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The NOVA SCOTIA MEDICAL BULLETIN

Editorial

T. L. C.

In the previous issue of the Bulletin is an excellent article by Dr. Delva and Dr. Murphy of Antigonish "On the Care of Young Children in Hospital" in which the plea is made for greater liberalization of hospital visiting for parents of young children and for much greater communication between parents and those looking after their children in hospital.

It is quite true that in the past visiting in the children's unit of hospitals was, and in some hospitals still is, frowned upon. However, this rule served certain purposes. Infections were not as well understood or controlled as they are and can be to-day. The rule had as its basic purpose the physical well-being and protection of the child.

Fortunately today the material set-up in many hospitals is excellent. Every convenience is at hand to look after the physical requirements of the child and cross-infection can be more skilfully controlled by modern drugs.

Increasingly, however, those having to do with the care of children have become aware that even as "man doth not live by bread alone", so also a child's emotional needs must always be kept in mind whilst treating his physical needs per se. Doctors realize that a child leaving the hospital emotionally injured is a serious failure of professional responsibility.

For most children hospitalization is a major emotional experience, where they go from the known to the unknown. Young children may be filled with feelings of dread, anxiety and uncertainty. Older children may be burdened with fears, sometimes from previous painful experiences, sometimes from having heard lurid tales of the sufferings on operations of others, sometimes afraid of doctors or "needles", sometimes — just afraid. Words alone do not comfort them but tender loving care gives them confidence and trust in those who minister to them.

Preparing a child for hospital should begin with the physician who should help the parents to prepare the child for this experience. Tender loving care and protection for the child should begin at the admitting office and extend all along the line.

Children have special needs at various age levels. Babies need to be held, rocked, mothered. Toddlers need large doses of T.L.C. and re-assurance especially at bed time and on awakening. Older children frequently feel helpless, deserted, self-conscious and need companionship. Adolescents need "to be suggested to" rather than "told to".

Today the parents are very much a part of the medical team. Their co-operation is invaluable if a child is to have the best total care. It is vitally

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important that the relationship between the parents and the hospital staff be a friendly and mutually helpful one. A short time spent by the family physician explaining the nature of the illness is of untold value in relieving undue anxiety. Parents need – and have the right – to know about the care their child will receive in the hospital. They should be permitted to see their children frequently unless by so doing the health of the child would be jeopardized.

In hospitals where visiting privileges are arranged and planned for as a necessary part of a child's treatment, parents are encouraged to see their children as often as possible. Both the parents and children benefit greatly and both are freed from needless anxiety. The freedom to visit is seldom abused and many parents become increasingly cooperative and appreciative of the efforts of the hospital staff.

A child's first visit to the hospital can be a frightening or bewildering experience or it can be a comforting one where pain is relieved and fears are overcome. This is the challenge. Doctors, nurses, hospital staff and hospital boards who are given the high privilege and responsibility of helping little children should never forget these things but constantly carry them in their minds and hearts. ■

N.B.C.

We are Delighted to welcome another Issue of the Bulletin prepared by the Staff of the Halifax Children's Hospital.

The Editors.

The Children's Hospital

The negotiations, meetings, correspondence and preliminary planning for the new Halifax Children's Hospital proceed at an ever increasing pace. At such a time it is only natural to reflect for a while on just what a children's hospital is, for in fact it is much more than just a separate institution for a special age group.

Basically, a children's hospital differs from other hospitals in the respect that the patients are growing, developing individuals, in varying stages of mental, physical and emotional maturity. With such patients, particular skills and knowledge must be developed to meet their needs. In the field of nutrition for example, it is necessary to know much more than what essential vitamins and minerals are required. Tact, skill and common sense must be employed at all times to see that the essential diets are prepared and served in such a way that they will be accepted by the little ones in bed. The various tricks of cajoling and encouraging a sick youngster to eat are interesting to observe.

And what about physiotherapy? A painful procedure such as mobilizing a fixed joint can be explained to an adult. Children, however, do not reason well. A child would prefer a fixed joint that did not pain to any painful manoeuver. The physiotherapist then must have faculties other than a mechanical knowledge of what is necessary to be done.

The whole field of the nursing profession is offered an opportunity to exercise those qualities of tenderness, compassion, and patience to the greatest degree in a children's hospital, for it is the nurse who takes the mother's place for these little ones when they must be separated from home. This is brought out most explicitly in the recovery room, where the harassed staff must do real "Florence Nightingale" work among trying surroundings.

Special tact and capabilities are needed in the admitting department also. In an adult hospital, the mechanics of admission are attended to quickly and the patient is then taken to his bed where he may wait many hours for history taking. In a children's hospital, the patients must wait for the busy internes. This in itself, along with the many consent forms, hospital insurance forms, and problems relating to various types of accommodation lead to a hectic situation on busy days.

The education of these growing, developing patients must be provided. Consider the many problems of an ordinary school room, multiply these by such things as different age groups, different religions, different home conditions, widespread geographic areas, and variations in degree of mental and physical well being and you end up with an educators nightmare. And yet, day in and day out, as many of the little ones as possible are provided with schooling.

Particular problems of a technical nature, such as differences in drug tolerance, special techniques in anaesthesia, particular dental attention, are all met and conquered every day within the walls of this hospital.

In fact, the hospital is a home away from home for the sick child, and as such the nearest possible approximation to ideal conditions must be provided. It is not an overstatement then to say that a children's hospital is a very special institution, differing in many ways from any other institution known to society. The patients that are confined therein will in a few short years be taking over the reins from those that now provide the care.

I hope that all who play a part in the development of the new hospital may be able to appreciate the full significance of the role of a Children's Hospital. ■

R. S. GRANT, M.D.

Recent Advances in Medical Genetics

PART I — Trisomy 21 Syndrome

MAUREEN H. ROBERTS* M.B., CH.B., D.C.H., F.A.A.P.

M. P. a mentally retarded child was sent to the Children's Hospital for investigation. He was born on 30th Nov., 1963, the third child of two normal parents aged 21 and 27 at the time of his birth, which was without abnormal incident. The pregnancy had been unremarkable. He was found to be a somewhat unusual case of mongolism (Down's Syndrome) with concomitant hydrocephalus, so that some of his features did not resemble the typical mongol. He had slanted eyes with marked epicanthal folds, protruding pointed tongue, hypotonia of all limbs and mental retardation. A heart murmur was heard which was thought to be organic in origin and probably due to a congenital heart defect.

The parents were given advice in management of the child and follow up care. It appeared that the hydrocephalus was arrested. They are, however, still young and wish to know their chances of having another mongol baby.

Chromosomal investigation of the child and his parents was undertaken to determine which type of mongolism he suffered from — trisomy 21, which may be termed a genetic accident, or a "translocation type", which is hereditary.

Venous blood culture of the three persons was set up using the technique of Moorehead[1] and at the end of 3 days the dividing cells were treated with colchicine to arrest them in metaphase. The cells were then swelled and fixed, and slides made and stained.

Chromosome counts were performed on a fairly large number of cells and a representative few photographed to prepare a permanent visible record, a karyogram, on which the chromosomes are arranged in descending order of size and numbered according to the Denver[2] classification.

Fig. 1 is the karyogram of M.P. which shows a total count of 47 chromosomes instead of the normal 46 (or 23 pairs) and there are three of the no. 21's instead of the normal two. This gives us the diagnosis of mongolism of the more common trisomy 21 type.

The patient's mother showed a normal female karyogram of 46 chromosomes with the female XX sex chromosome pair, (see Fig. 2) and the father showed also a normal male pattern 46 (xy) as seen in Fig. 3.

Discussion

Trisomy is thought to be due to a chromosomal accident at the time of formation of either the ovum or sperm. When the pairs of chromosomes split in the reduction division forming the secondary spermatocyte or the secondary oocyte, the pairs normally separate from each other, forming gametes with 23 single chromosomes in each. By chance two of the no. 21's migrate together into one of the germ cells either by being temporarily attached to or tangled with its pair (non-disjunction) or by being delayed in separating and so-to-speak "missing the boat" (anaphase lag — this might cause it to be lost altogether). Either of these happenings may lead to germ cells being formed

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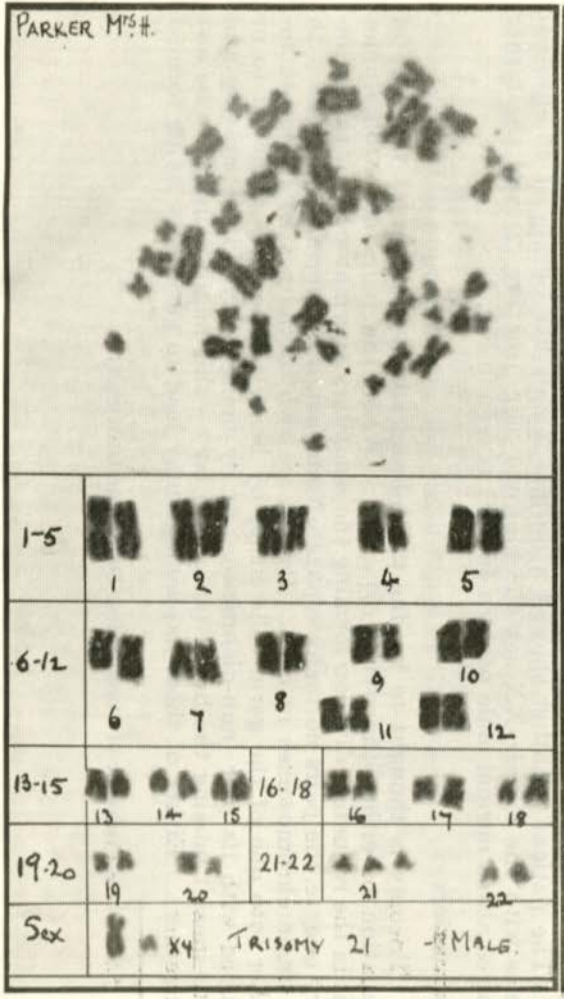


