*Water, Salt and Sugar

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NEARLY two years ago I set myself a study in this subject with special reference to the pre-operative and post-operative care of surgical patients. Being "cumbered with much serving", however, I accomplished little, and though I do not think that my good intentions contributed any paving stones to the road to Hades, it was too near to that to be healthy, and it required your request to address you at this time to restore me to the path of virtue. It seems to me, however, that work produced against time must disclose much of error and omission; and that that which occurs in what follows I must now accept as the reward of my procrastination.

FOR many years Medicine watched the development of surgical technique and the improvement in surgical anaesthesia until no body cavity was left unexplored and virtually no part was beyond reach of the scalpel. Then, a few years ago, it came to be stated that no further very important improvement should be expected in that direction, and that if operative mortality were to be reduced, it would have to come about by making the patient safer for surgery, rather than by making surgery safer for the patient.

Out of the acceptance of that there began to develop that inquisitiveness which has nearly always been pre-requisite to important discovery, and which now is helping us to bring physiology and bio-chemistry into its proper relationship to surgery. This, in turn, has enabled us to attach great significance to some of the apparently very simple things of our internal economy, and of such are the subjects of this paper—water, salt and sugar.

Now there need be no fear that I shall make any effort to exhaust those subjects and in so doing exhaust your staying powers. Either of them is good for an evening's presentation and discussion, but not this evening. It is my purpose rather to suggest some of their more important features and to stimulate even more interest than already obtains in this frequented field.

To greater or less degree our medical ancestors had some idea that the sick person should have fluids; but since they had little idea of fluid loss, except that which was quite visible, their efforts at best were only to keep up the usual intake of good health. This, for the sick person, was utterly inadequate and though results must have been terribly unsatisfactory, it was only relatively a few years ago that we came to appreciate the significance of dehydration and to think in terms of its effects. It had become apparent to us that dehydrated patients did not stand operation well, and it came also to be recognized that operation did something to patients which could be corrected by the giving of fluids. It was only a step from that to the filling up of patients with fluids, pre-operatively and post-operatively, and the order "force fluids" came to be about the commonest order to be heard in most of the surgical wards of the land.

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From the practice of pre-operative purgation and starvation of an older day we have seen the pendulum swing away over—as it is so much inclined to do in medicine—to the extreme of the opposite practice. In this, under fear of dehydration, fluids, nutrient and other, have been thrown into or piped into the patient, usually very much to his benefit but frequently without scientific justification, and consequently sometimes to his harm. Fortunately however the pendulum swings back from extreme positions, and it is found that somewhere along the via media is the place of reason.

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WATER

The importance of water in our economy is shown by the fact that while food deprivation may go on for long periods even to the loss of 40% of body weight, a 10% loss of body fluids means illness and a 20% loss means death. Further fundamental study has shown that 70% of the body weight is water; that 50% of that water is contained within the cells themselves; that about 5% of it is in the circulating blood and that about 15% is interstitial body fluid.

The mechanics of the circulation demand that the volume of fluid within the vessels must be maintained at a reasonably stationary level. We see the action of that law when, following any great loss of blood, the volume of the plasma is quickly made up. We see it in states of dehydration, where the blood volume is maintained, at the expense of intercellular fluid. Conversely also it is seen, that in oedematous states the increase in the volume of body fluid is not in the vascular compartment but in the intercellular spaces.

We have come, during recent years, to hear a great deal about *water balance*, and the idea of balance here, is the same as that which is involved in the keeping of accounts. It is the difference between that which goes out and that which comes in.

The intake, in health, is derived from several sources. The quite obvious fluid drunk equals from 1000 to 2000 cc a day. Contained in an ordinary average diet is another 1500 cc. Fluid from the oxidation of food furnishes about 500 cc. more as "water of oxidation." That totals up to at least 3000 cc. for normal daily requirements in health.

What becomes of that water? The amount that is lost as urine depends upon the amount that is available, and the average daily body waste of 35 to 40 grms. of solids, added to that, determines its specific gravity. At least 500 cc. are required to dissolve these waste products, and at that amount the specific gravity is 1.030. Of course considerably more fluid is required for the specific gravity that is usually found. The average loss through the feces in health is 150-200 cc. But it is the insensible loss, from the lungs and from the skin that is frequently the greatest factor in water excretion and that even under the most ideal conditions. Though it varies considerably, it has been calculated to between 1000 and 1500 cc. At first, that sounds like a very great deal of water to be excreted through those channels, but not when we consider the important functions of heat regulation and CO2 excretion which skin and lungs subserve.

It has been shown that in health the kidneys take care of waste if fluid is available at 15 cc. of water to the gram, and that that would give a specific gravity of 1.030. In illness, however, that ratio is impaired so that they may require as much as 50 cc. to the gram if waste products are to be excreted.

Diarrhoea greatly increased fluid loss, and if to that vomiting is added, the increased output and reduced intake constitute that vicious circle so frequently seen in paediatric practice, with its diastrous disturbance of water balance.

Again, fever is a great disturber of water balance. It very greatly increases lung activity; metabolism is speeded up; the CO2-O2 exchange is tremendously increased and the vaporization of water increases in keeping. Coller and Maddock have shown experimentally that in patients with temperatures above 100° F. the water loss from these channels alone is above two liters a day. Bingham in a more recent study has shown that 3500-4000 *cc. may be lost daily, in the breath and from the skin.*

In connection with loss from these sources one wonders why, in our hospitals, under conditions that call for conservation of water, the ether sweatbed is perpetuated. You know the system, in the adherence to which, patients are wrapped in heated blankets and kept in them summer or winter until pounds of water are sweated out of them. It is, no doubt, done with some idea of treating shock or of preventing pneumonia, but it is none the less an anachronism which increases postoperative atony and is at least deserving of protest.

It is of interest to note that the insensible perspiration through lungs and skin has preferential rights on the water that is available for excretion. Other sources of excretion may fail but this is not affected until 6% of the body weight has been lost in fluids. Then only will insensible perspiration diminish and by that time the patient is very ill, though still reclaimable by the giving of water.

In a series of ten unselected surgical cases investigated by Bingham, and published in the British Medical Journal only last month, it was shown that following each of the operations the patient became increasingly dehydrated during the period studied (the first three post-operative days). He showed that the smallest negative water balance was 679 cc. in one patient, at the end of the second day, and that the largest was 3565 cc. in another patient at the end of the third day, and that *not one of the patients maintained a normal water balance post-operatively.* It was further shown that even with an uneventful convalescence, normal water balance was not usually restored until the fifth day.

The conclusion arrived at by him, and by most investigators, is that the minimal fluid requirements in the days following operation is from 3000 to 4000 cc. and that if there is unusual or excessive loss—vomiting, drainage from a fistula, etc.—then that loss must be calculated and fluid to equal that amount must be added to the ordinary requirements. *As much as seven liters a day may be necessary to cover all losses.*

ROUTES

Now granting that increased intake is necessary, by what route or routes may it be given? *The oral route* would be best if it were available to us. It is the natural way and the simplest way. But it is best also because, as shown by Starkenstein Dressel and Leitner, fluid absorbed through the gastro-intestinal tract has a diuretic quality greater than that absorbed through parenteral routes. In many cases, however, and for obvious reasons, it is not available to us.

The rectal route is then to be considered. There is no doubt but that the rectal mucosa will absorb water, and this route is very frequently available to us as a convenient method for the administering of fluids. Of course the old retention enema has gone, partly because it was employed in too large amounts at a time. It had the effect of an enema, exciting peristalsis which expelled the fluid. But its demise came about more because it was superseded by the vastly superior continuous drip method, the familiar "Murphy drip" after the late John B. Murphy who devised it.

In our gastro-intestinal cases, however, the rectal route is no more available to us than is the oral route. Particularly is it contra-indicated in those cases in which the order is given—"nothing by mouth"—those cases in which gastro-intestinal rest is considered an important part of post-operative treatment. It can induce peristalsis and discomfort as readily as can fluids by mouth.

Another objection to proctoclysis is the fact that the rectal mucosa will only absorb water or saline—*not glucose.* To use glucose in rectal fluids is a waste of good glucose and a scientific error almost certain to increase clinical worries. It brings abundant food to sugar-fermenting and gas-producing bacteria in consequence of which, gaseous distention, which may already be problem enough, is definitely increased.

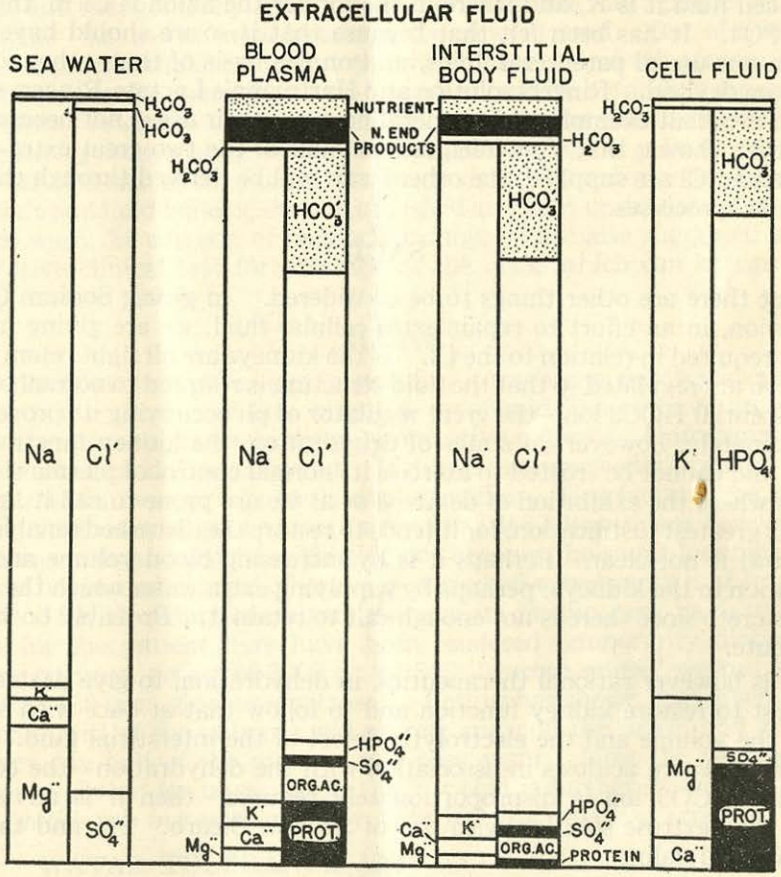
We have been prone to consider next *the subcutaneous route,* and I believe that even some recent text-books still mention it as good practice as the route of election. For my own part I must subscribe to the statement of Ravdin made to the American College of Surgeons in Philadelphia two years ago. In effect he said: "Any of you who favor the use of such subcutaneous or intramuscular injections, would cease to do so if before ordering another for a patient you would first try it upon yourself." For the reason that is involved in that, it should not be regarded as the method of choice, but as one to fall back upon if for any reason more suitable ones are not available. It also is limited in the substances that can with impunity be given in solution, in the injected fluid.

The intravenous route—Phlebcclysis. (*We* have been calling it venoclysis but our philologic purists insist that venoclysis is a hybrid form—half Latin, half Greek. To them, therefore, its use is a veritable brand of illiteracy—a mark of Cain. Phleboclysis they say, has both its halves from the same pure source, so, phleboclysis it must be!) There would seem to be little doubt,—and its persistent universal employment would seem to substantiate the fact —that the most generally satisfactory route is the intravenous one. What we shall say further therefore will have reference chiefly to that route.

In giving fluids by mouth we think little of chemical requirements, having to think more of taste. In giving them by rectum, we give only what we know can be absorbed, and we follow the indications within that limit. If we disregard the patient's discomfort and employ hypodermoclysis we give physiological saline, selecting sites of loose skin so as to prevent tension and consequent sloughing—an accident which is much more likely to occur if glucose also is employed. When we come to inject fluids into the blood stream, new studies were stimulated looking first to the harmonious blending of the fluid injected with that of the blood, and then to the restoration of normal body chemistry.

Fundamental to such studies is the information contained in the diagram which I have here set up. It is after Gamble of Harvard, from an address given at Johns Hopkins University last summer, published in the Hopkins

Bulletin and reproduced here by kind permission. It is what Gamble calls "the chemical anatomy of Body Fluids", and I would submit that it is a most important bit of anatomy that tends to be overlooked. Indeed I would presume to express the view that it is more important for students to learn this and its implications—whether as anatomy or bio-chemistry or what you will —than for them to learn ten tests for sugar in the urine and as many for urine albumen. Certain it is that without a working knowledge of it, we can have no appreciation of what we do in our efforts to repair that loss of extracellular fluid, which we know as dehydration.



Directing your attention to these diagrams, it is of passing interest to note the close similarity there is between sea-water, and extra-cellular fluid. It has been stated that if the water were taken from the immediate invironment of the denizens of the sea the little difference that appears here in the electrolyte content would be still further reduced. As to whether that tends to establish a further relationship between us and those other poor fish, which have not yet lost their tails, is something that I must leave you to ruminate upon at your leisure.

What is of more concern to us at the moment is the close similarity there is between the fluid of the blood and the interstitial body fluid. Obviously

the main difference is in the protein content. It is easy for us then to agree with Gamble that "*extra-cellular fluid is a single fluid lying in two compartments equipped with a device (plasma protein) for producing movement from the interstitial space into the vascular compartment.*" For a reason quite important to both internist and surgeon I would ask you to remember that little device, the plasma protein, for I shall return to it. Its importance is out of all proportion to its relative size in this diagram.

When we look at and compare the composition of *Cell Fluid* with extra-cellular fluid, we are at once struck with the great difference there is in its electrolyte content. Whereas in all extra-cellular fluid the great Kation is Na, in cell fluid it is K, and where in the former the anion is Cl in the latter it is HPO4. It has been felt that because that is so we should have regard for it in our use of parenteral fluids, and on the basis of that, other solutions have been devised. Ringers solution and Hartmann's Lactate-Ringers solution are two excellent examples. In general however their use is not necessary, for it has been shown, that if an adequate amount of the two great extra-cellular ions Na and Cl are supplied, the other items will be derived through the usual metabolic processes.

