ferments produced by these bacteria, which act chemically on the tissues. It has, besides, the property of preventing the tormenting thirst so often complained of by patients after operations. The suffering caused by depriving patients of water, after a laparotomy or herniotomy, is a thing that can not be recalled but with regret. From the early days of modern abdominal surgery, the established principle has been to deprive the patients of water, and until recently their burning thirst, their dry and parched tongues, and their ineffectual cry for "just a little water" was met with the mockery of a piece of cotton moistened with water. It still lingers in my mind, the plaintive pleading of a man, eighty years old, upon whom I had to operate for a strangulated hernia. His tormenting thirst could not be quenched by the few drops of water given him. He watched for the opportunity to get out of bed, and spying a bottle of whiskey at the other end of the ward, drank its contents, which was more than half a bottle. There was a recurrence of the hernia, stitches torn, and death from collapse. Fortunately to-day the canon of "water externally, internally, and eternally" has a recognized position, and the administration of saline solution, by intravenous, intraperitoneal cellular, and rectal methods, are extensively used to combat shock and hæmorrhage. The first one to use large injection of saline salution intravenously was Latta, of Leith, who in 1830 conceived this bold idea.

These procedures are to-day securely fixed in the routine of every surgeon as a postoperative procedure. But why not use it before operations, so

as to anticipate those terrible twins shock and hæmorrhage?

The filling up of the lymphatics, to the physiological limit, by the administration of large injections of water by way of the rectum, before operations, has a salutary effect on the final result. This water will be absorbed and will help keep the vascular tension within the norm, it will replace the lost blood, and help to eliminate toxic substances, stimulating every function of the body, for without water they can not be performed. It may be feared that this increase in the liquids of the body will favor hæmorrhage, but experience has proved the contrary. The facility of its employment is another important point. Following the customary catharsis, and the regulation of the diet the patient should be instructed to drink water freely, and large high rectal injections be used several days before operating. After the operation, the method of Dr. Murphy, of Chicago, of continuous rectal irrigation may be continued.

Hepatic Insufficiency.

More than a quarter of a century ago, Verneuil wrote: "We shall understand what weight hepatism possesses in the question of surgical indication, and we shall wonder that a fact of such gravity should have for so long a time remained unrecognized." And to-day we are still wondering that no great progress has been accomplished in this direction. The influence which hepatic disease may have on the termination of surgical diseases is a subject hardly mentioned by the authors, and the importance of hepatic insufficiency is nowhere treated in extenso.

There is no doubt that this unique gland, which has no analogue in the system, must have an

important influence in the final recuperative process, and when we consider its varied functions, urogenous, chromatogenous, glycogenic, and the detention and destruction of toxic intestinal substances, there is no good reason to suppose that it has not a prominent influence on surgical operations. Not only of those diseases of the liver or gallbladder itself, but of every other part of the organism. All chronic and progressive lesions of the liver, from whatever origin, converge sooner or later to the same end, the degeneration of the hepatic cells with the abolition of its multiple functions or hepatic insufficiency. The urogenic function of the liver is probably the most important. Hepatic urine is generally scanty, hardly reaching one quart in the twenty-four hours, dark in color with a reddish uratic deposit. There exist with this oliguria a more serious phenomenon, the diminution of the quantity of solids, and this progressive diminution is of the most grave prognostic value. I have said elsewhere that the kidneys are in affections of the liver, like a barometer, by means of which we can prognosticate the outcome.

This need not apply solely to those extreme cases to which Dr. C. G. Cumston refers in a very interesting article, The Frontiers of Death in Surgery in the *New York Medical Journal,* July 28, 1906, in which he says: "Generally speaking oliguria and anuria indicate that a patient is *a noli me tangere* and consequently should not be interfered with surgically." These patients are in extremis and everything will be useless. But in other conditions in which there does not exist such absolute anuria, in which the liver seems to have lost its oxidizing powers momentarily, with subsequent retention of the excrementitious products, as expressed by lower figures in the total amount of urinary solids, every ef-

fort should be made to correct this before interfering surgically.