FIG. 1

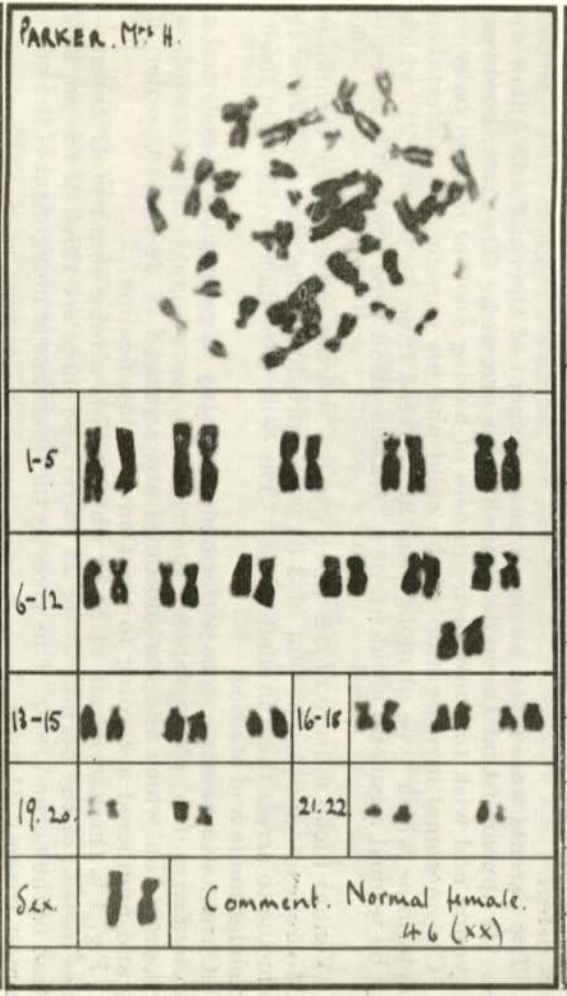


FIG. 2

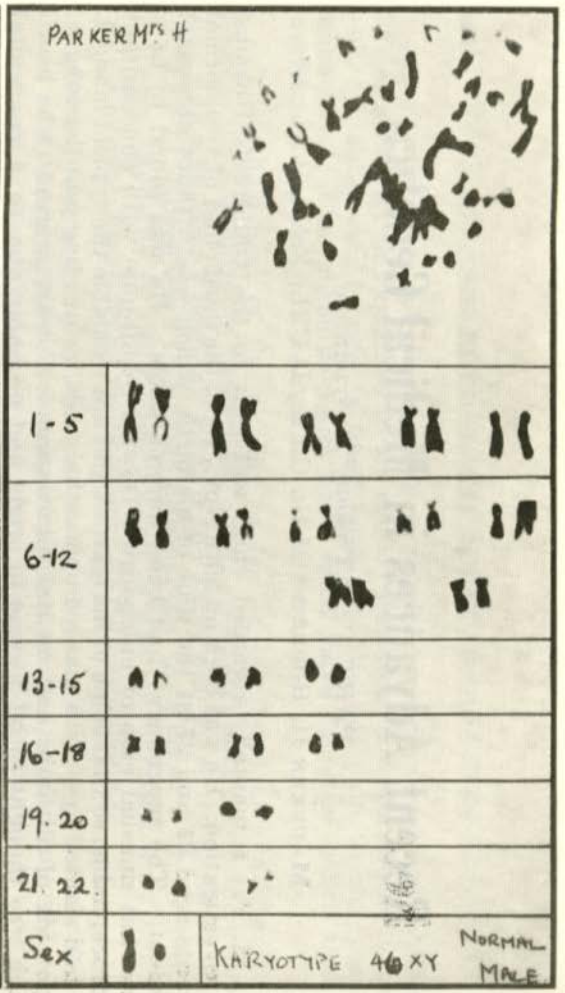


FIG. 3

containing either 24 or 22 chromosomes. So far no cases of whole missing chromosomes have been described except in the case of sex chromosomes, but this may well be found.

In this child the result of the fertilization of a normal 23 chromosome gamete by an abnormal 24 gamete has resulted in an individual with 47 chromosomes. When the no. 21 chromosome is the trisomic one, mongolism seems to be the result, although how this is actually produced is uncertain.

As non-disjunction is presumably an accidental happening the chances of these parents having another mongol child are not great, although naturally much more than those of other young parents who have never had a mongol baby at all. (If the causes of non-disjunction were certain we would be on firmer ground here.) The chances in the general population of a young mother of 25 having a mongol child are about 1/1000, but increase with advancing maternal age, e.g. at 45, they rise rapidly to about 1/25, chromosomal defects being perhaps commonest in an aging ovary.

Had this child been a mongol of the hereditary type, the chance of a recurrence of this would have been altogether different, almost as high as one in three in some cases. I hope to publish pictures of this type which is much less common when we find a case.

Summary

A case of mongolism (Down's Syndrome) is due to trisomy 21 is presented. The likelihood of its recurrence to the same parents is discussed. ■

REFERENCES - please turn to page 154.

Salicylate Poisoning in Children

FRASER MACDONALD, M.D.

Salicylate intoxication is the most common cause of poisoning that is seen in the paediatric age group. In adults it is second only to barbiturates in suicidal attempts. At the Halifax Children's Hospital and through the Poison Control Centre, cases are seen all too frequently and an average of four emergency treatments per week are performed. It is not unusual to see three or four children at one time. Fortunately most cases occur during daylight hours and Sunday morning seems to be the favourite time.

Salicylate intoxication can be caused in two ways:

(a) accidental overdosage
(b) therapeutic overdosage — which occurs in the treatment of
  (i) febrile illnesses
  (ii) rheumatic disorders

Most of the cases of accidental overdosage occur in the age group from 2 to 4 years — the age of extreme curiosity. These cases are the most satisfactory to treat as co-existing disease is not usually present.

Therapeutic overdosage is a rarity in treatment of rheumatic disorders because the children are usually older and dosage is adhered to carefully and there are early and obvious signs of toxicity. However, in infants treated with salicylates during febrile illness, toxicity can occur fairly rapidly. Extreme caution in the use of aspirin in infants is necessary.

Occasionally an older child is responsible for several young children being fed aspirin, during a "doctor-nurse" play session.

Salicylism seems to be increasing in frequency due primarily to the frequent advertisements of various products by news media. It is a rarity not to find a bottle of aspirin, adult or children's, in every household. Unfortunately, with this widespread advertising, there is very little public education as to its hazards. The candy flavouring does not help, and the use of safety grip containers is an insult to a youngster's intelligence. One observation of cap removal is usually enough to allow the youngster to do the job himself. The only fortunate fact about the use of baby aspirin is that the containers are small and the total dosage per bottle is not great.

Pharmacology

The parent compound of salicylates is salicylic acid. This drug is used topically as a keratolytic, fungicide, and as an antiseptic.

Acetylsalicylic acid, or aspirin, is the most commonly used salicylate.

Methyl salicylate, or oil of wintergreen, is used for topical therapy and is a basic ingredient in many liniments.

Sodium salicylate is similar to aspirin in dosage and uses.

Aspirin is used for its antiphlogistic, analgesic, and antipyretic properties. It is also a uricosuric agent and has been used in urolithiasis.

The mechanism of action is by no means clear. Antipyresis is usually rapid and effective in febrile patients, but is rarely demonstrable when the temperature is normal. Most evidence points to a central nervous system action with secondary increase in peripheral blood flow and sweating.

Analgesia by salicylates is due to a central depressant action. Aspirin has greater analgesic properties than sodium salicylate, but only pain of low intensity is relieved. In high dosage, salicylates also exert a toxic effect on the central nervous system.

The antiphlogistic action of these compounds is not well understood. Various theories have been proposed and involve the pituitary — adrenocortical axis, blood vessels, inhibitors of enzymes, alterations in body water and immunological responses.

The action on respiration, acid-base balance, cardiovascular system, gastro-intestinal tract, hepatic and renal system, and metabolism, will be discussed later.

Absorption, Distribution, Fate and Excretion

Aspirin can be absorbed from the stomach but is mainly absorbed from the upper small intestine. Effervescent preparations hasten emptying of the stomach as does sodium bicarbonate and also increases absorption. Sodium salicylate is absorbed more rapidly than aspirin. Amounts can be detected in the urine within 10 to 15 minutes and peak blood levels are obtained in 2 to 3 hours, decreasing over an 8 hour period. Rectal absorption of salicylate is usually incomplete and unreliable, especially when high levels are wanted. Topical salicylates may be absorbed if used over large areas of the body. Methyl salicylate is absorbed more slowly and lavage should be performed in all cases of oral ingestion.

After absorption, salicylate is readily distributed throughout all body tissues. At usual dosages, most is bound to plasma proteins and the percentage of unbound salicylate increases as the plasma concentration of the drug rises: Plasma salicylate level is also dependent on the pH of the urine. Administration of sodium bicarbonate tends to lower the level due to enhanced excretion and ammonium chloride tends to elevate it.