SALT

But there are other things to be considered. In giving Sodium Chloride in solution, in an effort to repair extra-cellular fluid, we are giving more Na than is required in relation to the Cl. If the kidneys are all right retention and excretion are regulated so that the fluid structure is restored to normal, with the very essential HCO3 ion—the great regulator of ph occupying its proper place. Unfortunately, however, in states of dehydration, the kidney function is impaired and cannot be trusted to exercise its normal control of plasma structure. This is where the exhibition of dextrose or as we are prone to call it "glucose" finds its greatest justification, for it tends to restore the disturbed renal function. Just how, is not clear. Perhaps it is by increasing blood volume and so the circulation in the kidneys; perhaps by supplying extra water which the kidneys must excrete since there is not enough salt to retain it. Probably both factors contribute.

It is however rational therapeutics, in dehydration, to give dextrose solution first to restore kidney function and to follow that at once with saline to repair the volume and the electrolytic defect of the interstitial fluid. Should there be a severe acidosis in association with the dehydration—the condition in which HCO3 ion is disproportionately reduced—then it is advisable to follow the dextrose solution with one of Sodium Bicarb. 2% and that, with physiological saline.

A more modern tendency still is to substitute Sodium Lactate for the Sod. Bicarb. Gamble in his paediatric work in the Massachussetts General Hospital prefers one part of isotonic Sod. Lactate to five parts isotonic salt solution in his cases of dehydration with severe acidosis. The lactate radical is quickly oxidized in the body and its place taken by HCO3 ion.

In what has so far been said, certain very important principles would seem to have been established, and certain details of procedure have been suggested; but given a patient, whose daily water loss is 4500 cc. through the normal channels, and we are restoring that amount with *dextrose-saline*, as is the common practice among us, is our procedure correct?

The usual intravenous saline contains 8.5 grms. per 1000 cc. That would mean that in the twenty-four hours we would be giving 38.25 grms. of salt—an amount far in excess of normal requirement. It is conceded as possible that a salt-starved, dehydrated person might tolerate such an amount for a time, and it is recognized that in extreme emergency cases the use of even a three percent solution might be necessary; but in our ordinary cases, have we any criterion by which we may guide ourselves, in this matter of salt supply?

Fantus, in several thousand cases at the Cook County Hospital, Chicago, has shown that of patients excreting less than 0.1% of chloride in the urine, 75% died; and the lowest mortality was in persons whose urine showed 0.6-0.8% chloride, and that generally speaking the mortality rate rose again as the figures went higher—i.e. as the urine became more concentrated. Out of that knowledge he expresses the dictum that no hypo-hydrates and salt-starved patient should be sent to the operating room—that it should be a standing order that *no patient should be sent to the operating room unless he has passed at least* 1500 *cc. of urine during the preceding* 24 *hours and unless it contained at least* 0.5% *NaCl.* He further says that every patient who has undergone a serious operation should have a salt and fluid balance sheet established and kept up-to-date every twelve hours to warn the surgeon of impending danger. He also suggested a simple quantitative clinical test for Chloride in the urine which can be carried out by any trained nurse.*

SUGAR

A consideration of the sugar content of intravenous fluid must also be of concern to us. And the first question we should like to have answered is what is the sugar tolerance in the post-operative patient? Unfortunately it is a question that cannot be answered. It differs very markedly from the normal and as far as can be seen is an individualistic affair. One fact may be accepted however, that *when sugar appears in the urine the tolerance has been overcome.* In such cases sugar must be withheld; not because the sugar loss means anything but because each gram of sugar so carried off carries with it at least 20 cc. of fluid. If with reduction, sugar loss persists insulin may have to be considered, for the patient may have been rendered temporarily diabetic. In the very common giving of 3000 cc. of 5% "glucose-saline" we put into the circulation 150 grm. glucose (dextrose). Fantus has shown that given 100-149 grms. one-third of the patients will excrete sugar in the urine, and given 200 grms. per day half of the patients will pass sugar. Now the very practical importance of that for us resides in the fact that is further stated viz. that *the total mortality rate increases suddenly when* 100 *grm. intake is exceeded.*

WATAR TOLERANCE AND RATE OF INJECTION.

While we are on the subject of tolerance and having seen something of the importance of that of salt and of sugar, let us go back a bit and raise the question of water tolerance. For present purposes we may agree to define water tolerance as the ability of patients to receive and to excrete water. We have mentioned three to four liters, which on occasion may run up to six or seven liters. Is body need so calculated the only factor to consider?

It will generally be conceded that the sicker the patient is the greater the amount of fluid he gets. Yet it is precisely that type of patient who is least able to excrete it. Again Fantus has shown that there is a progressive decrease in the percentage of fluid eliminated as the quantity of fluid administered increases, and he further shows that *the mortality rate is the higher the lower the percentage of fluid eliminated in relation to that injected.* He showed 20% of

mortality in a group eliminating 10% of intake in the first 24 hours, while in a group eliminating 11—25 of intake, the mortality was only 11% in a large series of post-operative cases.

It would appear then, that given a patient whose dehydration has been corrected pre-operatively and allowing for some retention of fluids at first to make up for operative loss, the further effort to maintain water balance should depend more or less upon the percentage of the fluid that is eliminated. If then regard is to be had for that, it is probable that some very sick patients might have a better chance for recovery with less fluids rather than with more. To what extent weakening of the cardiac musculature is a factor in this it is difficult to state but it would seem to be clear that regard for the percentage eliminated is one of our great safeguards against further cardiac damage. However, the *rate of injection of fluids* is also of importance as a factor in those cases, and we must have a word about that.

The rate at which intravenous fluids should be given has been somewhat of a vexed question in certain circles with which I am familiar, and as I go into the literature I find that it is equally so in other parts of the world. Wilder and Sansum have the following to say: "Dextrose solutions should not be injected more rapidly than .35 grm. per pound of body weight per hour, as above this rate sugar is excreted in the urine of a normal adult," and Cutter states that one could inject 10% dextrose at the rate of 500 cc. an hour and still be within this limit with a man of average weight.

Cutter, who seems to have made a very wide survey of the practice says "It has been rather general practice to inject a liter of solution in from thirty minutes to an hour. Recently several have taken violent exception to this practice and have recommended up to eight hours for the injection of a liter. Those who prefer more rapid injection say that continuous phleboclysis is not practical, while those advocating slow injection believe that the rapid method may cause speed shock. The man who selects a rate of flow of about 500 cc. an hour for adults where there is indication neither for particularly slow nor particularly rapid injection is treading middle ground..... In shock one should inject at the rate of from 20 to 40 cc. per minute constantly watching the pulse and blood pressure. When these improve to within safe limits *the speed of the injection should be reduced*" (40 cc. per minute equals 25 minutes for a liter, and 20 cc. per minute equals 50 m.p.l.) This investigator apparently considers 25-50 minutes for a liter a rapid rate to be employed only in shock and then reduced. Horsley confirms that, in this way: He says that in shock with B. P. below 90, 500 cc. may be given in a few minutes—blood volume is low and no harm can be done, but with rise of B.P. to within 10-20 points of normal the rate then should be 100-200 cc. per hour.

With respect to *shock*, my own feeling is that in moderately severe shock the ordinary intravenous fluids do not remain in the vessels sufficiently long to maintain blood volume and that hypertonic dextrose according to the practice of Fay in his cases of cerebral shock better fills the bill at first using 50 cc. of a 50% solution. With respect to *ordinary* post-operative fluids; though it is not the unmixed blessing for the intern that it might be supposed to be, because it sometimes requires a good bit of attention, the continuous intravenous drip has deservedly attained to a very prominent place in our scheme of things, and we frequently anticipate its use by having a gold needle put in while the patient is still on the table. We commonly use the great saphenous vein near the ankle though the cephalic near the lower end of the radius has been used by us and is also valuable. We believe that the fluids

available should be plain saline, plain 5% dextrose, and 5% dextrose in saline, and that to give the first two of these separately according to indication is safest and best, for example: two liters of 5% dextrose and one liter of physiological saline yields 8.5 NaCl and 100 gm. dextrose. The keeping of them separate admits of the dextrose injection being broken up, for it has been suggested that continuous dextrose injection may lead to over-stimulation of insulin and to hypoglycaemia. The rate of injection in our average case is 30-40 drops to the minute to give 3000-4000 cc. in 24 hours. Given at that rate we do not worry about temperature except to see that it is not hot. Electric light bulbs or other kinds of heat about the container are of no value. In some cases we employ rectal tapwater by "Murphy drip" and like it very much where it is a question chiefly of getting in water. However, it doesn't always work well.

We have learned a great deal about dehydration and electrolyte loss from our paedatric confreres—it comes almost out of the mouths of babes and sucklings! One might have acknowledged our debt to them earlier and at the same time might have listed their peritoneal route as one of the ways of giving fluid in dehydrated and toxic babies. It is only one of the many things which we have been obliged to exclude from this big subject.

There is however the matter that I promised to go back to—the plasma protein—and with it I shall conclude.

PLASMA-PROTEIN

This introduces the subject which I said is of very great importance from the point of view of both internist and surgeon. It is of very particular importance to us in the matter of certain post-operative complications and because it may necessitate a very profound modification of the methods we employ in the giving of fluids to some of our post-operative patients.

The subject of *nutritional oedema* is one that has engaged the attention of Medicine for many years and the great change that has come about in protein-feeding in some renal conditions, is evidence of that. It has been recognized as a concomitant of under-feeding, especially with deficiency in protein intake. This has led to a great deal of experimental research in which the relationship between a lowered serum protein and the production of oedema has been very definitely established. The occurrence of oedema following surgical operations, however, until four or five years ago had received very little attention. Jones and Eaton then showed that nutritional oedema is not uncommonly associated with surgical procedures, particularly in connection with the gastro-intestinal tract. Since then, a considerable amount of experimental laboratory and clinical work has been done to enlarge our knowledge of the subject. In 1935, 1936 and 1937, important contributions were made by Ravdin and his co-workers at the Harrison Department of Surgical Research, University of Pennsylvania, and my visit to them in November last found them still very busy in the same field of research.

Briefly the story is this: The plasma protein is normally at seven per cent and at that level it exerts an osmotic pressure which tends to maintain the balance between the blood and the interstitial fluid. It has been shown by Weech, et al, that as the plasma proteins are reduced, fluid begins to leave the vessels and that, in consequence of that, we get first a latent and later an evident oedema.

From the surgical side, the class of case in which this is so important is most frequently the gastro-intestinal case, yet Jones and Eaton's twenty-six

original cases included one each of abscess of the lung, cancer of the ovary and sepsis of a joint. In some of these it is not difficult to see that a reduction in plasma protein should take place where the indisposition of the patient reduces the intake and where a very definite loss by drainage is continuously occurring. But as we have stated, it is the gastro-intestinal cases that provide the greatest number. Here, frequently, they are cases in which for one reason or another—as in gastric surgical cases—the protein content of ingested food is progressively decreased to the point of very positive protein starvation and consequently to a lowered serum protein.

Now such cases are usually also dehydrated when they come to us and at that time their serum protein may show little relative reduction. If we properly hydrate them and then check the serum protein it will be found that it has been reduced. Yet now no oedema may be apparent. If however such a person is subjected to some surgical procedure, particularly one associated with some form of gastro-enterostomy, and particularly if intravenous salines are employed post-operatively the oedema which before was latent may now become established. Such oedema may become quite visible but it may occur only within the gastro-intestinal tract. One of its effects, as shown so well by Ravdin and his co-workers is to produce a great lengthening of the emptying time of the stomach, to such an extent that it is believed that in the past many cases have been reopened for mechanical defects of the gastro-enterostomy stoma where only oedema existed to produce its obstructive symptoms.

Now, given a case of undernutrition and known prolonged protein underfeeding with lowered plasma protein what factors influence it? It has been shown that excessive alkali ingestion tends to reduce it still further; that fluids tend to reduce its concentration by restoring blood volume, and that sodium is one of the very great, if not the greatest, factor in precipitating the oedema in those hypoproteinaemic cases. *We must remember therefore that if we use saline altogether in our efforts to restore extra-cellular fluid, and give only the reasonably small amount of three liters a day, we are giving more than four times normal sodium requirements and so are courting mischief.* Conversely it has been shown, that if the sodium ion is restricted it is difficult to produce oedema either clinically or in experimental animals, regardless of the level to which the plasma protein is reduced.

The treatment for cases of nutritional oedema or of hypoproteinaemia is, of course, protein feeding. Where it can be done, it should be given by mouth. And here, it should be remembered, that the patient is very much animal and that no protein can really substitute for animal protein. If other protein is to be considered at all it should be on a value basis of not more than two of vegetable for one of animal. Oddly enough there is one exception to that,—the soy bean—which may be considered as its equal. Where the oral route is not available, as is so frequently true, the intravenous route is, and blood transfusion is invaluable.

The last word in this however is being furnished at this moment in Philadelphia (and I hope I am not stealing any of Dr. Ravdin's thunder when he comes to address us this Summer at the Dalhousie Refresher Course). There, they are taking plasma (not the cells) from donors of known groups evaporating it by special process and storing it until it is required for use. Indeed they were discussing the building up of a library of such plasma in the different groups when I was there in November.

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My conclusions respecting this whole matter is that the facilities of our bio-chemistry laboratories must be availed of and our demands upon them must be made much higher if we are to bring to our patients that degree of pre-operative and post-operative care which, in this scientific age, they have a right to expect; and it must be apparent, I think, that the greater use of these facilities will indicate still further the need for individual rather than routine care. And as we demand of our anaesthetist that he should know at any moment the stage of anaesthesia in which his patient is, so the time is upon us when we should, at any time, be able to give an account of the chemistry and the relative volume of our patients' extra-cellular fluid which by our orders or our practice is being so profoundly changed.

Fantus Method for Estimating of Urine Chloride: Place 10 drops of urine in a test tube. Add 1 drop of a 1 to 5 Potassium Chromate Solution (The fluid will now assume a somewhat distinctly yellow colour).

Add drop by drop with the same dropper or one of the same caliber a 2.9% AgNO3 solution until a permanent colour change to red brown occurs (Silver Chromate).