As the liver partakes of or reflects the general condition of the system, the estimation of its functional capacity is of importance even independently of the lesion of the organ itself. It has been said that the toxæmia depends on an acid intoxication, and retention of the cholesterine, the bile being generally alkaline, but Bernard found it to be sometimes acid in dogs and rabbits on whom he operated, this was probably due to the severe operation which these animals underwent. It has also been noted (Flint) that anæsthetics and irritating vapors produce alteration in the glycogenic function of the liver, producing a diabetes which has been attributed to the irritation conveyed to the nerve centres by the pneumogastric which is then reflected in the form of a stimulus to the liver. This shows that the functions of the liver can be influenced through the nervous system, which may stimulate or depress it. Much confusion exists on the subject of jaundice. There is a clinical tradition that certain morbid conditions are accompanied by a predominant symptom—jaundice—which generally terminates in a complete cure, while another ends generally in death. This was the ancient division into simple and grave jaundice. Osler divided those cases into a hepatogenous and hemotogenous jaundice, according to the supposed location of the trouble. The great difficulty is in the dividing line between the two forms, clinically we know that behind the jaundice, be it simple (benign) or grave, there is a condition which is essentially toxic and that its gravity depends on two factors, the degree of alteration of the hepatic cells, and the degree of renal permeability.

The best defence of the organism against this autoinfection is the kidneys, and we know that if

a patient continues to urinate, the urinary and toxic crisis will terminate favorably. Simple jaundice is the one in which the renal function is sufficient, and is produced by many causes, especially the propagation by continuity of a gastroduodenal catarrh as was first described by Virchow. Grave jaundice is that in which the integrity of the hepatic cells is altered anatomically and functionally, with insufficient renal excretion. Of this grave jaundice there are two types, the primitive, which is a rare disease, due to some unknown pathogenic agent, which attacks individuals in perfect health; and the secondary grave jaundice, which is the most common and which may supervene on a preexisting jaundice; it is observed in hypertrophic cirrhosis and often follows a lithiasis, a cholangitis or any retention of bile. This very old nomenclature of simple and grave jaundice has the advantage of being uncomplicated with any theory, although by no means exact, in the present state of our knowledge, it is as good as any and better than many. It is weak inasmuch as it does not include those cases which lie between the two groups and for which it was proposed the name of semigrave. But, provisionally, this division is the best, meeting the surgical requirement.

It is difficult to generalize on a subject compact of individual cases, specially with insufficient data, but the capital question is, what is the condition of the hepatic cells? How are they functionating? Is there insufficiency? For after all, it all hinges on the number of hepatic cells which remain unimpaired, and on the efficiency of the renal function.

The presence of grave jaundice is generally a contraindication to operation, for besides the changes in the blood, the kidneys become affected, the blood appears to have lost its power of coagulation or this

power is markedly delayed. The anuria may not supervene immediately, but a few days after operation and jeopardize the life of the patient. An icteric person takes the anæsthetic badly; the respiration is often interrupted during operation, with great danger to sudden death. Many remedies have been proposed to increase the coagulability of the blood, such as large doses of calcium chloride, gelatine, and adrenalin, and notwithstanding the distinguished authorities who recommend them, it has proved futile in my hands.

There are two things which can not be sufficiently emphasized, the precious information which is to be gained by the valuation of the total amount of urinary solids, both for diagnostic and prognostic purposes, and the great danger attending operations when grave jaundice is present.

Glycosuria.

The presence of sugar in the urine is of considerable importance to the surgeon. A patient may not have an established diabetes, but the existence of sugar in his urine is of grave omen. It is well known since the time of Verneuil, that certain gangrene, ulcer, and furuncular eruptions are intimately connected with diabetes and that they can not be cured until all the sugar has disappeared from the urine. At present the ætiology of glycosuria is still unsettled. Diabetes may be considered a cryptogenic disease, possibly having multifarious causes, often traced to some abnormality of metabolism. When permanent it is a cellular disease, having some similarity with gout. Diabetes frequently follows traumatism, especially those of the head, also tumors of the cerebellum. It is not necessary for the tumor or the traumatism to involve exactly the floor of the fourth ventricle and thus realize the experiment of

Claude Bernard. It has also been observed in other injuries besides those of the head, as in fracture of the long bones. This glycosuria is generally of a transitory nature, lasting but a few days. In the traumatic variety the glycosuria has shock for its principal ætiological factor, especially concussion of the cerebrospinal axis. It has been said by Kausch, that in addition to the mechanical concussion of the body, the psychic effect of trauma, causing mental shock, is capable of determining a glycosuria.