Salicylates are excreted mainly via the kidneys by filtration and tubular excretion. In the urine, it is found free, as salicyluric acid, gentisic acid, and conjugates of glucuronic and salicylic acid. Though detection in the urine is rapid, excretion is slow. Approximately 50% of a given dose is eliminated in 24 hours. Concomitant disease has considerable effect on excretion. In febrile conditions, kidney disease, chronic alcoholism, morphinism, and hyperthyroidism, excretion is diminished. Also, in infants, elimination may be less effective due to hepatic and renal immaturity as well as an increased tendency to develop severe dehydration.

Toxicity is not always related to dosage. Blood salicylate levels of 30 mg% or higher can be considered as a toxic level. In disease states "pyramiding" may occur; i.e. an increasing rise of plasma salicylate level with each succeeding dose due to diminished excretion. The possibility can be entertained that altered renal function can be attributed to the use of other drugs along with aspirin. The antibiotics etc., may compete with tubular excretion or facilitate reabsorption. This concept is worthy of further investigation.

Pathological Physiology and Clinical Findings

The initial sign in children is usually **vomiting.** This may be due to local irritation, but is felt to be mostly central in origin. Idiosyncrasy to aspirin may occur and manifests itself in a variety of ways from an anaphylactoid reaction to skin rashes.

Gastro-intestinal haemorrhage may occur, but this is not common and with a large overdosage of aspirin, gastroscopic examination may fail to show any abnormalities. Vomiting is usually present and this is followed, from 3 to 8 hours after ingestion, by hyperpnea which is due to stimulation of the respiratory centre either directly or reflexly through chemoreceptors. Initially there is hyperpnea, but as intoxication increases, tachypnea also occurs.

The hyperpnea results in an excessive loss of CO_2, leading to a rise in pH with a resulting initial respiratory alkalosis. Most children with signs of intoxication when first seen are in this stage, that is with a blood pH of 7.41, or higher, and a normal or low CO_2 content.

This early respiratory alkalosis results in a renal compensation mechanism to correct the alkalosis by a decrease in bicarbonate reabsorption and alkalinization of the urine. In older children and adults the disturbance may remain in this stage after cessation of therapy or lavage. However, in younger children and infants with evidence of moderate to severe toxicity, after a variable length of time, a primary decrease in buffer base and CO_2 content occurs, which results in a metabolic acidosis. The blood pH drops to lower levels (below 7.35) and the plasma CO_2 content decreases.

A discussion here of the effects of salicylates on carbohydrate metabolism is necessary. Hyperglycemia and glycosuria are sometimes observed after large doses of aspirin. Some workers feel that the acidosis is primarily due to ketosis resulting from an alteration of the Krebs cycle of carbohydrate metabolism by salicylates with inhibition of utilization of lactate.

In the urine the presence of protein, casts and cells may be noted in many cases. Ketones are usual and reducing substances can be detected. The ferric chloride test will show a violet color characteristic of salicylates. A mild diuretic effect which may further increase dehydration, along with profuse sweating is also noted. In severe states, oliguria and renal failure may ensue.

Hyperpyrexia itself may be due to salicylate intoxication and is central in origin. A bleeding tendency may infrequently be noted in severe cases. This is primarily attributed to prolongation of prothrombin time due to salicylates.

Severe respiratory alkalosis may produce tetany. Sodium bicarbonate treatment in early stages will aggravate this tendency. Terminal cases manifest hyperactivity, disorientation, stupor, convulsions, circulatory collapse, coma and respiratory failure.

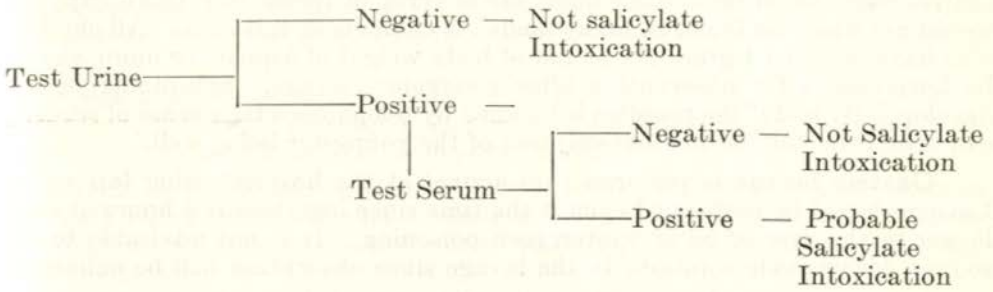
Diagnosis

Salicylate poisoning should be considered as a complication in many disease states in which aspirin therapy is used, as well as in cases of undetermined fever. In accidental overdosage the diagnosis is obvious. Blood salicylate levels can be determined easily and quickly by most laboratories. The ferric chloride test, consisting of adding a 10% solution of ferric chloride to 5 cc. of previously boiled urine, produces a brownish color in the urine indicative of the presence of salicylates (or phenothiazines).

The use of Phenistix promises to be helpful in areas where laboratory facilities are not available. These cellulose strips, impregnated with ferric and magnesium salts, turn a brownish purple color with salicylates and a grey green to blue color with phenylketones. They can be used in either urine or

serum. A color chart is available for estimating urine or serum levels. The following scheme may be used.

Fig. I



The following clinical classification may be helpful in deciding the degree of severity. In a separate column are listed possible laboratory findings.

Severity	Clinical	Blood Levels
(1) No symptoms	Occasional subjective but not objective findings	Salicylate 15 mg% pH 7.40 CO_2 20 mEq/L
(2) Mild	Mild to moderate hyperpnea, sometimes lethargy	Salicylate 30 mg% or higher pH 7.48 CO_2 16 mEq/L
(3) Moderate	Severe hyperpnea Prominent neurological disturbance (marked lethargy and/or excitability but not coma or convulsions	Salicylate 50 mg% or higher pH 7.38 CO_2 10 mEq/L
(4) Severe	Severe hyperpnea, coma or semi-coma with or without convulsions	Salicylate 70 mg% or higher pH 7.32 CO_2 8 mEq/L

The condition which salicylate poisoning resembles most closely is diabetic acidosis. Chemical and laboratory findings can be quite similar.

There is poor correlation between blood levels of circulating salicylate with severity of intoxication. Patients have died with levels less than 15 mg% while others have been relatively asymptomatic with levels up to .50 to .60 mgm%. An intrapolated salicylate level using logarithmic functions of time and elimination rates has been proposed as a better method of determining severity of intoxication in cases of massive single ingestion.

Symptoms of salicylate poisoning have been observed following a time lapse of up to 24 hours after ingestion of aspirin.

Treatment

Treatment of salicylism should be individualized in all cases. However, a basic routine is helpful in management.

Emergency Treatment should be instituted in the home. After the approximate amount ingested, the time since ingestion, the age of the patient,

whether or not the child is ill, and time necessary to reach a hospital has been determined, the parents should induce vomiting. This can be done by laying the child on the lap and inserting a gloved finger or spoon in the mouth. Some centres recommend the routine home use of syrup of Ipecac, but this compound would not likely be found in many medicine cabinets in this area. All children who have ingested 1 grain per pound of body weight of aspirin, or more, should be hospitalized for observation after emergency lavage. Symptoms seldom develop early and if the problem is handled by telephone a false sense of security can arise from the mother's description of the youngster being well.

Gastric lavage is performed on arrival at the hospital using tap water. Lavage should be performed even if the time since ingestion is 4 hours or even longer in the case of oil of wintergreen poisoning. It is not advisable to use sodium bicarbonate solutions in the lavage since absorption will be enhanced.

Laboratory studies — Blood should be taken, if possible, for determination of salicylate levels, pH and CO_2 content. Other tests might be useful such as serum Na, K, Cl, Ca, blood sugar BUN and prothrombin time. In severe toxic states, serum electrolytes, pH and salicylate levels should be determined at frequent intervals. Serum may be tested with the Phenistix as previously mentioned. Further investigation would be dependent on whether or not other disease is present, such as pneumonia, etc. A leucocytosis present may be due to salicylates. Urinalysis also can be helpful initially. Urine pH should be determined as well as evaluation for sugar, albumin, microscopic examination for cells and casts. Again the use of Phenistix will be helpful. One point that should be mentioned is that phenothiazine may give urine a color change similar to salicylates.

Fluid Therapy — The type of therapy here depends again on the severity and the presence or absence of vomiting. If the child is not vomiting, fluids can be given orally and should be pushed. Sodium bicarbonate, the specific antidote, has been advocated, but should **not** be used until approximately 6 hours have elapsed since the onset of symptoms. (Note: Not 6 hours from the time of ingestion). The oral dose of sodium bicarbonate is 60 milligrams per pound per day.

If the child is vomiting or in severe distress, intravenous therapy should be started. Amounts given should be large enough to correct dehydration and supply maintenance. Orders should state the total amount of fluid per 24 hours, the type of fluid, and the rate of administration. Amounts can be calculated using the weight method or by the surface area method. For example 120 cc. per kilogram per day, for the average 2 year old, or 2500 cc. per square meter of body surface.

The choice of I. V. solution varies, but generally a hypotonic electrolyte solution with glucose and water is satisfactory. For example 1/3 strength or $\frac{1}{4}$ strength Ringer's Lactate, or 1/3 strength glucose — saline solutions. Ample glucose in the form of 5 or 10% solutions will help reduce ketosis. If 1/3 strength glucose-saline solution is used, potassium should be added in amounts up to 2.0 milliequivalent per kilogram per day.

Care should be taken to avoid overhydration. If acidosis is severe, e.g. CO_2 content less than 10 millequivalents per Litre and plasma pH is below 7.35, then sodium bicarbonate solution can be added to the intravenous to raise the CO_2 content by 5 mEq/L or less. Patients may swing rapidly into alkalosis if too much is given.