The number of drops required to produce the colour change expresses in grams the content of chloride per liter of urine.

References

Hyman and Hirchfield: Severe reactions following rapid injections of fluid. J.A.M.A. CVI-1221, ibid C 305.

Farquharson E. L.: Continuous intravenous injections. Edinburgh Medical Journal XI 530-544.

Hieman, J. D.: The role of fluids in surgery. Journal Medical XV. 359-364.

Coller and Maddock: A study of dehydration in humans. Annals of Surgery V. 102-5-947. Studies in Water requirements of surgical patients. Anaes. and Analges. 14.140.

Coller, Dick and Maddock: Maintenance of normal water exchange with intravenous fluids. J.A.M.C. V. 107. 19-1522.

Lavietes, D'Esops and Harrison: The water and base balance of the body. Journal Clinical Investigation XIV 2. 251.

Cutter, R. K.: The use of large volume intravenous injections. J.A.M.A. V. 156. 15. 1250.

Church, R. E.: Water Balance in Surgery. A American Journal Surgery XXIX. 1-64.

Fantus, B.: Fluid post-operatively. J.A.M.A. V. 107. 1-14.

Lashmet and Newburgh: A comparative study of the excretion of water and solids by normal and abnormal kidneys. J. Clinical Investigation XI 5-1003.

Horsley, J. Sheldon: The intravenous administration of dextrose in Ringer's Solution. Annals of Surgery XCVIII. 4. 678.

Peters, J. P.: Body water. The exchange of fluids in man. Chas. C. Thomas, Springfield, Ill. (This has a bibliography numbering 875).

Bingham, D. L. C.: The water requirements of Surgical patients. B. M. J. Jan. 8, 1937.

Gamble, J. L.: Extra-cellular Fluids and its Vicissitudes. Bulletin Johns Hopkins Hospital LXI 3. 151.

Renal Defence of Extra-cellular Fluid: control of acid-base excretion and the factors of water expenditure.

Ibid LXI 3. 174.

Ravdin, I. S. and Rhoades J. E.: Surgical Clinics of North America. 15. 85-100.-135.

Mecray Barden and Ravdin: Nutritional Edema: Its effects on gastric emptying time before and after gastric spirations. Surgery 1/1-53. January 1937.

Barden, Ravdin and Frazier: Hypoproteinaemia as a factor in the retardation of gastric emptying after operations of Bilroth 1 or 11 types.

American Journal of Roent. and Rad. Therapy XXXVIII. 1 July, 1937.

Weech and Ling: Nutritional Edema.

Journal Clinical Investigation X 4.869.

Jones and Eaton: Nutritional Edema: Arch. of Survey XXVII. 1. 159.

The Anginal Syndrome

(Heberden's Angina: Angina of Effort: Angina Pectoris)

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THE Clinical Phenomena which result from certain physiological abnormalities are nowhere more likely to confuse us than in the above conditions. Here, quite frequently, the only symptom is substernal or precordial pain occurring in attacks. This pain may vary from a moderate degree of discomfort to an intense, vise-like agony. It may remain definitely local or radiate to the left shoulder, left arm, up to the neck, or occiput, to the teeth or to the upper abdomen.

It is now well established that when a coronary artery is acutely obstructed —pain results. This pain is due primarily to a defective blood supply to the musculature of the heart. Therefore, the outstanding symptom is pain, which accompanies physical exertion, quantitatively. That is why the term Angina of Effort is now so frequently used. It is that type of pain: definitely associated with a chronic organic lesion which has interfered with the coronary circulation.

Heberden, as far back as 1785, described the direct relation existing between exercise and this particular type of pain. It is now generally accepted that Angina Pectoris is the result of Ischemia of the Myocardium. This ischemia may be absolute or relative. And the exciting cause is especially Physical Exercise. Therefore, we must be extremely careful of details in our history-taking of the attack. More exercise than the patient routinely undertakes may be elicited, such as climbing a hill, running after a street car, mounting an extra-flight of stairs, emotional upsets, exposure to a cold wind, or increased physical exercise after a hearty meal—all these are most important to note carefully as contributing factors to the attack. The underlying pathology which one must keep before him is Coronary Arterio Sclerosis. Here, changes in the lumen of the vessels may occur without manifesting themselves by any other clinical phenomena; the coronary vessels are narrowed, a limited supply of blood results and the Myocardium is now unable to be adequately nourished. It is obvious then, that the degree of damage to the Myocardium is dependent upon the degree of damage done to the Coronary Arteries themselves. Coronary Thrombosis is all too frequently the end result of recurring attacks of Angina Pectoris. And Coronary Occlusion may sometime occur without any pain whatsoever. This, of course, is the exception and not the rule.

It is, therefore, necessary to determine at the onset whether you are dealing with an Anginal Syndrome or not. Clinicians may differ as to the cause but not as to the diagnosis. Briefly then—it is much more frequent in males than females (in the proportion of 4 to 1): Heredity is a most important etiological factor: it most frequently affects the well-set, strong man, obese, with a history of infrequent previous illnesses: the age incidence is 54 for males, 56 for females: it frequently complicates Diabetes and severe Anaemias must always

be ruled out as a cause of the symptoms. Neuresthenia, excessive use of tobacco, Hyperthroidism, Vasoconstriction by Adrenalin, all of these may produce symptoms simulating an Anginal Syndrome. Careful studies show that 1.7% of all Coronary diseases occur in persons under 40. The ratio in this class of men to women is 24:1. Hypertension is less common in these youthful cases but does exist quite frequently if the patient is a female. This is an important factor. There are fewer complications in these younger cases of Coronary disease and peripheral vascular disease is uncommon. It is well here to emphasize, that it is now no longer rare in practice, to encounter men under forty who have coronary artery disease.

In recent years, with the increasing incidence of heart disease the problem of cardiac neurosis has become a major problem in diagnosis. This condition must be distinguished from Neurocirculatory Asthenia, for most frequently the two occur together. Any neurotic or psychoneurotic state may have cardiovascular symptoms associated with it. In neurocirculatory asthenia, palpitation, precordial pain, dyspnoea of the sighing type, faintness, dizziness, tremor, sweating and nervousness may be the outstanding symptoms. The precordial pain may or may not be the outstanding complaint. The condition, however, must be recognized early and treated intelligently by reassurance and reasonably limiting ones activity.

The Diagnosis of Angina Pectoris depends upon a very simple but oft-neglected procedure, namely, a proper interpretation of what may be considered inconsequential symptoms. This point cannot be over-emphasized. One must get not only a careful, but an accurate history. This may involve prolonged questioning. The *character* and *definite location* of the pain is the all important point. Levine distinguishes, at once, as invaluable, the difference between the pain described by the patient's roving hand, first placed over the apex, then up the left side, then over to the right side of the heart, a *circuitous* and *indefinite* gesture (so common in Cardiac Neurosis) to the pain described by the clutching hand of the patient placed *at once, pointedly* and *definitely* upon the sternum and *kept there.*

The pain comes on suddenly, during effort. Walking is the chief activity to produce it, particularly if he indulges in an amount of walking extra to that ordinarily enjoyed. *This pain stops the patient up short.* He finds if he remains stationary and fixed, hardly daring to breath, that the pain actually lessens. Rarely does it prevent, however, continuation of effort. But he is very careful the pace he sets himself thereafter. (Increased breathlessness is much more often a sign of increased Myocardial damage more extensive than due to Angina Pectoris alone). He perspires about the forehead, looks pale and anxious, prefers to remain quiet, not talking or moving until the pain subsides. The heart's rhythm is undisturbed (there may be an occassional extra systole), the blood pressure during the attack is raised. The pain is always constant—uninterrupted. It does not throb nor stab. It lasts frequently only for a few minutes. When one recalls that nothing definitely abnormal except minor changes may be found from a careful physical examination, it is most important then that an accurate history of the type of distress be ascertained. No leading, positive, questions should be asked. But this point comes out clearly as Lewis emphasizes, "*In Angina of Effort the pain of a given grade recurs with repetition of a particular act.*" If care, then, is employed in elicitating these subjective symptoms a diagnosis of Angina Pectoris can be accurately made.

One must keep in mind, then, the consistency in the history *of pain in response to effort.* That so often clears up doubt in the diagnosis. If he is not used to shovelling snow off his front steps and does so, once or twice, he has a recurring attack: he notes after running for a bus on several occasions that he had an attack, etc., etc. It may not even be a severe pain, just a tightness in his chest or a smothering feeling in his neck, but it only came on after effort and seemed to do this on several such occasions, *that is the point.* If one has co-existing serious heart disease and gives a history of attacks of pain *while at rest,* or cardiac asthma occuring at night awakening him from sleep or other signs of a pre-existing Coronary Thrombosis, then the diagnosis of a more grave form of Angina Pectoris is pretty certain to be established. I am referring in this brief paper, however, to uncomplicated or primary attacks. The type of Anginal pain which occurs in patients at rest is indicative of a much more serious cardiac disorder.

Levine's test of Adrenalin injection as a diagnostic measure is helpful but dangerous. Five to ten minutes after 0.3 cc. of 1/1000 sol. of Adrenalin the pain is reproduced. It can only be used when Electrocardiograph tracings show no myocardial damage. The blood pressure and pulse rate rises. Nitroglycerin or Amylnitrate takes the discomfort immediately away. It is dangerous to employ this in the presence of organic heart disease.

Once the diagnosis of Angina Pectoris is established, our chief concern is preventing further myocardial damage. It is first imperative to establish in the patient's mind the *cause* and *effect* of such attacks. He should be assured of this fact, *that death during these early attacks is most infrequent* and that Angina of Effort is *not a dangerous symptom.* It is only when Coronary Thrombosis develops and more severe damage to the myocardium results that the whole prognostic picture changes. It is, therefore, the Physician's primary duty to discard the attitude of panic and terror which so often exists in dealing with this condition. Many years of useful life may be enjoyed by the patient if he adheres to a simple routine in treatment. If he allows serious vascular disease to develop from disregarding the early attacks and goes on his way with increased exercise and thereby aggravating early myocardial changes, then he finds out too late the road along which folly beckons. If we remember that during violent exercise from one to five liters of blood (1000 to 5000 cc.) flows through the coronary arteries every sixty seconds, one can at once appreciate the need of curtailing such foolhardiness, yet many men walk miles following these attacks to help "get their wind back." The prognosis depends upon whether or not a fatal coronary thrombosis is likely to develop and upon the state of the left ventricular muscle. The yard-stick by which we measure that, would be the amount of exercise the patient can undertake comfortably. It is of practical importance to recall that a new effort even though apparently less strenuous than those which he daily undertakes, with no discomfort, may precipitate an attack. Sir James McKenzie's old dictum that *"we can do with safety what we can do with comfort"*, is nowhere more apropos than here.

As an adjunct to a careful history of the attack, the Electrocardiograph is most valuable. One may often find a normal tracing. But distinct, abnormal QRST complexes frequently clear up ones doubt. The presence of a prominent Q wave in lead three and the changes in the T waves are of invaluable assistance. If Coronary Thrombosis is present the Electrocardiograph findings and value increases enormously. An absent Q wave in the new lead four at the apex, gives us further accurate information. The right coronary artery

supplies the right ventricle and the posterior portion of the left ventricle, while the left coronary branch supplies the remainder of the left ventricle. This anatomical knowledge proves of value in interpreting findings in leads one, two and three.

Froger and Magendantz emphasize particularly the excellent results which follow proper rest and dieting in these (and Coronary Thrombosis) attacks. Rest in bed, with a low caloric diet (Karell) giving the patient Nitroglycerin which he takes immediately an attack commences or in anticipation of an attack, when he is forced to undergo some necessary extra effort, likely to induce an attack. These are simple essential points in treatment which may prolong life and prevent serious accidents.

It may then be here re-iterated that in the absence of definite physical findings, together with a negative electrocardiogram, the diagnosis of an Anginal Syndrome can be accurately made from a careful history-taking of *Essential* and *Relevant* facts.

Bibliography

Coronary Disease in Youth—Glendy, Levine, White, J.A.M.A. Nov. 27, 1937.

Angina of Effort: A Clinical Study—Bourne and Scott. B.M.J. Jan 8, 1938.

The Recognition and Treatment of Cardiac Neurosis—Glendy and White. Medical Clinics of North America, March, 1937.

Diet in the Treatment of Heart Disease—Proger and Magendantz. (Medical Clinic Boston Dispensary) 1937.

Diseases of the Heart—Sir Thomas Lewis. 1937 Edition.

Diagnosis of Heart Disease—Heart Committee of New York Tuberculosis and Health Association. 1937 Edition.

Clinical Heart Disease—Samuel A. Levine. 1937 Edition.

Paranoia and Paranoid Conditions

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"Canst thou not minister to a mind diseased;
Pluck from the memory a rooted sorrow;
Raze out the written troubles of the brain;
And, with some sweet oblivious antidote,
Cleanse the stuffed bosom of that perilous stuff
Which weighs upon the heart?"

SINCE considerable confusion appears to exist with regard to the proper classification of those states of mental aberration which produce exaltation and grandiose delusions, an attempt will be made, here, to define true or intellectual Paranoia, and to deal in a differential way with the conditions resembling it.

Paranoia is a chronic, systematised delusional state of gradual onset arising from internal causes, and without the occurrence of hallucinations. An inferiority complex precedes the condition and the transposition of inferiority into superiority is one of the most amazing changes in the whole realm of psychiatry.