Diabetic patients constitute a dangerous class, and surgical interference must be limited to emergency cases where the exigency of the condition is such that operation cannot be withheld, as in intestinal obstruction, strangulated hernia, or gangrene. The percentage of sugar needs not be large to cause death, and I have seen a fatal termination by coma following a rapidly formed herniotomy, and where a very small amount of sugar was obtained. The slightest contusion or abrasion, even the most insignificant wounds and punctures, are liable to produce in diabetics, extensive sloughing and gangrene. The moderate pressure of the shoe I have known to produce gangrene of the toe. Prophylaxis is therefore imperative in diabetics, who should be warned as to the danger of small wounds. The absence of sugar in a diabetic is no security against postoperative coma, and a case is cited where coma supervened after operation in a patient whose urine had been free from sugar for two years (Halstead).

It is said by some that the presence of acetone and oxybutyric acid, and especially the ammonia, is of greater significance than the amount of sugar.

Besides the danger of the traumatism, the anæsthesia itself is a source of grave peril to diabetics. Beesly has called attention to an acute anæsthetic acetonuria, occurring even in nondiabetics, which

causes symptoms after operation, sometimes followed by death, which are either unaccounted for or are attributed to wrong causes, and which are due to an acid intoxication of sudden occurrence and of variable intensity originated by the anæsthetic and indicated by the degree of acetone in the urine. Diabetics are especially prone to this acetonuria, and therefore, when possible, local anæstliesia should be given the preference.

Be this as it may, one thing is certain beyond peradventure, that all surgical intervention on persons having glycosuria should be treated with the greatest circumspection; for not only is there danger to fatal coma, but the existence of sugar in the blood results in arterial sclerosis and trophic nerve degeneration, which causes a lower power of resistance of the tissue, favoring infection and preventing the healing of operation wounds. The administration of alkalies has been recommended to neutralize the acidity, and the sodium bicarbonate has been extolled, but nothing diminishes the sugar so rapidly in diabetics as the use of the sodium salicylate, which unfortunately is not permanent. Very large doses are well tolerated and it may be used with advantage at critical times to stop the waste. The question arises, what is the best course to pursue when gangrene has set in? What shall we do? This question has not been satisfactorily settled, but the consensus of opinion is to operate under local anæsthesia, avoiding general narcosis if possible and to amputate when the line of demarcation is well marked, and to cut far away from the gangrene, and to do it as rapidly as possible. It is necessary to go beyond the obliterating endarteritis and phlebitis which has produced the gangrene, not forgetting to employ a vigorous medical and antidiabetic régime.

Cardiac Insufficiency.

Advanced heart disease is a contraindication to surgical operations, especially when compensation is broken and there exists dilatation or fatty degeneration.

The condition of the myocardium is of greater importance than the valvular lesion, and it is generally agreed that the valvular lesion *per se*, when well compensated, needs not be deterrent to surgical intervention.

The influence which certain diseases have on the heart is well demonstrated in uterine fibroids. These neoplasms have a peculiar selective action on the heart, weakening it to a marked extent, especially when of large size, often leading to venous thrombosis, pulmonary embolism, or shock. It is here where a careful preparatory treatment manifests its undisputed utility. The desire to keep within the limits of this generalization prevents me from referring to cases where these precautions were advised but not followed and the omission was paid with life. But I can not refrain from citing a case lately sent me by Dr. Guillermo Cook, of Maracaibo, Venezuela, in which I successfully removed a fibroid weighing eleven pounds. The condition of this patient's heart was very serious, as the result of myocarditis which was aggravated by the fatigue resulting from her long voyage; in her case a prolonged preparatory treatment markedly contributed to the success. The preparation consists in an extended and absolute rest in bed, with the internal administration of ergot. The beneficial effect of this treatment is soon manifested by better heart's action, diminution of metrorrhagia, and a more buoyant state of the patient's mind.

Anæmia.

The undervaluation of the state of the blood, and overvaluation of the lesion producing it, has so influenced surgeons that they are liable to overlook the irreparable condition of the blood before undertaking operation.

Valuable information is obtained, no doubt, by the previous examination of the blood, enabling the clinician to estimate the resisting power of the patient, and also to appreciate the degree and type of anæmia which the patient might be suffering. The type of anæmia which a patient may have will influence very materially the final result, therefore the importance of knowing if it is a mild anæmia resulting from the surgical lesion or merely associated with it, or if he has pernicious anæmia or a grave secondary anæmia. Pernicious anæmia may be associated with any surgical lesion and the patient is foredoomed, therefore the great importance of the distinctive diagnosis, for pernicious anæmia is absolutely incurable. There may be lulls and temporary pauses in his condition, but the patient never recovers. In grave secondary anæmias the prognosis is brighter, and the patient may recover, partially at least from his anæmia.