Dosage for sodium bicarbonate can be calculated as follows.

0.058 grams per kilogram body weight to raise the CO_2 content 1 mEq/L or **approx.** 0.3 Gm/Kg. to produce a 5 mEq/L rise.

This should be used in a $2\frac{1}{2}$ to 3% solution. Intravenous therapy should be continued until the child can take oral fluids and electrolyte balance is improved.

Pyrexia can be controlled by external cooling. The use of sedation such as barbiturates is not recommended, since a possible synergistic effect with salicylates has been found in experimental studies.

Shock should be managed in the usual manner with whole blood, albumin or plasma transfusions. Serum albumin has the theoretical potential of combining with salicylate compounds and rendering them less toxic and more readily excretable.

Tetany may ensue due to respiratory alkalosis and/or early bicarbonate therapy. This can be controlled with calcium gluconate in amounts of 5-10 ml. of 10% solution given slowly intravenously.

Vitamin K is often used in therapy though not usually necessary in mild cases. However, in moderate to severe cases it may be useful. 1 mg. of Vitamin K will counteract approximately 1 **gm.** of salicylate.

Vitamin C is also used on the basis that the adrenals are depleted of ascorbic acid content in salicylate intoxication.

In severe cases manifesting hyperactivity, disorientation, stupor, convulsions, circulatory collapse, coma and respiratory failure, a rapid investigation and immediate therapy is important. In these cases peritoneal dialysis is advisable. To date this has not been used very frequently as most cases are seen here early. Alternatively in severe cases exchange transfusions or extracorporeal hemodialysis may be used. Increasing use of peritoneal dialysis in severe intoxications may lower mortality in the future. At blood salicylate levels of 80 mg% or higher in first 24 hours after ingestion, peritoneal dialysis is indicated. The time taken to reach a central area in severe cases might not be justified.

The use of acetazolamide (Diamox) has been advocated and has been investigated for the past few years. Because of conflicting reports it is probably unwise at present to use this drug at the present time except on a research basis.

Prophylaxis

Prevention at times is more difficult than treatment. An approach to this problem has been made by the manufacturers by using safety grip containers and small bottles. Warning labels are also necessary. Since news media influence people with regard to the usefulness of this drug but not its dangers, perhaps the medical profession could also use these media to explain its hazards. Mass over-the-counter sales of aspirin could be reduced and particular stress placed on safe aspirin dosage in infants, especially for any length of time. It would be interesting to record the number of aspirin poisoning calls received before and after widespread public education programmes have been instituted.

Summary

The importance of aspirin poisoning in children and its causes has been reviewed. A brief review of pharmacology is included. Clinically, aspirin

exerts a unique effect on acid base balance and the symptomatology is related to several factors such as age, amount taken, time interval, and presence or absence of pre-existing disease. A treatment plan is outlined, stressing individualization but also the importance of close observation. The need for more public education in this matter is emphasized. ■

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Human Water Needs and Water Use in America

Charles C. Bradley

(Abstracted from SCIENCE, 26 Oct., 1962)

Man's need for water is reviewed and is found to be far greater than the two quarts or so needed for drinking. A much larger volume is needed to sustain the food chain from soil to stomach. To produce a pound of wheat takes about 1,000 lbs of water, and the feed to produce a man's average diet (on the N. American scale) of meat would take 23,000 lbs or 2,300 gallons of water. This gives in round figures 2,500 gallons of water per man per day as the minimum for the provision of food. The water used in industry and the removal of waste raises this figure still further; after allowing for the proportion of the continent's rainfall which evaporates and that which runs off to the sea, the Author concludes that this continent can accommodate 50 million more people than now, or a total of 230 million before our standard of living starts to suffer. This figure will be reached before 2000 AD and he finishes with the remark that "young Americans alive today will see a significant deterioration in their standard of living before they are much past middle age," but "we should have almost 200 years before the American standard of living drops to subsistence level and Malthusian controls eliminate the necessity for intelligent action." ■

continued from page 147.

RECENT ADVANCES IN MEDICAL GENETICS

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The genetic studies resulting in this paper are supported by Federal-Provincial Health Research Grant 602-13-19 which has enabled a human chromosome research unit to be established.

Current Therapy In The Nephrotic Syndrome Of Childhood

C. T. Gillespie, B.Sc., M.D., C.M.

Introduction

In recent years much progress has been made in understanding the pathogenesis of the nephrotic syndrome. This syndrome embraces a wide variety of clinical states, but in childhood the commonest variety is the co-called *idiopathic nephrotic syndrome*, of which the specific etiology is presently unknown. It is still often referred to as *lipoid nephrosis* or *pure nephrosis*, but since these terms are confusing and give no indication of the pathology they are best abandoned. The term, *Ellis type II nephritis*, with the "pale, wet, kidneys" is confusing since Ellis was referring mainly to adults in the nephrotic stage of chronic glomerulo-nephritis.

In addition to the idiopathic nephrotic syndrome of childhood, (hereafter referred to as INSC), the syndrome also occurs in rare neonatal and familial cases where the prognosis is poor. It is also seen in various systemic diseases including diabetes mellitus, amyloidosis, sickle cell anemia, constrictive pericarditis, disseminated lupus erythematosus, and glomerulonephritis. Infectious diseases in which the nephrotic syndrome may occur include tuberculosis, syphilis, cytomegalic inclusion disease, subacute bacterial endocarditis and typhus. The syndrome may also be found after bee stings, poison oak or poison ivy intoxication, and following the use of gold salts, bismuth, Tridione and paradione, cold pills, and polio vaccine. Contact with wool has been cited as a causative factor. Finally a number of cases have been reported in association with renal vein thrombosis. Frequently in childhood however, no causative or precipitating factors can be demonstrated, hence the term "idiopathic."

Definition

The INSC may be defined as a clinical state manifested by edema, proteinuria, hypoalbuminemia and hypercholesterolemia, in which no known causative factors can be found. Most cases present between the ages of $1\frac{1}{2}$ and 4 years, the average age of onset being $2\frac{1}{2}$ years. It is commoner in boys than girls, but the exact incidence is unknown. However, estimates range from about 7 per 100,000 persons under 5 years of age to less than 1 case per 100,000 children under 10 years.

Pathophysiology

While the etiology remains unknown, there is a growing body of evidence pointing to an immunochemical disorder or some alteration of intermediary metabolism. Both auto-antibodies and iso-antibodies have been demonstrated in the experimental nephrotic syndrome in rats, and electron microscopy has demonstrated pathological changes identical to those found in humans with nephrotic syndrome.

It is now known that the primary lesion is in the basement membrane of the glomerulus where abnormal glomerular epithelial foot processes have

been consistently demonstrated. These changes are seen by electron microscopy when there is no evidence of abnormality using the light microscope. The lesions result in both renal and systemic functional abnormalities.

These functional abnormalities are reflected in the clinical and laboratory findings. Edema formation is related to lowered serum proteins and fluid retention on the basis of sodium retention secondary to hyperaldosteronism. It is further aggravated by marked decreases in circulating blood volume. The hypoproteinemia is related not only to increased loss through the kidneys, but also to increased catabolism and decreased synthesis in the body as well as poor dietary intake. The proteinuria is an index of altered permeability of the glomerular basement membrane to plasma proteins, especially albumin. It may also reflect a decreased tubular reabsorption of protein. Blood lipids show an inverse relationship with albumin: as the serum albumin falls below normal levels, blood lipid levels rise. Electrophoresis shows lowered gamma globulins but increased amounts of alpha^2 globulins and beta-globulin. Compensatory mechanisms to combat decreased circulating blood volume include increased secretion of aldosterone and anti-diuretic hormone. Serum potassium levels may be low due to increased urinary loss of potassium secondary to aldosterone secretion. Serum calcium is often low and tetany may ensue because of decreased ionized calcium levels.

Diagnosis

The onset is often gradual but may be acute especially when infection precedes the illness. Edema is the usual presenting sign and when heavy proteinuria (the urinary protein includes globulins and other proteins as well as albumin) is found, a presumptive diagnosis may be made.

On admission to hospital the diagnosis can be confirmed by obtaining serum protein levels (decreased) and the serum cholesterol level (elevated). In addition to these, certain other investigations are recommended before instituting therapy. Nose, throat, and urine cultures should be done routinely as well as a chest X-ray, hemoglobin, white blood cell count, packed red cell volume and erythrocyte sedimentation rate (ESR). The blood urea nitrogen (BUN), and serum sodium, potassium, chloride, and carbon dioxide content should be determined where possible and daily urinalyses obtained. If a source of infection is found, antibiotic therapy should be instituted. If a tuberculin or PPD test has not been done recently, this should be done immediately, since the nephrotic syndrome may rarely be a manifestation of tuberculosis.

Management

In milder cases, with proteinuria and minimal edema, a sodium-restricted diet should be given and steroid therapy may be started immediately.

If massive edema or anasarca is present and signs of hypovolemia (marked hypoalbuminemia, elevated hematocrit, pallor and often paradoxical hypertension) are present, the initial treatment should consist of the intravenous administration of salt-free serum albumin, before corticosteroids are used. The dose of albumin varies with the severity of the situation. In more edematous patients 25 grams of albumin per square meter of body surface area or up to 1.0 gram per kilogram body weight in 200 ml. of 10% glucose in water may be used, repeated twice daily if necessary. The albumin will help to correct the hypovolemia and assist in promoting diuresis.