This condition nearly always makes its appearance at, or after, middle life. Tracing out the personal history, however, one in all probability learns that in childhood and earlier life the patient was shy, seclusive and probably bookish and prudish. An idealist with great hopes for the future he never quite believed in his own ability and probably many a time cast longing eyes on the real or fancied ability of others. The Freudian school is particularly apt in the application of sex matters to this problem—especially stressing the importance of a homo-sexual trend in the individual and whatever truth there may be in the elaborate explanations given for the development of an exalted state from such an unfortunate one, it is at least reasonable to suppose that a feeling of inferiority could well be engendered in the victim of a homo-sexual trend. At any rate, one must admit that in the genesis of this condition a feeling of inferiority plays a prominent role. This usually exists from childhood, but it may be the result of disappointed ambition and less commonly it may be associated with guilt reactions centered about abnormal sex gratification whether auto, hetero or homo-sexual in character. An important mechanism in the change from inferiority to superiority is that of projection, in fact, it is so important that a word about its action is merited. The following example illustrates it: a man with an honest desire to succeed in life, plagued though he may have been by a feeling of inferiority, finds himself past middle life, a financial and business failure. It is a human trait, inherent in everyone, to seek some one other than one's self on whom to place the blame. The individual goes over his life, in retrospect, and sees many times where success was almost within his grasp, but rival concerns or business competitors succeeded in his stead. He may argue from this that a systematised attempt has been made throughout his life to prevent him from attaining the heights which were his just due. As a result, his inferiority ideas change—those about him are

base and inferior—and by projection he becomes a superior type—so superior that powerful agencies or secret societies have bent all their energy towards preventing him from achieving financial success.

The true paranoiac represents incident after incident to himself and gradually builds up a well systematised chain of delusions in which he explicitly believes. Argument and contradictory proof are of no avail, in fact, they strengthen his belief by forcing him to gather more proof for future arguments. Apart from the question of his delusions he remains well. Intelligence and knowledge are otherwise unchanged for a long time.

Prognosis and Treatment. This condition is uncommon in hospital practice, forming possibly, 1% of all admissions. In private practice it is decidedly more common and the reason is not far to seek. An individual who talks normally on every day subjects and who talks in such a convincing, even logical, manner on the subject of his delusions is difficult to certify, because he has many supporters who look upon him as a genius and a martyr. It is only when the thought content becomes almost entirely clouded by delusions or when the delusional trend leads him into serious difficulties, motivated by jealousy, reprisals—or amorous adventures—that the paranoiac must be put away for the protection of society. Once in hospital the prognosis is well nigh hopeless, but of the condition in general one should note that a great many paranoiacs become adjusted, and abortive or adjusted forms are much more common than is generally supposed. The question of treatment opens up the importance of mental hygiene and if there were proper supervision of the hereditary factor, proper child guidance and education, and if the economic struggle could be simplified the number of paranoiacs would undoubtedly greatly diminish. For the early case, most writers on the subject, while urging the importance of avoiding all argument with the patient, recommend that a careful attempt be made to instil a reasonable doubt into the patient's mind at the first meeting which may be enlarged upon at subsequent interviews. Psychotherapy, rather than drug treatment, is the rule and if the case comes under supervision early enough it may bring about a cure. Some cases become adjusted with, or without, treatment and are able to carry on their usual occupations. No evidence is noted in the literature to show that insulin is effective in this disease.

Differential Diagnosis. The nearest approach to the condition just described is found in *Paranoid Dementia Praecox*, but while this type of Schizophrenia develops later in life than the other forms of a disease that is essentially one of puberty, a careful history will disclose the usual premonitory symptoms, and the disease goes on, if untreated, surely and relentlessly to hopeless dementia, characterised by stereotypes, mannerisms, incoherence and total lack of interest. The delusions, while grandiose, are never well systematised and are not even well defended by the patient, who will perform the most menial task under supervision, with perhaps a half-hearted protest that the king should have better treatment, while the true paranoiac will *never* be ordered into an unsatisfactory situation by those whom he considers unworthy even to touch the hem of his garment.

For this group the "sweet oblivious antidote" is here (actually an anti-sweet). Kraepelin who did so much towards clearing up misconceptions relative to the two conditions just described looked upon the paranoid schizophrenic as practically a hopeless case. Sakel of Vienna introduced insulin shock therapy and the literature is bringing increasing evidence to show that

its results are very promising in this and in other forms of Dementia Praecox. The treatment is not a panacea, but evidence is steadily accumulating to show that a great forward step has been made towards the medical conquest of another disease.

Alcoholic Paranoia. These seekers after their own idea of the "oblivious antidote" are, generally speaking, lacking in good heredity and look upon themselves as unfortunate victims of circumstance. Long continued over-indulgence may produce a paranoid state. Hallucinations are common and euphoria is apt to be mixed with irritability. Memory defect, especially for recent events, is very marked. Treatment consists of withdrawing the irritant and general principles only. The results of treatment are only fair.

General Paralysis of the Insane. G. P. I., frequently, is a condition in which euphoria and exaltation are exhibited. On the other hand its earlier symptoms may be similar to, and mistaken for, Neurasthenia. Grandiose delusions when present are associated with marked change in both mood and personality. Memory is progressively impaired, and concentration becomes impossible. This is entirely a syphilitic disease and an early resort to lumbar puncture will show a positive spinal fluid Wasserman with, probably, a typical Langes curve. The treatment of this condition a few years ago offered nothing but heartaches. In this, as in Dementia Praecox, a better hope came from Vienna. Malaria Therapy, the discovery of Wagner Jauregg, can probably cause complete remission of symptoms in 30% of selected early cases and be helpful in 30% more. Other forms of thermal therapy, such as diathermy and typhoid vaccine injections, have their uses. Trypar samide, an arsenical first used in the treatment of African Sleeping Sickness, is decidedly better than other arsenicals perhaps because it has the power of better penetration of the choroid plexus barrier. It may be used on the early case or as an adjuvant to malaria, provided optic atrophy is not present. Finally, vigorous antileutic treatment should always be pursued even after apparent cure of the mental condition by malaria or other measures.

For the far better prognosis now available to sufferers in two of the conditions just described credit goes to Vienna—itself a recent prey to paranoid force. A more facile pen than the writer's should attempt to give full credit for the fine work that has been done towards the efficient treatment of mental disease by psychiatrists of that city. Perhaps one might be pardoned for quoting, once again, from the immortal lines of the Bard of Avon.

"To gild refined gold, to paint the lily,
To throw a perfume on the violet,
To smooth the ice, or add another hue
Unto the rainbow, or with taper-light
To seek the beauteous eye of heaven to garnish,
Is wasteful and ridiculous excess."

References.

Year Book of Neurology, Psychiatry and Endocrinology, 1937.
A Text-Book of Psychiatry, Henderson and Gillespie, 1936.
The nervous Patient, Emerson, 1935.

Insulin Therapy in Dementia Praecox

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PRELUDE

DEMENTIA Praecox is one of the most common diseases that inflicts mankind. There are more hospital beds occupied by mental patients than by all others combined and of these roughly two-thirds are Dementia Praecox. In Nova Scotia alone there are well over a thousand individuals who are considered permanently incapacitated by this disease.

In the past very little has been accomplished in the treatment of Dementia Praecox. Spontaneous cures have occurred and various methods of treatment have also produced a few recoveries; but on the whole treatment has done very little for these people, except to prolong their unfortunate lives. One reason why Dementia Praecox has become such a serious problem in the past quarter of a century is that modern methods of treatment have succeeded in prolonging the lives of these people without any appreciable addition to the number of recoveries.

Insulin Therapy

However during the past few years a new treatment for Dementia Praecox has been initiated which holds more promise than anything used previously. Newspaper accounts are to be disregarded, and even early scientific reports on this subject have suffered from inflation. But enough reliable information is now at hand to state definitely that considerable progress has been made and that a new field in therapeutics has been opened up.

Insulin treatment for Dementia Praecox was established by Dr. Sakel of Vienna. It had previously been used to stimulate the appetite in cases of mental depression, and in attempts to combat the deprivation symptoms in drug addiction. It was noted that large doses frequently produced changes in the mental reactions and behaviour of the patients. Dr. Sakel observed this and experimented on the therapeutic effect of insulin shock in various psychoses. Dr. Sakel commenced his work in October, 1933. Dr. Cameron of the Worcester State Hospital, was the first on this continent to use the treatment. During the past year it has come to be used in almost every civilized country, and at the Nova Scotia Hospital we have been trying it out since the last of November.

Technique of Treatment

In order to undertake this therapy, it is necessary that a special unit should be established for the purpose, because the treatment must be carried out very carefully if results are to be obtained, and there is also considerable danger in its application. We have established such a unit at the Nova Scotia Hospital—capable of carrying on treatment with five patients. A graduate female nurse is in charge of the unit assisted by two student nurses, one male and one female. From the therapeutic standpoint it would be preferable to have one doctor alone responsible for the unit and permit him to devote his whole time to the work. But at the present we consider our work on

Insulin Therapy as experimental; and although I feel reasonably sure that it will very soon become a standard means of treatment for certain cases of Dementia Praecox that time has not arrived yet, as we have still a good deal to learn about the selection and handling of these cases. Already we are able to see mistakes which we made only a few months ago, and undoubtedly we are still making mistakes although the first ones have been corrected.

A case should be in reasonably good physical health. As insulin in large doses tends to produce pulmonary congestion, cases with bronchitis or pulmonary tuberculosis must be avoided; although I would not consider a past history of these diseases as a contraindication if a patient was otherwise suitable for treatment. If a patient should develop a cold while undergoing treatment, the treatment must be discontinued for the time being. Of course a case of diabetes where the endocrine system and sugar metabolism is already out of gear would be a dangerous risk.

A Sugar Tolerance Test is carried out on all patients previous to their subjection to the treatment.

The actual treatment consists in the administration of insulin in the usual way by hypodermic and in a series of slowly increasing doses, until the patient falls into a state of hypoglycaemia. The patient is given one dose of insulin every morning about eight o'clock, except on Sundays. They do not have breakfast or any other nourishment on the morning of treatment. Treatment is discontinued during menstruation.

The first dose given is fifteen or twenty units. When the treatment was new, we started at ten units, but now we start at fifteen or twenty. The dose is increased by ten units per day and this rate of increase is continued until satisfactory results are obtained or it has become evident that the patient will not respond. If for any reason treatment is discontinued for a few days, it is resumed at a slightly decreased dose, five or ten units less for every day that they have been off treatment, depending on how far the treatment was advanced when it was held up. In the majority of cases treatment is pushed until coma is reached, but this is not always necessary, some of the katatonic patients respond better when taken out in the pre-coma stage.

Behaviour While Undergoing Insulin Shock

Sakel divides the shock (Bulletin 2) reaction into four definite stages. This is convenient for description although in practice the different stages shade into each other so gradually that they are often difficult to determine. Great variation in reactions occur but in describing these four stages I will try to come as close as possible to a typical case.

Incipent Stage

This stage lasts on the average about one hour. As a rule no symptoms are observed except slight drowsiness; although this depends a good deal on the patient, the theoretical condition may be upset in practice by some psychotic outburst or other abnormal variation.

Pre-Coma Stage

In this stage the physical reaction first becomes marked. The patient begins to perspire and this becomes more profuse as shock progresses. The face is flushed, variations in the blood pressure and pulse rate occur; but they are difficult to predict as they depend a good deal on the emotional state of the patient. The temperature tends to go up very slightly, although in a number of cases it falls. They complain of thirst and hunger.

As the Pre-Coma stage develops various mental changes occur. These may be in the nature of excitement, placidity, reactivation of the delusions or possibly a lucid period. Patients who have previously refused to speak may in this stage become very talkative, and patients who have previously been very talkative may become quiet. When a mental state which appears to be unusually favorable recurs on succeeding days subsequent treatments are terminated at that point. The katatonic cases especially are more likely than the others to show improvement when taken out in this stage. This stage lasts for $1\frac{1}{2}$ to 2 hours.

Stage of Coma

Coma comes on slowly $2\frac{1}{2}$ to 3 hours after the injection of insulin.

The dose required to produce coma varies greatly in different patients. The literature reports that coma is produced in some cases by 40 units, while in other cases as much as 300 units is required. In our patients the coma producing dose has varied from 85 to 260 units.

It is frequently difficult to determine when light coma is present especially in patients that show katatonia.

The coma stage is frequently heralded by muscular twitching especially marked in the facial and eye muscles.

At the commencement of coma the reflexes are likely to be increased but of course as coma deepens they gradually disappear.

Authorities differ a good deal on the question of when coma can be said to be present so the following measurement has been adopted.

The patient is not in coma until at least two of the following three signs have appeared:—

(a) The patient does not respond to external stimuli, such as his name spoken loudly in his ear.

(b) The eyes wander without fixation when the eyelid is elevated.

(c) The saliva drools from the mouth.

When the corneal reflex has gone, they are definitely in coma.

A positive Babinski may occur even in light coma.

The patient is permitted to remain in coma for various periods of time. First they are taken out when in a very light coma and if that does not produce satisfactory results, they are permitted to go deeper on subsequent occasions.

Coma is terminated by the use of glucose by mouth (when the stomach tube has to be used) or intravenously. We have obtained better results with the intravenous method and are using it altogether at the present time although we intend giving the other method a further trial later on. A 25% solution of glucose is used, about 40 or 50 c.c. usually being sufficient. In the intravenous method the patient comes out with astonishing rapidity and may be completely out even before the last of the intravenous solution has been given. When it is given by mouth they come out in 10 to 15 minutes. Following the intravenous the patient is given copious drinks containing sugar and fruit juice. At noon they are given a meal heavy in carbohydrates.

Post Coma Stage

Recovery from the shock is so rapid and complete that patients will be dressed and up about the ward ten minutes after the intravenous has been given.

Sometimes a lucid period occurs immediately on awakening from coma, and the patient may appear to be perfectly normal for a short period of time. When this occurs it is very startling, although at first it is likely to last only a few minutes. In favorable cases the lucid period occurs on succeeding days lasting longer and longer until they finally coalesce and the patient has returned to normal. But unfortunately in the majority of cases improvement takes place but not complete recovery.

Supplementary Therapy

There is a good deal more to this means of treatment than simply putting the patient into insulin shock and taking them out again. When a patient who has been subjected to insulin therapy shows a tendency towards recovery, they are in a very suggestive state and very little will produce a relapse. So when a patient begins to return to normal everything possible must be done to keep them going in the right direction. Psycho-therapy is used to keep them in as tranquil a state as possible. In all cases of Dementia Praecox lack of interest is the most difficult feature to combat. This is done by attempts to stimulate their interest in occupational and recreational therapy. Attempts at probing and deep analysis of the patient's symptoms are discouraged for fear of upsetting them, except when the patient himself requests reassurance on some special point.