When the blood making organs have lost their power of forming red blood corpuscles, and examination shows no nucleated or polychromatophilic red corpuscle, and their number are less than 2,000,000 to the cubic millimetre, the condition is extremely grave and to operate in such cases is useless. The presence of the nucleated red corpuscles should not deceive us into predicting a favorable termination, since they indicate that the hæmatopoietic organs are being forced beyond their capacity of reproducing the normal red corpuscles. They appear after

a hæmorrhage in small amounts. Both in pernicious and grave secondary anæmias a pokilocytosis or irregular character of the red blood cells occurs. In anæmias resulting from hæmorrhage the number of red blood corpuscles is not greatly reduced nor do they attain the giant sizes, megalocytes, as occurs in the pernicious and grave anæmias. The hæmoglobin is not diminished in the same proportion, notwithstanding the great diminution of red corpuscles in pernicious anæmia, in fact it is relatively increased.

The percentage of hæmoglobin is very important, and when it falls below thirty any surgical operation undertaken under this condition is very serious, and if it falls to twenty death can confidently be expected. The increase of the white cells is also a matter of importance in establishing the distinctive diagnosis between pernicious anæmia and secondary grave anæmia which does not happen in the pernicious type.

A leucocytosis may supervene to any traumatism or shock due to hæmorrhage, and may be present in suppurations and also in certain nervous conditions, and is found after convulsions and in certain forms of insanity. There is, besides, a leucocytosis of pregnancy with maximum intensity at time of labor.

The value of leucocytosis in inflammatory or suppurative lesion is still in doubt. Many observers attach a high value to it, while others seem to think that its importance has been much overrated. Those who advocate it trust more to a leucocytosis with high polynuclearlymphocytes than to the total count.

Dr. John Douglas, who has treated this subject very thoroughly in a recent article in the *New York Medical Journal,* September 28, 1908, Leucocytosis Count in Abdominal Surgery, says very justly, "so should one consider both the total and

differential count as part of the symptom complex or clinical picture of the case to be considered."

Considered alone a leucocytosis is no criterion of suppuration.

Malaria.

In our northern latitude malaria has not the influence on the termination of surgical operations, as it has below the Mason and Dixon line, for here we do not observe its baneful effects as often as they do in the south and in tropical countries.

The opinion of surgeons practising in malarious climates is unanimous as to this influence, and they recognize that malaria reacts most upon traumatism, and that wounds excite or renew attacks of intermittent fever. Malaria is often latent in the system, without arousing any suspicion of its presence, and it may be confounded with other conditions, especially when the attack of malaria occurred several years previous. This has been well exemplified in my practice by patients coming from those regions to be operated upon here, and in whom the most painstaking search failed to reveal any malarial infection, but in whom postoperative complications of a disturbing nature ensued. The first case to direct my attention to this danger occurred in an interval appendectomy performed on an otherwise healthy man, who on the third day was seized with a continuous fever which made my associates and myself believe was of septic nature; I decided to reopen the wound, and to my amazement found it perfectly healthy. Quinine checked all the symptoms immediately. Having learned the lesson, I invariably precede all operations on individuals coming from those countries by a course of antimalarial treatment, thereby anticipating this eventuality and securing my peace of mind.

Syphilis.

The relation which in many instances syphilis bears to surgical operations is of importance on account of the widespread influence which the disease has on the entire organism, and although often without any serious consequence to the immediate repair of wounds, at times it interferes seriously with this process—preventing the union of fractures and causing suppuration and troublesome ulceration of operation wounds. There are occasionally almost insurmountable difficulties in diagnosticating it, due in part to its chronicity, and the periods of quiescence for which it is noted, often remaining latent in the system until awakened to renewed activity by an injury or other cause.

Syphilis may coexist and be associated with all other acute and chronic diseases, thereby giving rise to the most complicated conditions. Little reliance can be attached to the history given by the patient; it has been said that all syphilitics are liars and that their statement cannot be trusted. This is true of many who by false representations try to conceal its presence, because of the bad repute in which syphilis is held by the laity, and the stigma with which it is associated; while others deny it, thinking that there cannot be any possible connection between their present troubles and a chancre, say, fifteen years ago. Aside from these instances and of the hereditary cases, there are many persons who are syphilitic without ever having suspected it; and their denial of all knowledge of a primary and even of secondary symptoms is undoubtedly sincere and honest. The cases of syphilis insontium are very numerous, a circumstance which reduces the value of the history, on which we rely to a certain extent. The most virtuous woman may be the innocent victim

of it, having unknowingly acquired it from her husband. The social condition of the patient should have no weight in our diagnosis, for syphilis is no respecter of rank or station, and it may be equally possessed by the most exalted personage as well as by the humblest individual. We have therefore to trust more to our own investigation than to the information furnished by the patient, remembering that syphilis may affect every tissue of the body, extending its influence over the entire organism, and that it has a peculiar way of imitating other diseases.

