

The NOVA SCOTIA MEDICAL BULLETIN

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EDITORIAL

FORTY YEARS ON.

The Nova Scotia Medical Bulletin is as proud of its forty years uninterrupted publication as was the Canadian Medical Association Journal of its fiftieth anniversary a year ago.

While The Lancet was ninety-nine years old when the first issue of the Bulletin came off the press, the majority of Medical journals published today were started since.

The Maritime Medical News, which started publication in 1888 had merged with the Montreal Medical Journal in 1910 to make way for the Canadian Medical Association Journal, and until 1922 there was no regional publication in the Maritimes. Even that one national organ was hard put to it to survive the first few years, and by 1921 had accumulated debts of over \$10,000.

It was in that year that a memorable meeting of the Canadian Medical Association took place in Halifax, during which a proposal to disband the Association was withdrawn in favour of one doubling the membership fees, and putting both the Association and the Journal on a sound footing.

This new venturesome spirit in organised medicine also led to the founding in 1922 of the "Medical Society of Nova Scotia Bulletin"—the first regional bulletin to follow the consolidation of the Canadian Medical Association Journal in 1921.

At first only a newsletter, the Bulletin became a full fledged journal by September 1922. The original editors proposed to confine themselves to Association news, transactions and similar matter, leaving scientific articles to the Canadian Medical Association Journal. However, by October 1923, they already found the limitations of their resolution irksome, and starting with a paper entitled "What of the future of Surgery" the Bulletin has consistently carried articles of a varied nature since.

The Bulletin in its yellow cover was a familiar sight on Nova Scotian doctors' desks until 1955 when the colour suddenly changed to blue, only to be replaced with the present glossy red and white cover in 1960. The Bulletin

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is thought of well enough to be read far beyond our borders—and a copy was recently requested by the Soviet Academy of Science.

For the future—we face increasing competition from the barrage of magazines which land each month on each one of our desks—magazines which are attractively produced, engagingly written and above all free. The Nova Scotia Medical Bulletin must maintain both its scientific standards and its interest to our membership. This depends greatly on the Editorial Staff and we shall do our utmost to be worthy of your trust. It depends also greatly on the material forthcoming from you, the membership. You can supply the articles, the case reports, the personal interest items and the light reading. Without these there will be nothing to edit.

J.F.F.

FROM THE BULLETIN OF 40 YEARS AGO

The Medical Society of Nova Scotia Bulletin, Sept. 1922

CHIROPRACTIC

For reasons best known to themselves there are a great many individuals who would like to enjoy a place in the Community on a plane with Practitioners of Medicine, but it is doubtful how Altruistic are their aims or objects considering their qualifying requirements.

The Prospectus of the Canadian Chiropractic College, an Institution which recently sought legislation from the Ontario Government, present the following illuminating information in reference to requirements of its students and graduates:—

“Our educational requirements of entrance are not exclusive nor yet exigent; TO BE ABLE TO READ AND WRITE IS ALL THAT IS NEEDED. We consider that one is better qualified to learn and practice Chiropractic if he is able to drive a screw or tighten a bolt. We know that neither M.D.'s. nor Osteopaths are as well fitted to take Chiropractic as those without their previous studies, as the latter have no medical cobwebs to be removed from their mental capacity. Our examinations must be passed with at least a minimum of 75%. Though they are apparently stringent, all can pass them successfully under our careful instructions.”

R FOR TRANSITION

TOM GORMAN, M.D. F.R.C.S.(C)

Antigonish, Nova Scotia

The Goal of Modern Society.

In modern society, interdependence has replaced independence. This gives powerful support to those who think in terms of society as a whole and the pre-eminence of its Social Goals. **The idea of riches for all is doubtless an illusion but the concept of scarcity for none actually seems to be within our grasp.**

Social Goals, Government, Ends and Means.

The superstition has grown in modern times that measures to accomplish social ends must and can only come through government intervention. For more than twenty years, our dominant political thinking has sought to meet our social needs by setting up new bureaus or establishing new administrative controls. We must be made to realize that the main task of government is to help the individual, not make decisions for him. The government should be the servant not the master of the people. This concept is in direct opposition to what has been happening; almost everywhere, the economic life has been over-run by the political life. We must realize that if you start with an entity called government and work downward, there is no real way to limit power because nobody has more power. Our political ancestors were quite clear on this. They realized that in a free democracy, the question of **Means** was of primary importance: they repeatedly emphasized that freedom is measured not so much by **What** we do but **How** we do it. Hence, their insistence on the separation of political and economic power and the complete independence of the spiritual and cultural life from both.