Dangers of Treatment

The most frequent complication to treatment is the development of epileptiform seizures, which when they occur, develop about the line between the coma and pre coma stage, although they may also occur later. They indicate that treatment should be terminated at once by the use of intravenous glucose and in some cases adrenalin is used also. (1 cc. of a 1 in 1000) Sol. by hypo.

Fatalities occasionally occur. Sometimes the patient cannot be aroused from coma, and no explanation has been given for it. I was told about a patient who remained in coma for three days in spite of all attempts to take him out, and then he finally died.

The fatalities vary from 1% to 3% (Bulletin 1 Dussick and Sakel 3%). Institutions which report the greatest number of fatalities also report the greatest number of cures.

Autopsies on fatal cases have shown congestion of the brain and lungs.

As a rule the physical condition improves, and weight is put on during treatment. In our own cases we found this to be true with only one exception.

Many patients become more sensitive to insulin so that a dose merely sufficient to produce coma at one time may become a fatal dose later on.

In one of our cases 85 units produced coma while in another 260 units were required. In the case where 85 units produced coma she became more sensitive and a few weeks later 20 units was found to be sufficient.

Occasionally the hypoglycaemic state may occur following the injection of glucose, possibly even hours afterwards.

Apparently there is very little if any psychic trauma resulting from the shock. The patient has amnesia for the period of treatment even for part or all of the pre-coma stage. I have frequently carried on a conversation with patients during the pre-coma stage and found out later that they had apparently forgotten all about it. On one occasion a patient who was having

marked twitching of the muscles explained to me in detail the sensations which he had; a few minutes later he went into coma, and on being aroused I was astonished to find that he had forgotten all about our conversation.

Blood Sugar

A question which frequently comes up on this subject is what about the blood sugar? Does the blood sugar give you any indication as to the dose required or help in any other way. The answer is *No.* All reports have consistently stated that no relationship can be found between the level of the blood sugar and the clinical manifestations. That has also been our experience at the Nova Scotia Hospital, although we continue to determine the blood sugar level on each patient twice every day during treatment. Once before the insulin is given and once when coma has developed. Some institutions have religiously done blood sugars every ½ hour and even every 15 minutes, but they did not acquire any more information than those places where the blood sugar was ignored altogether. Under treatment the blood sugar may fall anywhere from 4 to 20 mmg. per 100 cc. It may fall 20 mmg. under a small dose of insulin and later when a coma producing dose is given to the patient, it will fall only a few points.

Of late some institutions have been doing examinations on the spinal fluid taken when the patient is in insulin shock. They report that there is apparently a definite relationship between the sugar level in the spinal fluid and the clinical reaction, but so far we have very little information on this matter.

Results

In order to correlate the various statistics published on the results of insulin treatment the Canadian National Committee for Mental Hygiene has suggested the following terms and their definition which are very useful in describing the results.

Full Remission

Applies to those cases where:—

(1) All psychotic signs and symptoms have disappeared.
(2) The patient has complete insight into their illness.
(3) They can discuss their illness with equanimity.
(4) No residual changes in personality.
(5) Normal affection (emotional) relationships.
(6) Able to resume work at the previous lead of efficiency.

Social Remission

Applies to the cases where:—

(1) There are no gross or debilitating psychotic signs or symptoms.
(2) Partial insight into illness.
(3) Slight residual changes in personality.
(4) Patient is able to carry on with his work, but previous level of efficiency may be slightly impaired.

Improvement

Patient is more easily managed, and able to care for fundamental needs without supervision.

Negative

This term speaks for itself.

Control (See Chart No. 1)

The two most important questions in insulin therapy are:

(1) Do we get any results?

(2) Are the results any better than those obtained without treatment or by other methods of treatment?

To answer the first question we experimented with insulin therapy and I shall go over the results in a minute.

To answer the second question we used a control. The control consisted of 100 consecutive admissions of Dementia Praecox covering a period from about November 1936 to December 1937. These 100 cases did not receive insulin therapy, although all those who showed any improvement did receive other means of therapy, chiefly occupational.

Treated Cases. (See Charts No. 2 and 3)

Mrs. J. (Full Remission).

A typical case of Dementia Praecox (Paranoid Type). This patient is a married woman, age 37, with a child a boy of 14 years.

Family history negative as given.

Physical health good.

Admitted to the Nova Scotia Hospital in September, 1937 with a history of a recent breakdown. Admission forms stated that she was depressed, had been constantly troubled with hallucinations of hearing for the previous two weeks, imagined that many things were happening which had no basis on fact.

On admission she had ideas of reference, thought that people were doing many things to harm her. She was afraid to write home for fear that people would make fun of everything she wrote. Believed that people could read her thoughts. She had marked hallucinations both visual and auditory. She heard voices talking to her, imagined that her boy was talking to her. She also had delusions about terrible things happening to her husband and son. She saw a vision of her son with his head cut off. She believed that she was using somebody else's heart, and that her blood was not her own and so on.

Under treatment these delusions and hallucinations gradually receded, her insight improved, and finally the delusions and hallucinations completely vanished. She now passes all the tests for a full remission and is going home in a few days.

Mr. T. A typical case of Dementia Praecox (Simple Type). Social Remission.

A man of 24, single, a student above the average person in intelligence.

Family history negative.

Admission in August, 1937, with the information that he had been peculiar for four years and especially so during the past year. He accused people of bothering him, was seclusive, did not want to see anyone. Lost interest in his personal appearance.

Following admission the most noticeable feature of his case was lack of interest and sociability. There was a slight reactive depression but no evidence of hallucinations or delusions. He appeared to be quite satisfied with his problems being solved by incarceration in a mental hospital.

On treatment he began to take an interest in himself and his environment, engaging in games with the other patients and working about the hos-

pital. He is turning over in his mind the idea of going out in the world again but he does not want to go home, where he had a good deal of trouble, and there is not as yet any other place for him to go. He is an extreme introvert and insight although improved is not complete.

Miss K. (*A case of Dementia Praecox Kat.*). *Improved.*
A girl of 19, single.
Family history negative.
Admission—November, 1937.

She broke down mentally about two months previous to admission, was depressed, self accusatory.

The medical certificates stated that she was apathetic, had a vacant expression, negativism and katatonia were present. Auditory hallucinations were present, she seldom spoke.

In hospital there was marked evidence of katatonia and hallucinations. She was destructive and untidy and had peculiar emotional outbursts.

On treatment her condition became much worse so that it had to be stopped and we gave her up as a hopeless case. Weeks after treatment was stopped she showed improvement and is still improving at the present time. She now dresses herself, keeps herself fairly neat and tidy, does a little work and for the most part talks rationally.

Mr. P. (*Another case of Katatonia*). (*Social Remission*).
Age 19, single, student, university graduate (B.Sc.).
Mother a Dementia Praecox.

Admission in October, 1937. Mental illness started one month previous to admission. He developed the delusion that people were watching him. He had ideas of reference believing that the newspapers were talking about him. Had delusion of poisoning.

Following admission to hospital he showed marked katatonic behaviour, would hold rigid postures, refused to speak.

On treatment he began to take an interest in reading, then later in speaking and finally in playing games and working. He is still a little unstable emotionally and shows some minor peculiarities of behaviour.

Miss C. (*Katatonic Dementia Praecox*). (*Social Remission*).
A single girl age 19.
Admitted to hospital in January, 1938.
Family history negative.

She broke down five weeks previous to admission. She became forgetful and absent-minded, feeling that someone was after her. Talked of suicide.

On admission she was noted to be apprehensive, was afraid of everybody, refused to speak, expression dull, showed resistiveness and negativism, also katatonic rigidity.

On treatment she improved and she now dresses herself, reads, does some work on the ward. She is very shy and reluctant to speak.

With regard to statistics from other institutions there is tremendous variability. The majority quote recoveries in from 20 to 40? In those giving the latter figure the social remissions are recorded as complete cures.

In general those institutions which have tried the treatment for considerable time, place their recoveries at about 30%. Those places which

have had more experience, tend to have better results than others—a natural result of their more thorough experience.

Now the important question is will these patients stay well.

Once improvement starts we find that it is likely to hold although one case that improved at first has since relapsed.

Going back over cases treated and recovered in the past few years it would appear that the great majority remain well. When relapses occur they are more likely to be among those in the social remission group.

But we cannot be definite about the matter until we have had at least ten years experience in Insulin Therapy.

In conclusion I would say that Insulin Therapy is a distinct improvement on older methods; although it should not be considered as replacing those older methods, some of which must be used to supplement the Insulin Therapy.

We still have a great deal to learn about Insulin Therapy and undoubtedly the means of treatment will develop further and become more efficient in the future.

CONTROL

(1) Cases which did not receive Insulin Therapy.

Consecutive Admissions of Dementia Praecox	Full Remission	Social Remission	Improved	Negative
100	3	3	8	86

(2) Insulin Therapy Completed.

No. Cases Treated	Full Remission No Psychotic signs or symptoms noticeable. Full insight.	Social Remission Recovered from Psychosis but insight incomplete and slight residual change in personality noted.	Improved	Negative
7	1	1	2	3

(3) Insulin Therapy Incompleted.

4		2	2	

Historical Sketches of Hospitals and Alms Houses in Halifax, Nova Scotia, 1749 to 1859

MARGUERITE H. L. GRANT

THE Lords of the Trade at Whitehall, England published in a London Gazette of 1749, an advertisement calling for volunteers for the new colony, which was to be established on the Acadian Peninsula, under the leadership of the Honourable Edward Cornwallis. To this government proclamation a large number, two thousand five hundred and seventy-six, persons responded, including retired sailors and soldiers, clerks, gentlemen, surgeons and surgeons' mates.

In a letter to the Admiralty at London, Mr. Hawkins, a sergeant-surgeon, was requested to call a board to examine the surgeons whose names were entered to go to Nova Scotia. Among them was a surprisingly large number of medical men, twenty-eight in all, many of whom remained in the province; it was not until about 1800 that native born Nova Scotians, Dr. Samuel Heard of Halifax, Dr. D. B. Lynd of Truro, Dr. Robert Bayard of Cornwallis and Dr. W. B. Almon of Halifax, took up the practice of medicine, Old Countrymen and Loyalists having occupied the field until that time. Again in 1814 a large number of physicians came over with the British regiments after the close of the American War, most of them leaving Halifax for other parts of the country.

The following list includes the pioneers.

Alexander Hay	ship's surgeon.
Georgius Phillipus Bruscowitz	surgeon.
Thomas Wilson	"
Charles Paine	"
William Grant	"
Robert White	"
Matthew Jones	"
Patrick Hay	"
John Wildman	"
John Inman	"
Cochrane Dickson	"
James Handerside	"
Henry Pitt	"
Joshua Sacheverall	"
David Carnegie	"
M. Rush	Doctor and surgeon.
John Willis	Chemist and surgeon.
John Steele	Lieut. and surgeon.
Augustus Caesar Harbin	Assistant Surgeon.
Robert Grant	Surgeon's mate.
Henry Menton	" "

Fenton Griffith	Surgeon's	Mate.
Thomas Lonthian	"	"
William Lascelles	"	"
John Wallis	"	"
John Grant	"	"
Daniel Brown	"	"
Archibald Campbell	"	"

To this list may be added Robert Throckmorton, surgeon and pupil at St. George's Hospital, England and one Alexander Abercrombie, who is described as an apothecary's mate. Dr. Jonathan Prescott came later. He was born in Massachusetts and after studying medicine in Louisburg came to Halifax after that town was restored to the French in 1749. Dr. Steele, a Lieutenant and surgeon, was evidently an elderly man as he arrived with a family of three sons and three daughters over sixteen years of age. He died in 1764. Major Leonard Lochman also arrived with the settlers. He was a German army surgeon with an allowance of £91.55s. 6d per annum. Very little is known about the lives of these early practitioners but there are a few whose names have been recorded, especially of those who were connected with the old hospitals and alms houses.

The new inhabitants were conveyed in thirteen transports and a sloop of war. The Honourable Edward Cornwallis reached the shores of Acadia on June 8th. 1749. The old town of Chebucto, later Halifax, then centred around the Parade with Buckingham Street the northern limit beyond which was called the North Suburbs. Salter Street was the southern boundary, south of which was known as the South Suburbs. The whole town was surrounded by palisades strengthened with block houses and beyond these the thickly wooded forests growing close to the water's edge. The streets were within this line of forts, the lamps for lighting these having been ordered from Boston. Signal Hill or Fort George, now the Citadel, and then until 1778 about eighty feet higher, formed the background. The Beach was in front of the town and was that part of the waterfront between the lowwater mark and Bedford Row. On the Beach stood the stocks and the gallows where the prisoners were punished. The fleet was anchored off shore.

It is stated that the French lost a great number of men on their passage to Louisbourg with small pox, yellow fever and other diseases, but the transports at Chebucto lost only one child. However, during that autumn and following winter nearly one thousand persons died of a destructive epidemic. On October 14th the Governor found it necessary to publish an ordinance concerning the dead and commanded all Justices of the Peace, upon the death of the settlers, to attend at the burial and carry the corpses to the grave under penalty of loss of citizenship.

The musket proof log houses were not constructed to suit the climate, so this insufficient protection from cold weather together with the intemperate habits of many of the inhabitants paved the way for the disease which caused the havoc during the winter 1749-50.

The following winter was a much milder one, fine and healthy, snow covered the ground from the middle of January until early in March, when the fishing vessels left for the banks. "There were very few sick persons, never more than about twenty-fiveon the hospital ship at one time'" This hospital ship is one of the first references to a place for the care of the sick. It was

probably one of the ships fitted out in England with doctors, nurses and medical supplies to sail with the fleet and was anchored off the Beach. The following extract from a letter written by a settler at Chebucto, July 28th, 1749, throws a little light on these ships. "Our health and preservation has been in a great measure under Almighty God, owing to the prudent measures taken by those who had the direction of the good work in having ventilators and air pipes in all the ships, and furnishing rice and fresh provisions for the use of the sick, as well as the lying-in women and young children."