Once infection is treated and hypovolemia corrected, then definitive management may begin. **If no infection is present, the patient should be ambulatory**; he will tend to limit his activities to his own capacity. The diet should be as palatable as possible with particular attention to a high caloric intake. Protein in the diet should be given freely as long as the patient can tolerate it.

In the pre-diuretic phase, a low-salt diet is given but it is important to recognize that once diuresis occurs, **salt restriction should be terminated,** since sodium losses during diuresis may result in severe hyponatremia.

Since steroids cause retention of sodium, chloride and water, and renal loss of potassium, existing edema may be aggravated during corticosteroid therapy and hypokalemia with subsequent tubular damage may result. A daily weight chart along with daily measurements of urine output are most important in determining the increase or decrease of edema. If edema is moderate to severe, diuretic therapy is indicated, either before or in conjunction with steroid therapy.

Useful diuretic agents are hydrochlorthiazide, 10 milligrams per kilogram body weight per day in two divided doses, and spironolactone, 30 to 100 milligrams per kilogram body weight per day. As noted earlier, hypovolemia must be corrected with serum albumin before these agents are used since they may produce serious electrolyte disturbances. Either drug may be used alone but are preferably used in combination where a synergistic effect is obtained since they act at different sites in the kidney (hydrochlorthiazide blocks sodium reabsorption in the upper distal tubule and spironolactone acts on the potassium and hydrogen ion exchange mechanism site distally). Thus sodium loss is augmented and hypokalemia with alkalosis is prevented.

Once there is some evidence of reduced edema, corticosteroid therapy is begun. There is convincing evidence now that corticosteroids not only promote diuresis but also tend to bring about revision of the renal lesion to normal. Furthermore it is generally agreed that long term maintenance therapy is associated with a much lower relapse rate.

At the Children's Hospital, cortisone or prednisone are used. Maximum doses are prescribed: cortisone 10 milligrams per kilogram body weight per day in four 6-hourly doses, or prednisone 2 milligrams per kilogram in four doses. Diuresis often ensues after 10 to 14 days on such therapy but may occur later. These full dosages are continued for 3 to 6 weeks. During this time the patient's progress is checked daily by following the weight, total urine output and urinary protein loss, serum electrolytes, (Na, K, Cl, CO_2). BUN, and erythrocyte sedimentation rate. Proteinuria gradually diminishes but is often present to some degree for weeks or months. After daily full doses of prednisone given for the first three to six weeks, **full-dosage** intermittent therapy is begun. In some children, once diuresis has occurred and proteinuria is no longer present, hypoproteinemia may still be present. In such instances, further doses of salt-free albumin should be given to correct this.

Intermittent therapy (three successive days per week) on full dosage is maintained for a minimum of 6 months. If proteinuria persists however, therapy should be continued until the urine has been protein-free for at least 3 months; it is then tapered off during the next few months. In the past relatively short courses of corticosteroids were used but the recurrence rate of proteinuria and edema was higher than with prolonged intermittent full-full-dosage therapy. If proteinuria increases during the corticosteroid main-

tenance period, the full dosage regime should be reinstituted for 3 to 4 weeks. Most physicians now follow a regime similar to that outlined.

A very important factor in prognosis is the duration of proteninuria. This applies to duration before any treatment, or recurrence during maintenance therapy; the longer the duration of proteinuria, the less favourable the outcome. Prompt reinstitution of full dosage corticosteroid therapy is required. To insure promptness, the parent should be shown how to test the urine **daily** for protein and report any increase immediately.

The precautions to be observed in a patient on corticosteroids are well known, and they should be observed in these patients. If mumps, measles or chicken pox develop while these children are on steroids, **large doses of gamma globulin** should be given. If contact with chicken pox occurs, steroid dosage should be reduced if the virus is still in the incubation phase. However, should clinical chicken pox appear, steroid therapy should be maintained or even doubled.

It is almost redundant to emphasize that **nephrotic cuildren are prone to infection.** They have a particular susceptibility to pneumococcal infection with development of peritonitis. In recent years organisims other than pneumococcus have become increasingly prominent agents of infection. This susceptibility to infection is increased with corticosteroid therapy so that **infections must be watched for closely and treated promptly.** In school-age children, because of their increased exposure to infection, it is recommended that **monthly doses of gamma globulin** (at least 0.1 milligram per pound body weight) be given.

> **N.B.: For a period of at least two full years, and possibly longer after steroid therapy has been stopped, any surgical stress or stress from severe infection in these children, MUST be covered with full doses of corticosteroids, usually for two-week intervals. A simple tonsillectomy two years after complete recovery could be fatal due to adrenal insufficiency unless adequate steroid coverage is given.**

The role that renal biopsy has played in the understanding of this syndrome should be stressed. Percutaneous renal biopsy in the proper hands is a relatively simple and low risk procedure, and is of greater prognostic value. This has resulted in a greater availability of tissue specimens for electron microscopic analysis which has been the key to the pathology of this syndrome. As many cases as possible should be submitted for renal biopsy, especially since electron microscopic examination of clinical material is now available.

Prognosis

The outlook depends on the degree of renal damage, and this can only be assessed by renal biopsy. Although statistics are not yet available there is no longer any doubt that with treatment schedules such as that outlined above the prognosis is far different from the rather gloomy figures of previous years when 50 to 60% of cases died. Today we expect complete recovery in the vast majority of cases.

Summary

The basic principles governing therapy of the idiopathic nephrotic syndrome of childhood may be outlined as follows:

1. Corticosteroids are the treatment of choice.
2. Salt-poor albumin, hydrochlorthiazide, and spironolactone are important and at times necessary adjuncts to steroids in severe cases.
3. Steroid therapy should be started as soon as possible after the diagnosis is confirmed (providing severe hypovolemia is not present).
4. If significant hypovolemia is present, preliminary therapy with albumin and diuretics is required.
5. Corticosteroids in full daily dosage should be continued long enough to effect a diuresis with a a return to normal of blood biochemical values and restoration of renal function — usually these are accomplished within a 3 week period.
6. Following clinical remission, intermittent full dosage of corticosteroids on three consecutive days per week for 6 to 12 months should be maintained.
7. The natural history of this syndrome is definitely altered with corticosteroid therapy.
8. Diet should be high in calories with a high protein intake. A low-salt diet is the only required restriction during the phase of edema.
9. Due regard for the complications of corticosteroid therapy should be maintained, especially for at least 2 years following cessation of therapy.
10. Bed rest is not required in this disease unless severe infection is present. ■

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FROM THE BULLETIN OF 40 YEARS AGO

The Medical Society of Nova Scotia Bulletin, May 1924.

Parenteral Infections — Their Influence On Nutrition In Infancy*

GORDON WISWELL, M.D., CLINICAL LECTURER, DISEASES OF CHILDREN, DALHOUSIE UNIVERSITY, ATTENDING PHYSICIAN HALIFAX INFANTS' HOME, MEDICAL ADVISER CHILD WELFARE CLINIC MASSACHUSETTS HALIFAX HEALTH COMMISSION, HALIFAX, N. S.

Speaking generally of systemic infections, you are well aware that in infancy and childhood the milder ones are most commonly represented by Otitis Media, Naso Pharyngitis, Pyelitis, Furunculosis, etc., while the more severe are grouped with Bronchitis, Pneumonia, infectious diseases, Meningitis, etc. It is with the milder group that we more especially wish to deal today. To my mind their influence is far more insidious and far more likely to be overlooked as an important factor in the progress of the baby. More often the gastro intestinal symptoms dominate the picture, and although they form an important part of this picture, frequently the nutritional disturbance becomes secondary and the diarrhoea or the vomiting may only be a symptom of systemic infection. Nutritional disturbances therefore fall into two distinct classes — those due to food and its incorrect administration, and those due to infections outside the alimentary tract.

In contrast to the etiologic factors of disturbances of nutrition of purely alimentary origin, we have this other type which must be considered as secondary to other forms of injury to the general infantile organism, and as I have said, affecting the gastro-intestinal function, especially, in that the digestion, is so definitely injured that food which was well tolerated can no longer be borne. This form is similar to the condition produced by excess feeding and the most characteristic member of the group is the disturbance resulting from acute or chronic infection. The bacterial poisons injure the entire cell structure of the body, and, of course, this affects the organs of digestion. As a result, their functional capacity is reduced, and unless the food is promptly changed to suit, a complicating alimentary disturbance is added to the infectious process. The complication may become grave enough to obscure the primary condition of infection. Recovery from the alimentary disturbance may take place before the infectious process disappears, or the digestive trouble may become chronic as an independent disease.

*Readers will be surprised how many of these principles are still true after 40 years.

An article on the present treatment of gastroenteritis is coming soon.—Editor.

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The President's Page

ANNUAL MEETING
THE MEDICAL SOCIETY OF NOVA SCOTIA
1964

The one hundred and eleventh annual meeting of The Medical Society of Nova Scotia will be held at the Keltic Lodge, in Cape Breton, September 14-17, with the two preceding days reserved for meetings of the Executive.

The first day and a half to two days of the general meeting will be taken up with sessions pertaining to Society business. There will be one to one and a half days given to clinical meetings, and an afternoon free for golf, sightseeing or other such activities. The final morning will be devoted to meetings of Sections and the first meeting of the New Executive. The meeting should be finished with Thursday lunch.

The accommodation would appear to be excellent. The luxurious Lodge, with its excellent dining room and meals, will be available solely to the Medical Society, along with the cabins, swimming pool, and other facilities. There will be no lack of accommodation because of the many excellent motels nearby.