It is not necessary to share the extreme opinion of Ricord, who would have given mercury to the Venus of Milo, it is prudent, nevertheless, to be always on the alert, and to employ the Latin method of jurisprudence, considering the patient guilty until proved otherwise, and to sin more by excessive carefulness than to allow it to escape our observation.

How often are we not chagrined to find that our carefully repaired perinæum, on which all care was bestowed, both as to the proper coaptation of the turn muscles and mucus membrane has come to naught, with stitches torn, wound suppurating? We hastily blame some defect in our asepsis, when in truth the cause is somewhere else. This is no exaggeration; every operator can recall similar experience. This probably would have been prevented by proper treatment.

Many suppurating joints in children which pass for tuberculous are in reality syphilitic. This was forcibly impressed on the writer years ago, by a little patient, two and a half years old, who came very near having her leg amputated in one of our hospitals, and what saved her leg was the unwillingness of her mother to have it severed. Under specific treatment, a rapid cure was effected.

It is unnecessary to enumerate all the multitudinous forms which this protean disease may assume, for volumes could be written.

The Mind.

Never has my pen been more timid than now, when treating this arduous question of the mind. The difficulty is enhanced by the scarcity of available data, for very little has been said on this subject, and the chapter on surgical psychology remains to be written. What an interesting and absorbing chapter will it not make!

The reciprocal influence between mind and body is well exemplified at surgical operations. The hopeful and courageous patient is more likely to live than the crestfallen and cowardly. Amongst the very few modern authors who have treated this matter, Fowler is one who said: "That the mental condition bears some relation to the occurrence of shock there can be no doubt, since it has been shown that the stoically inclined individual and those hopefully inclined, as well as children and the insane, other things being equal, suffer comparatively little shock."

There can be no doubt of the influence of the mind in causing the physical symptoms of shock, and the depressing effect of fear is even experienced by the bravest. True courage, as Van Buren contended, consists in fact "in persistently facing danger after fully recognizing its extent." All men are born cowards, but familiarity with danger will conquer this mental weakness. Fear has an ætiological value, which is not generally recognized, and no matter how the patient fears before operation, we are wont to feel secure in the thought that when he has "gone under the anæsthetic" we have conquered his fright, when in fact we have only mas-

tered his resistance. To some the idea of the knife is sufficient to cause an agonizing terror, capable of terminating in mortal shock. Dr. R. H. M. Dawbarn, of New York, relates a case where the patient died through sheer cowardice, before anything had been done to him.

Aside from these extreme cases, the effect of fear and anxiety is well known to alter the heart's action, the respiration, and of having a relaxing influence on the bowels, the skin, and micturition. The Edinburgh surgeon who confessed that he always had a diarrhœa before any serious operation is an example of this relaxation.

The attitude of the surgeon, his belief in the final success of the operation, seems to filter through the patient, for in that supreme moment, the patient's mind has many eyes and perceives by a sort of intuition or mental transmission of thought, what transpires in the mind of those surrounding him. Patients are very susceptible to suggestion, especially those who possess a pusilanimous mind; and who knows how much harm can be done by an imprudent and loquacious nurse?.

So, too, during anæsthesia, in which the waked consciousness is subdued, as psychologists tell us, but the second self, the great subconscious self, is never asleep. The possibility of this is of high importance at time of operations, where incautious remarks may be passed between those present, and which may have an injurious effect on the patient's mind. That this is no idle speculation—that the mind is never asleep in its totality—is sustained by no less an authority than Sir William Hamilton, and recent experience with hypnotism seems to confirm this view. It is therefore convenient to bear this in mind, that although the conscious ego may not

be cognizant of what transpires during narcosis, the subconscious self may do so.

CONCLUSIONS.

The main conclusion arrived at in this paper is an earnest plea for a more extended recognition of the heterogeneity of the individual and a fuller appreciation of the constitutional conditions underlying or associated with surgical diseases, which emphasizes the advisability of an extended preparatory treatment before undertaking surgical operations.

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