It was customary in early days to have a hospital ship accompany the forces. When General Howe's army was preparing to leave Halifax in 1776, the following orders were issued. "The sick and wounded now in hospital ships that are judged proper to be carried with the army, and the invalids (till a proper ship can be allotted for them) must be put on the 'British King', and such sick as it is found necessary to remove to an hospital, and likely soon to recover, as well as those that fall ill during the passage, must be received into the same ship. The utmost exertion will be required to put a stop to the scandalous drunkenness, which of late has been too prevalent among the soldiers, so contrary to their usual behaviour and highly destructive to their health."

The settlement was a naval and military station of the Imperial Government and in sums of expenditure submitted to Parliament in 1749 and 1750 were included "amounts for hospital stores, a surgeon and medicines, drugs, instruments and other necessaries *for the hospital*". In another account the pay of surgeons, apothecaries and mid-wife, exclusive of what they received at Halifax, was £860.0.0. Mid-wives were in demand in these early days. A request came in from Colonel Sutherland in command at Lunenburg in 1755 for two proper persons to reside there as mid-wives at a salary of ten pounds a year, as the inhabitants were losing so many of their children.

In the first allotment book of the town of Halifax, the following assignment is noted: "in this square is the hospital and orphan house measuring 290 x 420 feet, through which a new street is laid."

This square included that section now bounded by Hollis and Barrington Streets, with Salter the northern and Bishop Street probably the southern boundary.

On March 19th. 1750 the frame was erected for this public hospital for the settlers and it was maintained by the British Government for several years. It was a large wooden house and stood on part of the land now occupied by Government House. Government House, erected between the years 1800-1807 was to be placed in the field between Hollis and Pleasant Streets, "to include the site of the old hospital." The corner stone of Government House was laid on September 11th, 1800 by Governor Wentworth.

An advertisement which appeared in a Halifax paper of April 25th, 1805, further designates the location of the hospital. "For sale—the old wooden building in front of new Government House. The purchaser must remove the whole of the materials in one week after sale. N.B. The brick chimneys and the stone in the cellar wall are reserved." This building was on the Hollis Street side, which is the actual front of Government House. On the northern part of the hospital and lot was a lane separating it from the orphan house which was also established in 1750. In 1804 a bill was read to authorize the Commissioners for the building of new Government House, to close the lane between Government House and the lot formerly called the Orphan House lot. At a Council held in August, 1768, it was resolved that the hospital and grounds

and the orphan house and lot be granted to trustees, but on the request of several of the magistrates the hospital was granted as an almshouse and the old wooden building was for a long time used as a residence for field officers and for other military purposes.

In 1769 there was no other building south of the old hospital on Pleasant Street except an old cottage in which later became Bremner's Field. This cottage was near the foot of South Street and figured in the tragedy of 1866 when the ship "England" arrived with cases of Asiatic Cholera on board. Pleasant Street in the last decade of the eighteenth century consisted of a broad wooden walk a mile long. It was called the "Mall" and once accorded "America's Broadway"; it extended from about Salter Street southerly to Inglis Street along the east side. It was a popular walk and much frequented by the Duke of Kent and the officers of the garrison.

Dr. Leonard Lochman states in a letter to Lieutenant-Governor Francklyn, that in 1749 he had been recommended by the Duke of Richmond to go with the new settlers to Nova Scotia as Inspector and Surgeon General of the hospital in Halifax; that he was to receive a salary of a guinea a day. He further stated that later he was told that Mr. John Steele, a Lieutenant and Surgeon, was also to go with him as chief surgeon, the positions to be equal and the fee of a guinea a day to be divided between them. This fee was later reduced to five shillings a day. In 1753 he was ordered to Lunenburg and was probably succeeded by Dr. Alexander Abercrombie. Dr. Lochman complained that he had to build another home in Lunenburg after having gone to a great expense in Halifax where he built a home with a large garden in the north suburbs. The house had a hipped roof and was situated on the northern extremity of what is now incorrectly called Lockman Street, named in compliment to him as he had been a leading citizen in that part of the town, known as "Dutch Town". After being stationed in Lunenburg he returned to Halifax where he died after a lingering illness on May 9th. 1769, in his seventy-third year. He was buried under the Old Dutch Church where a mural tablet with coat of arms may still be seen.

Records of 1752 show that Joseph Palmer was the overseer of the old public hospital and that there were twenty-two patients, twenty-one males and one female above sixteen years of age. About 1753 Dr. Alexander Abercrombie, who came over with the expedition was appointed surgeon, a man beloved by all and a "blessing to the province"... "For three years ending 1768 he was paid £60 for his services." He died in 1773 in his fifty-first year and was succeeded by Dr. John Phillips who also carried on the business of a chemist and druggist between the years 1780 and 1800, in the vicinity of the Dockyard on Phillips Hill, now Gerrish Street. After making a fortune in medicine and drugs he retired in England, where he died in 1842. In the Morning Post of February 21st., 1843, the following is noted: "A Mrs. Mary Phillips, late of Nova Scotia, has just be queathed a large fortune to be divided between the St. George's Hospital, the Hanwell Lunatic Asylum, the Blind School and the Welsh School." It was at St. George's Hospital, England, where some of these pioneer doctors were trained.

There was a common jail in the early days from which prisoners went to the stocks for punishment. The old common jail and garden was situated on Hollis Street nearly opposite to where the Halifax Hotel now stands, and formerly the property of Robert Brown. It was used until about 1787 when

an Act was passed for the sale of the old jail and garden. The police and watch were stationed under the old city building on Water Street. There was also a jail near where St. Mary's Cathedral now stands and was formerly the residence of Colonel Horseman which the Government purchased in 1752. In that year the Council recommended that the stone house, a very substantial one and "commodiously situated", which was for sale, belonging to Colonel Horseman be put in condition in place of the old one, which had been improved for the County of Halifax and which was insufficient for that purpose. It was also decided, "that it often happens that prisoners, by long confinement, the want of exercise and of the many conveniencies of life, are rendered infirm and sickly and frequently contract distempers that either prove fatal or subject them to an ill state of health after their inlargement, whereby they become incapable of serving themselves or the community; be it enacted that the justice of His Majesty's Court or any three of them (quorum unus) shall be and hereby are empowered to cause one or more apartments in the public hospital in Halifax to be conveniently fitted up an effectively secured with iron bolts, bars and locks for the reception, lodging and detention of sick and infirm prisoners for debt." The prisoners obtained a certificate from the physicians and surgeons representing their removal from the public jail to the hospital and were detained there in the safe custody of the overseer of the hospital until the surgeons certified their recovery. At this council it was stated that there were 445 persons to whom it was necessary for the Governor to allow provisions, including artificers, labourers and the provisions for the Orphan House and Hospital.

There are few records of the hospital but the following references point out some of the difficulties of the time.

In 1752 complaints were received at the House of Assembly here from the Lords of the Trade at Whitehall concerning excess charges for labour and materials for the hospital and rangers and later letters were read complaining of the cost of upkeep.

On September 23rd. 1754, a memor,al was read from Mr. John Grant, surgeon, in which he desired to contract with the Government for supplying and attending the hospital. The accounts were inspected and a decision made that no advantages could be gained by contracting. It appeared that the *Government Hospital* was in much better order and better taken care of by Dr. Abercrombie, the surgeon, than could be expected from any contractor, as well as being on a more certain footing and at a moderate expense.

Again in June, 1755 a letter was read from Mr. Pownall, secretary to the Board of Trade, enclosing memorials and complaints of Mr. John Grant relating to the affairs of the hospital. A public inquiry was ordered concerning the grievances, papers were read on the hospital's expenses, but no person appeared to abet Mr. Grant, or to make any complaint relating to the hospital or the surgeon of it. The affidavits of the surgeon's mate and of Sarah Dunlop, the matron, were taken relating to some of the particulars of the memorials. It was pointed out "that the expense of the hospital in 1755 for thirty patients was £1173. 1s. 6d. that if placed under contract for the same number of patients it would be £780. The savings then would be £393. 1s. 6d. and by certain restrictions the number of patients could be reduced to ten; the savings annually in that case would be £963. 1s. 6d." In the memorial of Sarah Dunlop complaint was made that she had worked in the hospital without reward.

Though there are few records of hospitals for the wealthier classes, measures were taken for the care of the poorer inhabitants of the town as early as 1750,

when a school house was started and established in 1752 for orphan children. It was erected just north of the old public hospital, a lane separated the two lots. Dr. Alexander Abercrombie of this old hospital was also in charge of the sick children at the school—a little later a school for German children was built on the site of the Old Dutch Church in the north suburbs. The sick of the needy were at first cared for in a temporary workhouse which was purchased by the Government in 1754. This was located on the north side of Spring Garden Road on the property now known as Grafton Park. In 1758 a bill was passed to establish a new asylum for the poor, in which year a stone house sixty feet long by twenty feet wide and twelve feet high was erected just back of where the First Baptist Church now stands. There was a hospital ward and doctors were appointed as at the public hospital. In 1812 a wing was added for the care of the insane, finally between the years 1868 and 1869 a new poor house was built in the west end of the town. The old buildings were torn down and the lot sold. It was from the old workhouse of 1758 that the Nova Scotia Hospital at Dartmouth and the Victoria General Hospital, Halifax, developed in the years 1858 and 1859 respectively.*

About 1760, Halifax with a population of three thousand, was divided into three towns, Halifax, Irish Town (in south suburbs) and Dutch Town (in north suburbs). The whole settlement contained about a thousand houses, great and small, many of which were used as barracks, hospitals for the army and navy, and for various public uses.

A plan of the city of 1761 shows on what is now Blowers Street, between Barrington and Grafton Streets, an old hospital adjacent to the quarters of Captain Vaughn (where the old wooden Infirmary stands at corner of Blowers and Barrington Streets). It was known as the *Military and Naval General Hospital* and became the centre of medical practice after the old public hospital was granted as an Alms House in 1768. The term "general hospital" in those days did not infer that it was open to the public but a hospital for the treatment of all cases among the military or navy only. It was the largest at the time and was situated on the south side of the street. In the minutes of Council of 1754 Hospital Street is mentioned in this vicinity and it was probably the old name for Blowers Street which was not so named until after 1784.

The following quotation refers to the location:

"In 1784 there was no building where the old part of the Halifax Infirmary stands but behind the site on Blowers Street was the General Hospital." Back of the hospital at the end of St. Mary's Girls School was the first Roman Catholic burying ground with an entrance from Grafton Street. Here were buried all the followers of the Roman Catholic faith who died between the years 1786 and 1844. After being used as a hospital the old building was converted into residences or soldiers barracks, which remained until they were removed for the present brick building formerly known as Aynsley's Stables.

The old building consisted of about twenty or more low one story pitched wooden houses, the Dutch type of building then quite common in Halifax. This hospital ceased to be used for the sick after the military general hospital was opened on the Citadel shortly after the Duke of Kent left Halifax in 1800, a naval hospital having been erected in the north suburbs in 1783 for sick naval men.

In account books of 1757 to 1761 are found interesting records of provisions and other items for the naval hospital, which then was probably one

* See "Historical Background of the Nova Scotia Hospital, Dartmouth and the Victoria General Hospital, Halifax," in MEDICAL BULLETIN for May, June and July, 1937.

or more of the twenty buildings of this old military general and naval hospital, or perhaps one of the two houses called the red and green hospitals near the Beach on the road leading to the naval yard (Water Street).

Extracts from Receipts of Provisions with the Number of Men and Nurses Victualled at the Naval Hospital at Halifax in the years 1757, 1758, 1759 and 1760.

1757 July	Lbs. of Beef	Lbs. of Mutton	Lbs. of Bread	Gallons of Beer	Lbs. of Rice	Lbs. of Sugar	Lbs. of Flour	Lbs of Butter
24th.	1,110	....	1,542	992	6,437	1,474	600	224
25th.	1,120	....	305	992	.....	.....	...	...
31st.	945	....	892	930	.....	.....	...	...
1758 May 23rd.	2,180	....	.....	...	.....	.....	...	...
1761 Feb. 28th.	.....	....	.....	...	.....	.....	...	...

1757 July	Lbs. of Soap	Lbs. of Candles	Men on Shore	Nurses	Steward	Total	At Sick Quarters	Victualled at Hospital
24th.	.....	125	937	19	1	957	18	939
25th.	200	...	947	19	1	967	18	949
31st.	1,900	...	500	21	1	522	10	512
1758 May 23rd.	.....	...	1,208	66	1	1,275	10	1,265
1761 Feb. 28th.	.....	...	130	13	1	144	5	139

It will be noted that there are as many as sixty-nine nurses at the hospital at one time with ten only listed at sick quarters, yet in 1779 a general stationed in New York wondered whether it were possible to find one nurse for the new hospital, "Fort Massey", which was established for the artillery in Halifax.

In 1783 Dr. Boggs was one of the mates of the military division; he was the ancestor of the Boggs family of Halifax, a Loyalist of New Jersey who had served in the British Army during the Revolution. His residence was on Grafton Street.

There are records to show that other hospitals existed in the early days but detailed accounts of these are lacking.

"In 1765 there were two hospitals near the Beach at the foot of Hawe's Hill, now Cornwallis Street, called the red and green hospitals. They were there in 1785, one stood on the site of the north country or Keating's market, the other on the property now owned by the heirs of the late H. H. Cogswell."

These hospitals were named after the colour painted and were probably used for naval men or sick seamen. Keating's market was at the foot of the hill on the north side of this cross street, which was called Hawe's Hill, after a trader who kept a store on the Beach or Water Street, just opposite the hill. The location of this hospital is referred to in the following advertisement in a Nova Scotia Chronicle of 1769, "For sale—a good house and store situate on the beach near the red hospital."

This old store is probably the one owned by Mr. Hawe and was occupied by the family as late as 1820, when Cornwallis Street (Hawe's Hill) was the northern boundary of the town. The business was then carried on by Mrs. Hawe, an old lady who was noted for her only daughter, a very beautiful girl who was said to have been the belle of the town. On the opposite corner at the foot of the hill was an old town pump called Hawe's pump.