The business meetings will be held in the lounge, with its bright and cheery atmosphere, designed for clear and cooperative thinking, amidst sunny surroundings. The exhibitors will also set up their booths in the lounge, but separated from the actual business sessions.

The snack bar will be available at all times for coffee breaks and in-between snacks to members, wives and guests. The beautiful new swimming pool completed last summer will be at our disposal in the moonlight as well as the sunlight.

The recreation hall may be used for any purpose desired throughout the meeting, except on Wednesday morning, when this space will be required for the clinical program.

The clinical program will be under the direction of Dr. Gordon Mack, immediate past Chairman of the Dalhousie Refresher Course Committee. Dr. Hamish McIntosh, Associate Professor of Medicine, University of British Columbia, has accepted an invitation to take part. The general tone of the clinical meeting will be in the form of group discussions with a dozen or more topics, each with two or more clinical tutors. Doctors will have their choice as to which they wish to attend, but all will deal with practical medical problems, and should be of wide interest. In addition, we are this year instituting a discussion on physical education through the Physical Education Committee, under the chairmanship of Dr. John Williston, of New Glasgow. Speakers who are specializing in that topic of broad and current interest will be present.

The business meetings will undoubtedly be highlighted by discussions regarding the formation of "council" government for The Medical Society of Nova Scotia and, of course, the topic which is giving us all so much concern, namely "the path ahead" in medical economics and health insurance.

The entertainment program has not yet been finalized, but we shall be leaning heavily on both the Halifax Medical Society and our friends from Cape Breton.

The President of the Canadian Medical Association, Doctor Turnbull, of Vancouver, will be with us and it is the Committee's desire to invite the Minister of Health for Canada to speak at one of the luncheons. Our own government representatives will of course also be invited to the meeting. All in all, the various aspects of the program seem to be shaping up nicely, and should well be ready by September 14th.

With a Cape Breton setting what more could one ask? ■

Clarence L. Gosse,
President.

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FROM THE BULLETIN OF 40 YEARS AGO

The Medical Society of Nova Scotia Bulletin, May 1924

Parenteral Infections - Their Influence on Nutrition in Infancy

The susceptibility to infection is even more noticeably controlled by the state of nutrition. This susceptibility varies in individual babies — due possibly in congenital deficiency and on the congenital difference in constitution in different children. Among breast fed babies, we have some who remain free from infection under most favorable conditions, while we have others on the breast who under favorable conditions, contract infections very easily. This lowered immunity is often accompanied by other defects such as an exudative or neuropathic diathesis and these states are all always aggravated and the susceptibility to infection is even more striking when these babies are put on artificial feeding. And more so than ever when this artificial diet is improper. In practically all cases in artificial feeding there is slight departure from the normal state, healthy as the baby may appear. This explains again why the breast fed has the greater resistance.

The natural immunity of the breast fed infant, which factor alone is possibly the strongest reason for breast food, gives us the best example of the importance of food in the development of resistance to infection.

When artificial food is adopted, the susceptibility is increased and the nutritional disturbance may be so slight as to be overlooked. Every method of feeding which unfavourably influences metabolism automatically increases susceptibility to infection, while normal feeding leads to normal tissue building and lessened tendencies to disease. Usually we find an abuse of the fat and carbohydrate tolerance, and therefore a poorly balanced diet as the originating cause of lowered immunity. Overfeeding, then, must be avoided on account of these principles alone, and an early start on mixed diet made. In every baby each nutritional disturbance further lowers the immunity, until beginning with an apparently harmless upset, the baby arrives, after repeated disturbances, at the more severe state of Marasmus and Intoxication.

Parenteral infections are often followed by enteral infections. Proper treatment of the systemic disease is most important in the prophylaxis of enteral disturbance. Secondary enternal infection should always be kept in mind, but apart from noting these points we are not discussing primary alimentary disturbances today. ■

ANNUAL MEETING 1964
KELTIC LODGE
PRELIMINARY PROGRAM

Saturday Sept. 12th, 1964

9.30 a.m. 6th Regular Meeting of Executive

6.30 p.m. Reception for members of the Executive and their Wives - at the swimming pool.

Sunday Sept. 13th, 1964

9.30 a.m. Annual Meeting of Executive

8.30 p.m. Ceidilh - Keltic type - Lounge or Pool

Monday Sept. 14th, 1964

9.30 a.m. 1st and 2nd Business Sessions.

1.00 p.m. Luncheon - Speaker Dr. Turnbull,
President C.M.A.

2.30 p.m. 3rd Business Session

7.00 p.m. Old Fashioned Corn Boil with
The Cape Breton Hootenany's

Tuesday Sept. 15th, 1964

9.30 a.m. 4th and 5th Business Sessions

1.00 p.m. Luncheon - Speaker the Hon. R. L. Stanfield,
Premier of Nova Scotia.

2.30 p.m. Business Session
Report of Nominating Committee
Panel on Medical Services Insurance
Panel on Physical Education

7.00 p.m. Dinner - Speaker the Honorable Judy LaMarsh,
Minister of Health for Canada
The Cadigan Family Singers

Wednesday Sept. 16th, 1964

CLINICAL PROGRAM

8.30 a.m. Clinical Breakfast Meeting
Medical Investigation and Management of Renal Calculi.
Dr. Hamish MacIntosh,
Associate Professor of Medicine,
University of British Columbia.

10.30-11.30 Group Clinical Discussions -
Hypertension, Arthritis, Bronchitis, Diabetes, Resuscitation,
Gall Bladder Disease.

11.30-12.30 Group Clinical Discussions -
Dermatological lesions, Ano-rectal problems, Newer therapeutic drugs,
Constipation, Pediatric diseases, Obstetrical techniques

1.30 p.m. Golf, fishing, sightseeing, etc.

6.30 p.m. President's Reception

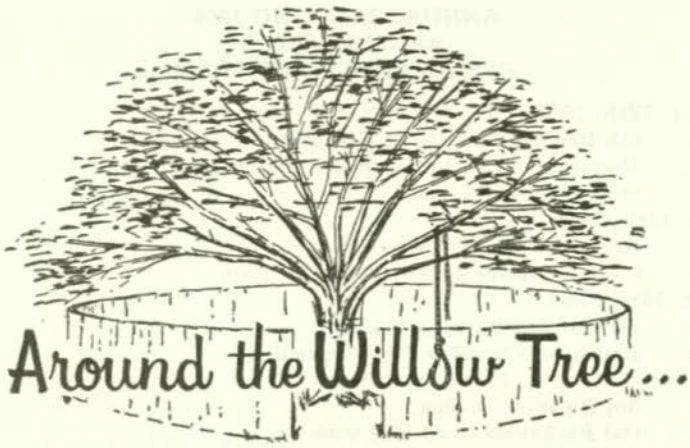
7.30 p.m. Annual Dinner (Dress Optional)
Awards of Honorary Membership
Awards of Senior Membership
Installation of the President

Thursday Sept. 17th, 1964

9.30 1st Meeting New Executive

10.00 Meetings of Sections of the Medical Society of Nova Scotia.

Mr. Wright, the Canadian Medical Retirement Savings Plan representative will be on hand throughout the convention for consultation by appointment to discuss (without charge) personal financial investments with any members of The Nova Scotia Medical Society. Preference will be given to outside of Halifax members as Mr. Wright will be in Halifax the following week for continuing consultations. This was available at the last British Columbia meeting and met a tremendous demand.



Medical Practice in Nigeria

M.T. Casey, M.D., C.M., F.R.C.S. (C), F.A.C.S.

In Nova Scotia there is one doctor for every 1200 people. In Nigeria there is one doctor for every hundred thousand people. Public health measures are in their infancy and the incidence of disease is extremely high. One of the greatest needs of this country, and of other developing countries as well, is in the field of medicine. This obvious need will explain in part why, having volunteered my services, I left Halifax in November, 1962 and travelled to Emekuku, Eastern Nigeria, West Africa to work as a surgeon in a 216 bed mission hospital.

Getting off the plane in Lagos is an experience in itself. One is hit by a blast of air as hot as if an oven door had opened.

A most impressive first sight is the color of the native costumes and their distinctive style. The men wear loose flowing robes, the women ankle-length lappas. At every corner the attention of visitors is caught by other striking scenes — an elderly woman carrying a huge bundle on her head, her posture and carriage still magnificent from years spent at this labour — a Hausa trader in his characteristic robes, selling ivory and ebony carvings, camel leather and lizard skin articles as well as many others.

The journey inland to the mission affords more and more unusual scenes — along the roadside there are native villages where it is only too evident that even the most basic sanitary facilities are lacking and where disease must be very prevalent.

It was a pleasant surprise to find the hospital compound to be a nicely landscaped, well laid out aggregation of about eighteen separate buildings. I learned that the hospital had developed to its present condition over a period of thirty years. It began when the nuns passed out Mist. kaolin from the steps of the convent. Today, the 216 bed institution has modern X-ray, laboratory, facilities for most types of surgery, a very busy obstetrics and gynecology department and a training school for nurses.

The medical staff consisted of two sister doctors and myself. One nun is a member of the Royal College of Obstetrics and Gynecology of London. The other is a general practitioner who conducts the out-patient department, where over a thousand patients are seen each week. As the only surgeon I performed one thousand major surgical procedures during my year there.

Since there was no anaesthetist I had to administer spinal anaesthesias for my cases. These were used in more than one-half the cases. For patients requiring general anaesthesia, as in thyroidectomy or gastrectomy, the surgeon would intubate and the nurse would carry on as anaesthetist.

Most types of surgical cases seen in Canada are seen also in Nigeria but often the natural course of the disease would have been altered by native medicines or the manipulations of native doctors before the patient was brought to us. This was especially prevalent in obstetrics where the tragedy of ruptured uterus was all too common.