Doctors' Dilemma.

There is a tragedy in the making. The medical profession, men of good will seem unable to carry out their good intentions because of philosophical and practical immaturity. Society accepts our service and demands more, yet they do not recognize our insight. The medical profession are peculiarly inarticulate in the face of the great crisis about to break around them. They seem unable to explain to the layman their most cherished goals and means to achieve them. This is especially baffling since they have been taught to believe that they are an educated, sincere body who possess a valid and inspired philosophy of man. But to society as a whole, their posture in the welfare scene is most difficult to understand—society asks how can a profession whose deeds and problems are so vitally of the present live intellectually and socially in the past and still be counted men of good will?

The theme of this paper is not more debate; but, rather, the plea for a **bold new synthesis** in the area of fees where most conflict arises. It is toward this end that the philosophical and practical basis of remuneration is to be examined and recommendations made.

The Rights of Man.

Man is explicable by nothing less than all his history. The creation of a thousand forests is in an acorn; and Egypt, Rome, Britain, and America lie folded in the first man. Every revolution was first a thought in one man's mind; every reform was once a private opinion. It is universal nature which gives worth to man. Human life as containing this nature is mysterious and inviolable and is hedged round with laws and penalties. It is this Natural Law which gives to man his rights and indicates his duties. These rights are those of Man not Men and are inalienable. Simple justice and awareness of duty keep one man's rights from conflicting with those of another. The obscure consciousness of this fact is the light of all our day; the plea for education, for charity, for friendship and love. The Natural law and its codified extensions, the Law of Nations and the Positive Law govern man's behaviour, but neither of the latter can justly alter the dignity of man. The Rights of Man in terms of his "individuality" and "personality" existed before the Positive Law and, hence, are, or should be, unaffected by it.

Charity, Fees and Robin-Hood.

Medical care grew out of charity and man's concern for the welfare of his brother. In the beginning, the remuneration of the "medicine man" was mainly in gratitude, knowledge and awareness of having done good. Material remuneration was small if at all but the stature produced by the good works was monumental. As time went on and the "medicine-man's" art improved, and his scope enlarged, remuneration was sought—later still, the custom of charging much from those who could afford to reimburse for services given to those who could not, developed into the Robin-Hood principle which still forms the basis for our modern day fixing of fees. There was not then and there is not now any accurate equating of work performed (service rendered) and remuneration sought.

The Rights of Man and The Rights of Men.

Modern society both East and West is preoccupied with the Welfare of its members. In this preoccupation with methods, techniques and organization, the fundamental nature of man: his rights and duties under the Natural Law are being buried under an avalanche of Positive Laws. Charity has all but disappeared and the emphasis is on the purely material. The whole complex business of Welfare, of which medical care is but a part has become the arena of the "New Humanist" who interprets man's position exclusively in mechanistic, material terms. To them, it is not the Rights of MAN but the Rights of MEN. "Individuality" and "personality", the fundamental features of MAN under the Natural Law are secondary to the rights of the group as promulgated in the Laws of Nations and the Positive Laws. The stark insistence is on Man's rights with precious little emphasis on Man's Duties to himself, his fellow man and the state and vice versa.

Materialism and the Doctor's Tarnished Image.

It is within this complex welfare framework that the Doctor must continue to practice. With so much emphasis on material things, it is quite understandable that doctors should be evaluated by and large along material lines. The service rendered is to be paid for by material goods; therefore, this service should have material dimensions and be measurable. The medical profession's rather tarnished public image is due in large measure to purely material con-

siderations. The public resent the suggested opulence of our standard of living. They feel we got this way out of their misfortunes. They resent the occasions when real or imaginary medical needs are not met. They do not understand the dimensions and importance of the doctor-patient relationship. They are being "wooded" by the paternalism of the welfare state; and "duped" out of their individual rights.

Respect for the Individual — the Rights of Man.

No amount of arguing along conventional lines will alter the public's desire in this regard—they want their rights; they do not want "charity". We have to accept this fact even though we know charity must be preserved in our way of life—it is essential for us because without it, we become mere technicians working at the business of health and repairing the sick "machines" (men). Even if all of society negates the notion of charity and the dignity of man, we cannot do so—for the most important component of our art will be lost — the basis respect which a doctor has for human life and the necessity of viewing the patient as an individual with personal, inalienable rights.