In 1880 are records of two houses still to be seen on this old street, one at the foot of the hill on the north side (the red hospital) and the other east of Mr. McQueen's confectionery, Brunswick Street. This may have been the green hospital, which was "*further up the hill*". Also the following extract from the Acadian Recorder of September 13th, 1845 is probably another reference to this green hospital, "a few days since some labourers dug up a number of skeletons with an Indian tomahawk, in excavating the foundation of a house on Lockman Street, the skulls and teeth were quite hard and well preserved. When the place was used for a burial ground is a circumstance whereof no living individual, so far as we have learned, has any rememberance, although a house still stands, within a short distance that was formerly used as an hospital."

When Buckingham was the northern limits of the town the dead of the new colony were buried north of this and it was a common custom, when a sailor was put in the grave, to place several cannon balls to mark the spot. The Dutch burial ground was where Gerrish Street is now laid out.

As Halifax was a port where many ships were arriving from countries infected with diseases, measures had to be adopted in the meantime to prevent their introduction. In 1760 the first steps were taken towards quarantine when a ship arriving with small-pox was ordered to remain at Mauger's Beach (on McNab's Island) and the cargo to be placed in the fresh air. In 1761 an Act was passed entitled "An Act to Prevent the Spreading of Contagious Distempers." Later ships were held in quarantine between George's Island and Mauger's Beach, and in 1793 the Council advised that a "Health Boat" with a few hands be appointed to watch vessels and to get in touch with them and give instructions when coming into the harbour. From this time on more strict laws were enforced and amended from time to time until 1852 when sanitary laws were considered preferable to quarantine. In 1799 Health officers were appointed to the various ports throughout Nova Scotia.

"Medical practice in Halifax in the early part of the eighteenth century was crude indeed, profuse blood-letting, blistering, purging were the great standbys, heroic doses of calomel being the order of the day. Surgery was practically limited to lancing abscesses, performing amputations and "cutting for the stone". Anaesthetics were not known until long afterwards and patients were simply held down or strapped to the operating table, while the knife and the saw were being used, their screams often being heard outside the hospital. Suppurating wounds were the commonplaces of treatment and laudable pus was much talked about; we may reasonably presume that many

were killed whom they hoped to cure." Halifax being a naval and military station in the midst of alarms, there was no lack of clinical material and so the profession at that time represented the best skill of the age. The barber's razor was the important instrument for blood letting. It is interesting to note here that the organization of the Barber Surgeons was founded in London in 1540.

The bloodstone was used as is seen in the following extract from the journal letters of the Rev. Dr. Mather Byles, December 16th. 1787.

"Dr. Almon the system-monger came in great distress to borrow my bloodstone for a man who notwithstanding all his scientific efforts was absolutely bleeding to death. The man put on the bloodstone and the bleeding stopped; but the doctor is of the opinion that this was owing to the violent stiptics which he had been taking for several days before, and which exactly at that instant began to operate."

Blackberry jelly was a favourite remedy and the following extract from the diary of the same writer on January 11th. 1788, states, "Rheumatics and Rum-matisms are the two endemial diseases of Halifax. The night between the two years was spent in extreme pain, but without any mixture of the nephritic complaints which I have as yet had no symptom of since my constantly taking blackberry jelly."

Medicines were the property of the Government and apparently expensive for in December, 1753 a memorial was read at Council from Robert Grant, John Grant and William Merry, surgeon's mates, assistants and apothecaries. (Mr. Merry's premises were on Grafton Street the "Young Avenue" of early days). "That your memorialists have lately met with great difficulties in the recovery of their debts as surgeons and apothecaries, which have occasioned great animosities, expense, loss of time and troublesome lawsuits to your memorialists and to some of the subjects of the provinces from the supposed extravagance of medicine, accounts and attendance to them charged.... We have transmitted to your Honour the lowest price of medicines we in our consciences think reasonable to make and of which we believe a living could be procured under the strictest economy and the lowest payment that could be wished for."

The Council were of the opinion that to regulate the price of medicines was not only unprecedented but would be attended with infinitely more inconvenience than those complained of in the memorial and ordered it dismissed.

In a letter of January 13th, 1755, Mr. John Grant complained about the injustice in the present medical service in Nova Scotia by which he and others were prevented from making a living and frequently further complaints were registered by the doctors of the difficulties in collecting fees and expenses incurred in attending the sick both in the homes and institutions.

Dr. Robert Grant, a surgeon's mate, came out on the frigate "Charleton" with the expedition under Cornwallis. He lived within the pickets, at the corner of Prince and Granville Streets (where the Morning Chronicle building now stands). He was on the staff of the old public hospital where he held the position of surgeon, but was later removed from the hospital, probably as he was not on good terms with Governor Lawrence.

As late as 1813 the following doctor's bill was in dispute and throws some light on this subject.

"To Dr. J. G. V. Landsberg,

For bleeding, plasters, ointment, two operations, physic, healing and curing from fingers to elbows. £9. 12s. 8d."

In early days the doctors were the dispensers of drugs and medicines. Dr. John Phillips and Dr. Michael Head appear to have been the early druggists, they also sold other commodities. Dr. Phillips' place was near the Dockyard and Dr. Head's on Granville Street. Dr. James Fillis Avery was another who besides practising kept a drug store which he attended personally. His old firm later, Avery, Brown and Company, at No. 8 and 10 George Street became the well-known one of Messrs. Brown and Sons, and then Brown and Webb.

Few of the doctors who practised medicine during the 18th century possessed a diploma, in Great Britain to some extent and very largely in the older colonies of America, those who wished to become physicians, obtained the requisite knowledge by being apprenticed for a term of years to a prominent medical man.

As time went on measures were adopted for regulating the medical profession and in the years 1818 and 1828 bills were introduced for this purpose. As early as 1796 records show that a medical board or society existed as in that year Governor Wentworth objected to men of the Royal Nova Scotia Regiment being discharged by a medical board "as with the exception of four they were all able for duty."

In 1828 the population of the city was 44,000 and there were sixty-five registered practitioners. By 1854 the medical men numbered one hundred and twenty, one-half being native born, but the proportion of medical men was low compared to the population which had greatly increased.

In 1832 a Board of Health was formed as in England to combat the dread diseases, especially cholera which had been introduced into America through immigration.

Quackery flourished exceedingly in Nova Scotia and a provincial medical society was organized in self defence. This society existed as early as 1846 as a petition signed by the members was presented to the House requesting a public hospital. In 1867 the society was incorporated, Sir Charles Tupper, then Dr. Tupper, was presiding officer.

In 1869 a clinical society was formed, the first meeting having been held at Dr. Farrel's office. There were present: Dr. Slayter, Dr. F. R. Reid, Dr. Somers, Dr. Trenaman and Dr. Farrel. Dr. Reid was the first chairman and Dr. Farrel the first secretary. A somewhat elaborate system of by-laws was adopted and mutual exchanges of opinions and experiences presented.

Today the Medical Society of Nova Scotia is still active and the question of federation with the Canadian Medical Association is now under discussion.

to be continued.

The Nova Scotia Medical Bulletin

Official Organ of The Medical Society of Nova Scotia.

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VOL. XVII APRIL 1938 NO. 4

A Monk Was He.

THE devil was sick in Halifax last month, that most powerful of worldly devils, public opinion, and a fervent, lame-armed monk he became. There was this difference from the old rhyme, that where the sick devil of fable developed a very sensitive conscience, as becoming a holy man, the Halifax evil one promptly lost his. His sensitive point was confined to a vaccination mark which the impious might say was of greater merit, at such a time, than prayer.

In view of estimates that during the recent small pox scare more than twenty-five thousand of Halifax's sixty-five thousand people were vaccinated in a period of ten days, it is impossible to believe that, a short time before, public health authorities in Halifax placed the number of conscientious objectors to vaccination at 60%.* According to legal interpretation, a conscientious objector in Nova Scotia is one who makes statement, *under oath*, that he does not believe in vaccination as a protection against small pox. That such a type of person exists is shown in the battle science has had against public opinion ever since its birth, but that he should make up sixty per cent of Halifax people is an absurdity and has been disproven, if such were necessary, in the past weeks.

The experience of the Halifax profession in the recent outbreak was that while a few people refused vaccination in view of the disability it might bring, while many more postponed it in hope that the threatened epidemic might not develop, the objector who professed to be guided by his principles and his conscience was of an apparently extinct species.

Where, then, lies the discrepency between the statistics of to-day and those of a month, a year ago? Only two explanations are possible: either thousands of people have blithely perjured themselves to escape a passing discomfort, or else there has been gross laxity in the enforcement of government statutes and irregularity in the issuing of exemption certificates. The more likely reason is obvious.

*Of 12,691 school children enrolled in Halifax in 1932, 7,108, or 58%, presented certificates exempting them from vaccination. In Dartmouth, for the same year, the percentage was 67. There is no indication that these figures have altered appreciably since that time.

A mild outbreak of diphtheria in Halifax some months ago resulted in the administration of diphtheria toxoid to several thousands. It is to be hoped that, sufficiently scared, Halifax, capital city of Nova Scotia, home of Dalhousie Medical School, seat of provincial hospitals, might attain equality with the rest of the province in matters of public health. If tuberculosis, bovine and human, could be made sufficiently sensational; if the daily press, whose powers seem practically unlimited, could stir up an epidemic of cancer, might not that old devil be completely metamorphosized instead of suffering a mere transient relapse into virtue?

A. L. M.

The recent small-pox scare did more good than harm. Thousands are now protected who had been somewhat indifferent to the possibilities of this kind of invasion.

How did it happen that a person suffering from small-pox wiggled through the net set by our Federal Public Health authorities? One wonders if lack of clinical experience is the explanation and if the condition passed unrecognized because a "coloured plate" failed to convey, or at any rate, failed to impress itself on the minds of the unfortunate medical officials. True, it is a happy state of affairs when physicians must of necessity rely on pictures of diseases rather than on the actual conditions for their professional training. Medically speaking, however, such a method of teaching is a poor second-best. If such were not so, pathology could be taught from a book equally as well as at the post-mortem, and the stethoscope could be discarded in favour of a gramophone record.

The death of one and the grave illness of another demonstrates that small-pox is the same old virulent disease as in times past, and ever ready and alert to attack the unwary.

It would have been expected that those charged with the responsibility of preserving the public health would have recognized this rare opportunity for the instruction of medical youth: that they would have promptly communicated with the Dalhousie Medical School and advised, yea insisted, that full advantage be taken of the situation.

The Dean of the Medical School telephoned Ottawa on behalf of the students and his request was refused. He then wired the Minister asking if there were any scientific reason why his deputy should have refused and was told that the reason for refusal was the virulent type of disease and the serious condition of the patients: and believe it or not, it was dated the twenty-third day of March, in the year of our Lord nineteen hundred and thirty-eight!

H. W. S.

CASE REPORTS

The Nervous Complications of Mumps

IT is often forgotten that meningeal symptoms may be caused by mumps. The acceptance of these symptoms in a disease, generally regarded as a simple one, is not as infrequent as is generally believed. Meningeal symptoms may make their appearance at the onset of the disease, or, as is more frequent, about the second week of the illness. The following cases illustrate these points.

Case 1. G. W., a boy five years old, awoke one morning with a sense of tightness around the angle of his jaw. There was little swelling visible or palpable. Towards afternoon his temperature rose to 103 F and he complained of headache, vomited once or twice, and became somewhat irrational, but not unduly restless. On examination he showed the typical signs of meningeal irritation, such as neck rigidity, Kernig's sign, etc. These lasted for two or three days before subsiding. On the second day of his illness he showed the typical enlargement of the parotid glands. As he was not very restless and his headache not very severe no lumbar puncture was performed. His subsequent course was normal.

Case 2. A. T., a girl eight years old, had a typical case of mumps involving both parotid glands. During the course of her illness she frequently got out of bed and ran around the room. Four or five days after the swellings had subsided she awoke one morning complaining of headache, dizziness, and some disturbance of vision. She vomited her breakfast and had a temperature of 100 F. Toward afternoon her temperature rose to 103 F. and her symptoms were more marked. In addition she became quite restless and developed a more or less continuous twitching of her arms. It was at this time that I saw her and on examination found well marked signs of neurological involvement. Her reflexes were exaggerated, her neck and back were rigid, Kernig's positive, Babinski negative, pupils reacted to light and were equal in size. There were no sensory changes.

In view of her history I diagnosed the case as one of mumps meningitis. A lumbar puncture was performed which showed increased pressure, a cell count of 220 per c.mm. with a differential count of 90% non-granular cells. A chemistry of the spinal fluid was not done, due to a misunderstanding.

Her subsequent course was normal. Her temperature dropped to normal in forty-eight hours, and her neurological signs abated after a period of four or five days.

Treatment was purely palliative except for the lumbar puncture.

Neither of these cases at present show any ill effects from their complications. As a general rule the prognosis in these cases is usually good, although deafness, blindness, spastic paralysis and iodicy have been reported as occurring.

Cases with meningeal signs may be divided into two groups: (a) true meningitis: (b) the encephalitic type. These cannot be differentiated clinically as the symptoms and signs are identical. The cell count, however, does vary. In the meningitic type the cells usually reach a count of 2000 or more per c.mm.,

whereas in the encephalitic type a count of 200-300 per c.mm. is found. Actually then Case 2 is one of mumps encephalitis rather than mumps meningitis. Whereas there is no difference in the clinical symptoms, once lumbar puncture is done and the differential diagnosis made, if it is encephalitis then the prognosis becomes poorer, than if the diagnosis of meningitis had been made. There is no way in which one may suspect what case will develop these or any other complication. One thing of importance in Case 2 is the fact that the child did not remain in bed during her illness. I am quite sure that one of the best prophylactic measures that can be taken to prevent these complications is keeping the patient warm and in bed during the illness. This is particularly advisable in the handling of adult patients.