Childbirth was looked on as a purely physiological process and aid was sought only when some difficulty arose. Caesarian sections were done easily under local anaesthesia. The hospital conducts an excellent training school for native midwives and many of the graduates establish maternity homes in the area, contributing much to the improvement of maternal and child health.

All types of medical diseases were seen, with malaria, amebic dysentry, hookworm, anemia and malnutrition being very wide-spread. Pertussis and measles were found to be deadly diseases among these natives and pulmonary tuberculosis is very common.

In many hospitals in the region, one sister-doctor would be responsible for all treatments. She must be surgeon, tropical disease specialist, obstetrician and very often all this with a minimum of laboratory facilities and no X-ray.

Because the area is so densely populated there are many hospitals within a hundred mile radius. We held clinical meetings every two months, and doctors from the various missions and a few industrial plants attended.

The great need of the country is in the field of public health. A surgeon can treat only a limited number of patients, because each one must be treated individually, but mass immunization programmes for tetanus, typhoid and pertussis, swamp drainage to eliminate anopheles mosquito, fresh clean water, and sewage disposal could save millions of lives. Education in the field of nutrition could greatly reduce the incidence of Kwashiorkor and anemia.

The year in Nigeria was a very rewarding one for me. There are many frustrations but there are as many rewards. One of these is the realization that the cases might not have received any treatment and could very well have died if I had not been there. This is a satisfaction denied a doctor working in Nova Scotia, where there is no shortage of medical men. Another is the feeling that always results from improvising, no matter in what field one is working. One of my most prized possessions is a song dedicated to me, composed and sung by the natives on my departure. The greatest privilege of all was meeting the permanent missionaries and working with them. They give not one short year but a lifetime of selfless service. ■

Tuberculosis of the Pericardium

A review of forty-four proved cases in a veteran population shows that medical treatment of this relatively rare form of tuberculosis is often sufficient, but surgery may also be indicated. Early initiation of treatment is of utmost importance.

Before the adoption of specific antituberculosis chemotherapy, tuberculous pericarditis carried a grave prognosis. Eighty to 90 per cent of those afflicted died in the acute phase, and many of the remainder subsequently died from constrictive pericarditis or from miliary tuberculosis.

For the study reported, the Veterans Administration in Washington, D.C., supplied a list of all veterans treated in its hospitals from 1952 through 1955 who had a clinical diagnosis of tuberculous pericarditis. The clinical records of 214 patients from all parts of the United States were collected and carefully reviewed. Forty-four cases had a positive culture or acid-fast bacilli seen in histological sections of the pericardial fluid or resected pericardium.

The average age at onset was 51 years, with a range of 20 to 66 years. Twenty-four patients were white, and 20 were Negro. However, since the ratio of whites to Negroes in the United States veteran population is 12:1, the disease was 10 times more prevalent among the Negro race.

Dyspnea on exertion or at rest was one of the earliest and most disabling symptoms. Less common and more gradual in development were ankle swelling and nonproductive cough. Chest pain, usually aggravated by deep inspiration, coughing or change in position, was variable in its nature, but rarely resembled angina. Generalized complaints of fatigue and anorexia were common.

Signs related to an elevation in venous pressure were also common. Pulse pressure was not significantly less than normal in the majority of cases, but it was rare to find a value greater than 40 mm. of mercury.

Electrocardiographic tracings exhibited lowered voltages and 'T' wave inversion and were of considerable aid in the diagnosis.

In 10 cases a right-sided cardiac catheterization had been done. The pressures and their tracings were "consistent with" constrictive pericarditis.

Medical treatment

In the group of 44 patients, 23 received medical treatment without subsequent operation. The medical regimens consisted of specific antituberculosis chemotherapy; pericardial paracentesis to obtain fluid for bacteriologic study and to relieve tamponade; and digitalization, diuresis, and a low-salt diet.

Streptomycin, para-aminosalicylic acid (PAS), and isoniazid were the only chemotherapeutic agents used. Duration of chemotherapy averaged eleven months for 11 patients who survived for five years and for 2 who died of unrelated causes. Early chemotherapy appears to be of paramount importance for a medical cure. ■

Reprinted from the Abstracts of the National Tuberculosis Association, May 1964.
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Eight patients died while receiving medical therapy. At the time of death all but 1 (who died two days after admission) were receiving antituberculosis chemotherapy. At autopsy all 8 had a thickened pericardium. Some of these pericardia were studded with caseous granulomas. The surfaces of the hearts appeared gray owing to a thickened epicardium.

Two patients probably died from the effect of cardiac tamponade. Another died of pulmonary edema after a bilateral thoracentesis, and one went into cardiac arrest after the paracentesis of both pleural cavities. Four others died as a result of chronic constrictive pericarditis.

Surgical Treatment

A pericardiectomy was performed in 21 patients after a period of medical treatment.

The indications for pericardiectomy were as follows: continued accumulation of a pericardial effusion; thickened pericardium (demonstrated by injection of air into the pericardial sac); calcification of the pericardium; results of pericardial biopsy; progression from larger globular heart in the effusion stage to a smaller heart with continued high venous pressure; and moribund patient with severe cyanosis and unobtainable blood pressure.

Thirteen patients have survived for five or more years after pericardiectomy. Two others are well after four and a half years. Another had a fatal gastrointestinal hemorrhage one year after pericardial resection.

Four patients died within thirty days of pericardiectomy, an operative mortality of 19 per cent.

The 11 patients who survived for five years or more have given no evidence of relapse or tuberculous pericarditis, nor has constrictive pericarditis supervened as a late sequela. This is one of the most important facts derived from this study: that early success of medical therapy results in control of the tuberculous infection, so far as control of infection can be assessed by an average follow-up period of seven and two-tenths years.

Conclusion

Several generalizations appear to be justified on the basis of this series. The early institution of chemotherapy increased the possibility of a favorable outcome of medical therapy.

The chronicity of pericarditis is the circumstance that most clearly calls for pericardiectomy. Pericardiectomy was superior to medical therapy alone in patients whose chemotherapy was begun late in their disease, as judged by symptomatology. Excellent results were achieved by pericardiectomy in 11 of 13 patients in whom symptoms of pericarditis had been present for more than six months before the pericardiectomy was carried out.

Treatment of tuberculous pericarditis should be started as promptly as possible with a regimen of two or more antituberculous drugs. The chemotherapeutic regimen should always include isoniazid. The total duration of chemotherapy should be at least two years under the most favorable circumstances, or longer, as indicated by tuberculous lesions in other organ systems if such lesions are present. However, tamponade severe enough to result in hepatomegaly, ascites or peripheral edema provides a clear indication for pericardiectomy. Pericardiectomy can safely be done through infected tissues under cover of antituberculosis therapy. Early success by both medical and surgical therapy may be counted on to give lasting control of infection; both modalities prevent constrictive pericarditis as a late sequela. ■

Personal Interest Notes

Children's Hospital

Staff Attend Royal College Meet in Quebec City

At the annual symposium of the Royal College of Physicians and Surgeons held from January 16-18 this year in Quebec, various members of the Children's Hospital Medical Staff presented papers.

Dr. D. A. Gillis and Dr. E. B. Grantmyre presented a paper on "Meconium Plug Obstruction of the Colon". The authors made a plea for barium enema examination prior to abdominal exploration of the new born with distal bowel obstruction of uncertain aetiology.

Dr. W. A. Cochrane discussed two cases of Juvenile Lymphocytic Thyroiditis in identical twin girls.

A family study of 7 Nova Scotian cases of Polycystic Disease by Drs. V. W. Krause, Clare T. Randall and W. A. Cochrane was read by Dr. Krause. Differentiating between these and Macroplycystic disease of the kidney and liver, which presents with renal symptoms, the name Hepatorenal Micro-Dysplasia, was tendered for the Nova Scotian variety.

Doctors G. Ross Langley and Krause discussed three cases of Aplastic Hereditary Spherocytosis.

Staff Appointments, Chitdren's Hospital

Dr. Ian C. Bennett has been appointed head of the Department of Dentistry, The Children's Hospital. Dr. Bennett is a graduate of Liverpool and of Toronto and has completed his work for the degree of Master of Science in Dentistry from the University of Washington, Seattle, specialising in Paedodontics.

Dr. C. Edwin Kinley, recently returned from postgraduate work in England and, presently Markle Scholar on the Dalhousie University Staff, has been appointed to the Active Surgical Staff. He will specialize in Thoracic Surgery.

To the Honorary Consultant Staff, Dr. Allan Morton has recently been appointed and Drs. E. M. Fogo and J. F. L. Woodbury as consultants in Rheumatology.

Congratulations

Best wishes are extended to Dr. Amir M. Saed, son of Dr. and Mrs. B. Saed, Hamadan, Iran, and to his bride, the former Miss Geraldine Amelia Quigley, daughter of Mr. and Mrs. Gerald T. Quigley, of Truro whose mar-

riage took place on April 25th in St. James Presbyterian Church, Truro. Dr. Saed has been Resident at the Children's Hospital for several years, and has this winter, been on the Staff of the Halifax Infirmary.

Dr. W. A. Cochrane, Chief of Medicine at the Childrens' Hospital was special guest on the program "T.V. Nurse" originating in Saint John, N. B. one night during April. The hostess of "T.V. Nurse" is Mrs. Frank Hazen, an alumna of the Children's. This programme is to be shown on CBC's Halifax station, CBHT beginning May 7.