N. B. COWARD.

OBITUARY

The BULLETIN regrets to announce the death of Dr. Freeman P. Smith of Mill Village, Queens County, on March 29th, from a stroke, shortly after attending a patient. Dr. Smith was born at South Brookfield, eighty-nine years ago, and received his early education at Mill Village, then spent two years at Acadia University, and two years at Dalhousie University, and graduated from Bowdoin Medical College in Brunswick, Maine, in 1881. His collegiate course was interrupted by a break of two years during which time he worked in the lumber woods to secure money to finish his education. Dr. Smith started practice at Barrington Passage where he remained for ten years and then returned to Mill Village where he practised for nearly forty-seven years. Rich and poor alike have reason to recall with gratitude the faithful ministrations of this beloved "Country Doctor". Dr. Smith was a member of the Liverpool Masonic Order, a member of the Lunenburg-Queens Medical Society, and an honorary member of the Medical Society of Nova Scotia. Besides his widow, the former Mary Wilson of Barrington Passage, he is survived by one daughter, Mrs. James Buchanan of Liverpool. A brief funeral service was held at his home, followed by the impressive Masonic burial service. Interment was made at South Brookfield, where Frimrose Smith, the only surviving member of his family, resides.

The BULLETIN extends sympathy to Dr. R. M. Benvie of Stellarton in the death of his mother, Mrs. Eben Benvie, at her home in Saltsprings, Pictou County, on March 14th, at the advanced age of ninety-four.

Abstracts from Current Journals

SURGERY

Metycaine Spinal Anaesthesia (Woodbridge)—*American Journal of Surgery.*

A RECENT issue of the *American Journal of Surgery* contains an article on the above practical subject which is a critical analysis of the results obtained by the use of different drugs in this form of anaesthesia. The opportunities for forming judgment in such a clinic as Lahey's give to the observations of the writer a great deal of weight. The author claims for metycaine an anaesthetic quicker in onset and longer in duration than novacain or procain, while the drug is considerably less toxic. The usual technique of spinal anaesthesia is employed. The drug is administered in 10% aqueous solution mixed with spinal fluid. The solution so formed in spinal fluid is heavier than spinal fluid itself and so can be made to flow caudal or cephalad for the convenience of the operator. At the end of twenty minutes the solution is no longer moveable by gravity. The Trendelenburg position is used after this period if necessary to combat a fall in blood pressure. If the pressure falls 50% below pre-anaesthetic levels ½ c.c. of 1-1000 solution of adrenalin is used to combat this complication.

The tabulation of the type of operation shows 70% to have been abdominal while 21% were in the stomach and biliary tract. Another table shows 90% of the anaesthesias to have been satisfactory, 7.5% fair, 2.5% unsatisfactory. As to duration 99% had anaesthesia for over one hour and 50% for 100 minutes. This lengthy duration is the outstanding feature of metycaine anaesthesia.

Toxic manifestations are given as pallor, nausea, vomiting, fall of blood pressure and disturbed breathing. Blood pressure fall is based on the percentage of the pre-anaesthetic level and not on actual pressure readings. Only 1% showed more than 50% drop and none more than 75%. Disturbed respiration occurred in 5.3% of cases being largely due to paralysis of upper intercostal muscles and was combated by the inhalation of oxygen and artificial respiration. The fall in blood pressure and respiratory disturbance are the complications most seriously to be feared. The postanaesthesic complications are numbness with occasional foot drop, occasional headaches and various types of anxiety neurosis. Backache occurs but usually not severe.

The tables included in the article showing various complications and difficulties of anaesthesia are complete, clear and concise. Embracing as they do the reports of 1381 cases the findings must carry considerable weight as does also the following concluding observations. "There have been no deaths in our series attributable to spinal anaesthesia and few if any complications for which it is surely and solely to blame."

The Injection Treatment of Hernia—*American Journal of Surgery.*

Two articles on this subject are contributed to the above journal, one of which gives the rationale and technique of the above treatment, while the other gives a critical review of the successes and failures in a series of 225 cases. The more optimistic of the articles states that for over a hundred years the

injection treatment of hernia has been the idealistic dream of the medical profession. It has had periods of agitation and experimentation, its ups and downs, with final triumph as a recognized method in surgery. The other article while admitting some successes is not so optimistic.

The much extended use of sclerosing solutions for various treatments has no doubt caused the marked revival in their use for the blocking of the inguinal canal. Femoral herniae are much more difficult to treat and should not be attempted until one is thoroughly familiar with the treatment of inguinal hernia.

The essentials of treatment are:

(1) A thorough and complete mastery of the anatomy of the inguinal canal and a sense of touch as to when these different layers are passed by the injecting needle.

(2) Correct differential diagnosis between direct and indirect inguinal hernia.

(3) The use of the proper sclerosing solution, the ones suggested being the use of tannate and gallate preparations of certain plants. The ordinary sclerosing solutions must be used in such small quantities that the result is not as good as when less toxic injections such as Pina-Mestral hernial solutions is used. The injection of 5 c.c. of this solution begins at the internal ring and continues down the canal to the external ring. For the direct, the injections do not go so high.

(4) The use of a well fitting truss to be worn at all times is a prime essential in the line of treatment.

The article of critical review gives the many difficulties that beset this procedure and couples with these the fact that treatment takes up better than one year. The article of favor points out that this treatment is ambulatory, can be done in the office and is practically painless. It is also applicable to these who, through various causes, are poor risks for ordinary operative procedures. The complications are listed:

(1) Irritation of the skin under the truss.
(2) Swelling of the cord and testes which may be permanent or transient.
(3) The solution may get into a vein or in the peritoneal cavity.
(4) Recurrence of the hernia.

No doubt the method will have an appeal to those who dread the operating theatre through fear, and to those who may be prevented from ordinary herniotomy through physical disabilities.

Department of the Public Health

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Office—Metropole Building, Hollis Street, Halifax, N. S.

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Those physicians wishing to make use of the free diagnostic services offered by the Public Health Laboratory, will please address material to Dr. D. J. MacKenzie, Public Health Laboratory, Pathological Institute, Morris Street, Halifax. This free service has reference to the examination of such specimens as will assist in the diagnosis and control of communicable diseases: including Kahn test, Widal test, blood culture, cerebro spinal fluid, gonococci and sputa smears, bacteriological examination of pleural fluid, urine and faeces for tubercle or typhoid, water and milk analysis.

In connection with Cancer Control, tumor tissues are examined free. These should be addressed to Dr. R. P. Smith, Pathological Institute, Morris Street, Halifax.

All orders for Vaccines and sera are to be sent to the Department of the Public Health, Metropole Building, Halifax.

Report on Tissues sectioned and examined at the Provincial Pathological Laboratory, from March 1st., to April 1st., 1938.

During the month, 252 tissues were sectioned and examined, which with 41 tissues from 9 autopsies, makes a total of 293 tissues for the month.

Tumours, simple	27
Tumours, malignant	27
Tumours, suspicious of malignancy	1
Other conditions	197
Tissues from 9 autopsies	41
	—493

Communicable Diseases Reported by the Medical Health Officers for the month of March, 1938.

County	Cerebro Spinal Meningitis	Chickenpox	Diphtheria	Influenza	Measles	Mumps	Paratyphoid	Pneumonia	Scarlet Fever	Smallpox	Tbc. Pulmonary	V. D. G.	V. D. S.	Whooping Cough	Infantile Paralysis	German Measles	Diarrhoea	Goitre	TOTAL
Annapolis	..	6	..	4	8	..	1	15	..	..	..	..	..	..	..	..	..	..	34
Antigonish	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	3
Cape Breton	..	2	25	20	4	13	..	4	81	..	2	..	1	10	1	..	2	..	165
Colchester	..	3	..	24	48	13	..	8	..	..	1	..	..	..	..	..	..	..	97
Cumberland	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Digby	..	..	..	..	..	..	..	8	..	..	1	..	..	..	..	..	..	..	9
Guysboro	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
Halifax City	..	8	3	..	24	16	..	..	8	3	..	..	..	..	..	..	..	..	62
Halifax	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1
Hants	..	..	..	..	..	30	..	1	..	..	..	..	..	..	..	..	..	..	31
Inverness	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Kings	..	12	..	15	73	15	..	2	6	..	..	2	..	..	..	..	..	..	125
Lunenburg	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	4
Pictou	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1
Queens	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Richmond	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Shelburne	..	..	..	..	..	..	..	6	..	..	..	..	..	..	..	..	..	..	6
Victoria	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Yarmouth	..	..	..	2	..	1	..	..	..	..	..	..	..	..	..	..	..	..	3
TOTAL	..	35	28	65	161	91	1	44	97	3	4	2	1	10	1	..	2	..	545

Positive cases Tbc. reported by D.M.H.O.'s. 36.

RETURNS VITAL STATISTICS FOR FEBRUARY, 1938

County	Births M	Births F	Marriages	Deaths M	Deaths F	Stillbirths
Annapolis	23	13	8	16	11	4
Antigonish	7	11	4	15	10	0
Cape Breton	115	107	64	58	32	6
Colchester	26	23	11	20	19	4
Cumberland	45	33	23	30	25	5
Digby	12	16	13	15	14	1
Guysboro	13	13	5	12	17	0
Halifax	109	124	61	60	50	6
Hants	21	26	4	29	30	1
Inverness	21	16	6	13	11	1
Kings	17	26	16	23	18	2
Lunenburg	28	28	17	22	21	2
Pictou	37	34	35	20	21	0
Queens	16	23	9	7	6	0
Richmond	10	13	4	3	11	0
Shelburne	21	17	5	15	8	2
Victoria	9	12	1	9	9	0
Yarmouth	15	31	21	18	17	0
	545	566	307	385	330	34

Personal Interest Notes

DR. and Mrs. J. G. MacDougall of Halifax have returned from spending a vacation in Florida.

Dr. C. G. Campbell of Pictou is taking a post-graduate course at Queen's University, Kingston, Ontario.

Dr. T. A. Kirkpatrick of Kentville is at present in New York taking a post-graduate course.

Dr. G. W. A. Keddy, son of Dr. and Mrs. O. B. Keddy of Windsor, has been successful in passing the examination and receiving his F.R.C.S. at Edinburgh, Scotland. Dr. Keddy has been studying in Edinburgh and England since his graduation from Dalhousie Medical School in 1935, and will probably return to Windsor during the summer.

Dr. David B. Morris of Windsor is taking a post-graduate course at the Polyclinic Hospital in New York for two months.

Dr. E. G. Young, Dr. C. B. Weld, Dr. R. D. H. Heard and Dr. N. B. Dreyer of Halifax recently attended the three-day annual session of the Federation of the Societies for Experimental Biology at Baltimore.

Dr. Donald Mainland, Professor of Anatomy, Dalhousie University, has been invited to join the committee to study organization of medical research in Canada. Dr. Mainland is one of twelve distinguished members of the Canadian profession invited to complete personnel of the committee, of which five members already have been named.

Dr. H. T. Townsend has returned to Stellarton from England where he has been for nearly a year taking a post-graduate course.

Congratulations to Dr. and Mrs. A. M. Marshall of Halifax on the birth of a daughter on March 16th.

Dr. H. K. MacDonald of Halifax has returned from a recent visit to several clinics in Montreal and the United States.

We are pleased to note that Dr. W. R. Dunbar of Truro who has been ill since January has recovered and is able to resume his practice.

At a meeting of the Health Division of the Council of Social Agencies held in Halifax on March 21st, Halifax port quarantine regulations were discussed by Dr. W. D. Forrest. Dissatisfaction with the radio pratique method of quarantine clearance was expressed, and health problems in general and quarantine measures in particular were dealt with. Dr. N. H. Gosse was Chairman of the meeting.

Again?

"Dere goes dat slatternly Mandy Jackson wid her ten pickaninnies. She sho do look repugnant."

"Lan sakes! Again?"

Gratitude.

Hubby: "Why do you feed every tramp that comes along. They never do anything in return."

Wife: "Well, it's a relief now and then to give a man a meal and not have him find fault with everything."—*Journal.*

Dr. and Mrs. Gerald R. Burns of Halifax left the end of March for New York for an absence of about two weeks. Dr. Burns attended the sessions of the American College of Physicians at its annual convention in New York.

Applications from Maritimes and Newfoundland are between fifty and sixty for first year medicine. Applications for entrance into the first year of medicine at Dalhousie for the session 1938-39 are increasing daily. The number of new applications from natives of the Maritime Provinces and Newfoundland is between 50 and 60, distributed as follows:

Dalhousie University, 19; St. Francis Xavier, 14; Mount Allison, 9; Acadia, 8; U. N. B., 3; Memorial University, Newfoundland, 2.

Two students of the present first year class who retired on account of illness have signified their intention of returning next fall.

Although the Medical Faculty has set the ideal number of students in the entering class at 45 there is every prospect that, because of the large number of applications from the Maritime Provinces and Newfoundland, the class will reach the maximum number of 50, as has been the case during the past two years. This year, for the first time, native students who have a bachelor's degree and satisfactory academic records are being accepted immediately upon receipt of the customary deposit.

Likens the Halifax City Health to the Ox-Cart.

The attitude of Halifax to-day towards health conditions was likened to that of the ox-cart age by Dr. H. B. Atlee speaking to the Progressive Club of Halifax at their luncheon meeting on March 29th. The present Board of Health, composed of a group of laymen and one medical practitioner, was inadequate to cope with the situation, he said. Dr. Atlee suggested the establishing of a modern health department in order to put into effect the full benefit of medical science.

Dr. Atlee stated that the recent smallpox scare should never have arisen, and never would have arisen, if the proper precautions such as vaccination had been more strongly enforced. Blame for the smallpox scare, however, could not be attached to any one person.

Dr. Atlee also spoke of the high death rate from tuberculosis in Halifax and the lack of proper medical service in the schools. He suggested the setting up of a modern health department to investigate cases of tuberculosis and the training of children in schools to practise health rules as the only way to cope with the problem. In this way children will develop a background to preventive medicine.

The final Scientific Meeting of the Halifax Branch of the Medical Society of Nova Scotia, for the season of 1937-38, was held at the Dalhousie Public Health Clinic, on Wednesday, April 6th. The meeting, at which the attendance was large, proved to be most entertaining and highly instructive.

Doctor Murray McKay, Superintendent of the Nova Scotia Hospital, presented a paper on, "The Results of Insulin Therapy in Dementia Praecox". Doctor McKay stated the results obtained at his institution, as well as the procedure followed in this form of treatment. The spontaneous discussion and numerous questions asked following its completion attested to the excellence of the paper.