Dr. Cochrane is co-ordinating the work of establishing in Halifax an Atlantic Research Center to deal with the problem of Mental Retardation — the biggest single problem facing medical science today. Three in every hundred children born in Nova Scotia this year will be mentally handicapped in some degree. Dr. Cochrane hopes a team of scientists, psychologists and statisticians will be brought together in Halifax to staff this center. "If only one element of the planned research helps to conquer mental retardation, 1967 will, be remembered as much for the setting up of the Atlantic Research Centre at Halifax, as the year in which Canada celebrated a century of Confederation".

Drs. J. C. Acker and Dr. N. B. Coward have recently been holding clinics under the N. S. Society for the Care of Crippled Children in Digby, Shelburne, Lunenburg, Bridgewater and Windsor.

University

New Medical Centre Grant Approved: Construction of Dalhousie's new $5,000,000 medical science building – Nova Scotia's centennial project is likely to get started by next April. The province will match Ottawa dollar for dollar in the project, which will be named after Amherst-born prime minister and Canadian medical leader, Sir Charles Tupper who was a longtime member of the Board of Governors of Dalhousie and vitally interested in educational matters in this province.

Dr. J. A. McCarter, head of the department, and professor of Biochemistry is one of 25 distinguished Canadian humanists and scientists elected to Fellowships in the Royal Society of Canada.

Two of Dalhousie's residents in psychiatry, Dr. Robert P. Parkin, and Dr. Benjamin K. Doane have been awarded travelling fellowships from the R. Samuel McLaughlin Foundation. These fellowships provide a monthly stipend plus travelling allowances for a period of one year. Dr. Parkin will study child psychology at Columbia and Dr. Doane will spend a year of study at Maudsley Hospital, London, England.

Dr. W. A. Cochrane, Dr. R. C. Dickson and Dr. J. A. McCarter recently attended the Joseph P. Kennedy, Jr., Foundation for Mental Retardation Dinner in New York City.

Doctor Donald I. Rice has been named associate executive director of the College of General Practice of Canada. He will assume his new post in Toronto September 1st. In his new career, Dr. Rice will be developing services to help Canadian family doctors keep up to date with the march of medical progress.

Dr. C. H. Young of Dartmouth, specialist in internal medicine, was re-elected president of Maritime Medical Care for another year. Other members elected to the Board include: Dr. T. B. Murphy, vice-pres., Antigonish: Dr. H. B. Whitman, Westville: Dr. R. F. Ross, Truro; Dr. D. F. Macdonald, Yarmouth; Dr. D. C. Brown, Amherst; Dr. F. G. Bell, Liverpool; Dr. G. E. Kenney, Hantsport; Dr. K. A. Fraser, Sydney Mines; Dr. G. W. Sodero, Sydney; Dr. E. P. Nonamaker, Halifax and Dr. A. M. Lawley, Inverness.

Cape Breton

Sydney: Dr. Thomas B. Acker who has conducted a crippled children's clinic in Sydney for 38 years was honoured by Sydney Rotary Club. Mayor Russell Urquhart said Dr. Acker was "responsible for rehabilitation of hundreds of crippled children". Presentations were made to the guest of honour to mark "Dr. Tom Acker Day" at the club's weekly meeting.

Louisbourg: A new career begins at almost 80 for Dr. J. G. B. Lynch. Retired chief of Dosco medical services, he has opened an office in the old Sydney and Louisbourg Railway station. Mornings only.

Glace Bay: Dr. M. Singh Virick, who is at present a member of the Glace Bay Medical Clinic, gave a talk recently to the U. C. Women at Knox Hall. Dr. Virick spoke on India where he took his medical education. He is a native of Rangoon, Burma. In his immediate family there are 29 doctors, over half of them, including his three sisters, being medical women.

Digby County

The Digby County Community Mental Health Centre moved into its newly purchased quarters, 88 Warwick St., recently. Dr. R. A. Armstrong, executive director of the Digby-Annapolis Mental Health Clinic is among the contributors to a newly published book on community psychiatry and community mental health which may well become a standard guide to this field. The chapter in "The Handbook of Community Psychiatry and Community Mental Health" contributed by Dr. Armstrong and Drs. Alexander and Dorothea C. Leighton, of Cornell University, is the outcome of the research project, – the Stirling County Study of psychiatric disorder and sociocultural environment, on which they have been engaged for ten years or so, and deals with the social and community psychiatry in small town and rural areas.

Seven Nova Scotia doctors attended the four-day scientific assembly of the College of General Practice in Montreal, March 30 - April 2. The assembly was part of a formal program of 100 hours of post-graduate study every two years. More than 500 family doctors from all over Canada attended, as well as delegates and observers from at least 22 other countries. Nova Scotia doctors who attended were; Drs. D. G. Black, Digby; Earle L. Reid, Kentville, and F. Murray Fraser, S. G. B. Fullerton, H. Ian MacGregor, Herford Still of Halifax, and A Gordon of Dartmouth.

NUFFIELD TRAVELLING FELLOWSHIP AVAILABLE FOR A CANADIAN GENERAL PRACTITIONER THIS YEAR

The Nuffield Foundation of England has made a Fellowship available to a Canadian for 1965. Applications for this award should be mailed to the

office of the College of General Practice of Canada, 150A, St. George St., Toronto 5, Ontario, BEFORE SEPTEMBER 15, 1964.

These Fellowships are intended to assist general practitioners to widen their experience and special interest in some subject of importance to them in their general practice. The Fellow is expected to take a six-month study tour. Wives will be encouraged to accompany their husbands for a minimum period of three months.

FINANCE (a) Return travel at tourist rates.
(b) The subsistence allowance £7 a day and £3 for wife in Canada and U.S. Elsewhere £5 and £3.

BIRTHS

To Dr. and Mrs. Duncan Campbell, Bridgewater, a daughter, Elizabeth Jane, at the Dawson Memorial Hospital on April 1, 1964.

To Dr. and Mrs. Douglas Cudmore, (née Frances Clark), a son, Stephen Geoffrey, at the Grace Maternity Hospital, Halifax, on February 20, 1964.

To Dr. and Mrs. F. Ian Gilchrist, (née Joyce MacLeod), a daughter, at Leopoldville, Congo on April 13, 1964.

To Dr. and Mrs. G. William McQuade, (née Doris Hill), a son, Kelly William, at St. Rita's Hospital, Sydney, N. S. on March 30, 1964

To Dr. and Mrs. Graham Pace, (née Roxie Stevens, R.N.), a son, at the Grace Maternity Hospital, Halifax on April 27, 1964.

To Dr. and Mrs. Donald M. Seaman, (née Joan Campbell), Guysborough, a daughter, at St. Martha's Hospital, Antigonish on April 9, 1964.

To Dr. and Mrs. Malcolm Stephen (née Joan Crowell, R.T.), a son, at Hotel Dieu, Moncton on March 29, 1964.

To Dr. and Mrs. Kevin J. Tomkins (née Mary Shepherd), a son, Sean Francis, in Welland, Ontario on April 17, 1964.

OBITUARIES

DR. LEWIS R. RYAN, son of Mrs. Lawrence A. Ryan and the late Mr. Ryan of Truro died suddenly in hospital in Ottawa, April 17th. He graduated from Dalhousie in 1938.

DR. HENRY CHARLES S. ELLIOT, chief pensions officer in the Department of Veterans Affairs died at Camp Hill Hospital on April 2nd after an illness of seven weeks.

After graduating from Dalhousie in 1921, he practised in White Bay Newfoundland, Upper Musquodoboit and Guysborough, returning to Halifax in 1932 where he engaged in general practice. He served overseas with the 22nd Field Ambulance. Since the end of the war he has been in the Department of Veteran Affairs. To his family we extend our sympathy.

We are glad to welcome the 29th Annual Convention of the Canadian Dietetic Association which will be held in Halifax from June 16th-18th this year.

Meetings will be held at the Nova Scotian Hotel and items of particular medical interest will include:

June 16th — "Nutrition Problems in Children"
Dr. W. A. Cochrane.
— "Pre-Flight Preparations and In-Flight Feeding of Astronauts"
Dr. D. O. Coons of the Manned Spacecraft Centre, Texas.

June 17th — Panel on "Teaching the Medical Team"
— The Violet Ryley — Kathleen Jeffs Memorial Lecture — "Feeding the Multitudes"
Dr. L. H. Cragg, President, Mount Allison University, Sackville, New Brunswick.

June 18th — Papers on:

"Fish Protein Concentrate" — from Fisheries Research Board, Halifax.

"Nutritional Value of Fish in Reference to Coronary Heart Disease and Current Dietary Research" — Dr. C. M. Harlow, Department of Veterans Affairs, Halifax.

"Dietary Factors Affecting Plasma Lipid Levels in Man" — Dr. J. M. R. Beveridge, Queens University, Kingston, Ont.

"Fat in Diet and Weight Loss" — Dr. W. I. Morse, Dalhousie University, Halifax.

"The Patient Returns to the Community" — Dr. Cairbre McCann, Crotched Mountain Foundation, New Hampshire.

The speech at the Annual Banquet will be "Diet, A Study in Ignorance" by no other than Dr. H. B. Atlee. ■

NOTICE

MEDICAL CARE CLAIMS REGARDING DEPENDENTS OF U.S. MILITARY PERSONNEL

"For information regarding benefits, forms, administration and payment for medical services rendered dependents of United States military personnel, contact the Executive Agent for Military Attachés, Office of the Air Attaché, United States Embassy. 100 Wellington Street, Ottawa, Canada."

(Excerpt from letter signed by Colonel C. R. Webb, Jr., U.S.A.F.)