Doctors-Patients-Economics (Fees).

The Doctor-Patient relationship is not simply a matter of the patient's need and the physician's art. There is ever present the economic factor. If the patient is personally responsible for remuneration, the matter is relatively simple; but if fees or remuneration are paid by a third party, the situation becomes much more complicated.

Third Party Interest — Primarily Economics.

It does not matter whether this third party is a professional group, a government agency, a consumer group or a commercial insurance company, the administrative function of the third parties has a familial resemblance: viz, to direct, to coordinate and to control.

The first principle the **third party** must establish is the kind of service to be provided, whether **essential** service, **desirable** service or **luxury** service. In the application of the insurance principle to health services, the third party must set some limits to what it is prepared to offer; otherwise, it faces either continuing rise in premiums or the inevitability of bankruptcy. To this end, control can be exerted on (A) Patients or (B) Physicians or both.

(A) Patients

- I. Limitations of benefits.
- II. Exclusions.
- III. Waiting period.
- IV. Financial participation — co-insurance.
- V. Cancellation of contract.

(B) Physicians

- I. Authorization.
- II. Review of accounts.
- III. Limitation of fees.
- IV. Cancellation of privileges.
- V. Professional discipline.

The actual payment for physicians' services can be on Salary basis, Capitation basis, Fee-For Service or some combination of these.

Salary

It is rarely possible to evaluate objectively the salary method of payment in private practice because it is often linked with conditions which tend to discredit it. For example, the "municipal doctor" system on the prairies which limits the choice of physician and is prone to the abuse of **under-service**. However, it is well to note that the Health Insurance Plan of New York City is quite successful; there, 900 general practitioners and specialists in 30 groups provide comprehensive care to 255,000 people. The physician payment within the group is salary plus bonus.

Capitation.

Under the capitation system, the physician collects a per annum amount from each person on his panel and contracts to supply service to the patient. The complaint by physicians is that the per annum amount is too low and that **the demand for service is too high**. In this system, there should be a built-in incentive for strong preventative emphasis, but, actually, such is not often the case.

Fee-for-Service.

In Canadian private medical practice, fee-for-service is by all odds the most prevalent form of physician remuneration. This is so, mainly because the physicians want it that way and it fitted well with the heritage of freedom of choice of physician.

When third party interest in health insurance measures become manifest on a national scale, many of the problems involved in the maintenance of fee-for-service became evident. For even moderately successful operation, a standardized schedule of fees is required in which each item is given a fixed value. It must be assumed that a rational, objective, balanced schedule of fees obtains; whereas, in fact, all fee schedules are a mixture of tradition, negotiation and special group pressures. It must also be assumed that the fees for treatment will average out to an income commensurate with the professional qualifications and experience of the physician — such is not always the case.

Administratively, the fee-for-service method is unpredictable of total volume of accounts. There is no way of accurately determining the total maximum financial commitment for a given budget period. The maximum capital amount available at any given time to pay accounts is not determinable. Thus, it becomes necessary to apply "Ceilings" or to "Pro-Rate" accounts. This feature ultimately gives a sort of "Capitation-look" to Fee-For-Service: the amount distributed being according to total items of service provided by each physician rather than according to, the total number of patients on the panel.

Pro-rating creates the psychological impression on the physician that he is being underpaid — this seems to hold true, no matter how high his total income. The fact that he can make no defence of the fee associated with any or many items in the fee schedule in no way diminishes his reaction to what seems to him the imposition of bargain rates.

The major criticism levelled at fee-for-service is the temptation for **over-service** and the degree to which it lends itself to exploitation by a **small minority of mercenary physicians**.

It seems to be apparent that there are advantages and disadvantages to any system of physician remuneration.

Service rendered — Tangible and Intangible.

The physician's services rendered to a patient seeking relief from illness real or imaginary is not a single entity. The listening, examining, manipulating, operating, writing, etc., are physical acts and are measurable in time and effort. But there are myriad items of service given to the patient which are less tangible. The dependency of the patient on the doctor and his psychological support in this time of dependence; the training and experience of the physician; the thought, worry and concern which a good physician expends in successful treatment, are not measurable by any yardstick. Yet these factors are part of the service given, and are elements in the doctors dispensing his duty and responsibility. Expenditure and lost income while being educated are to some degree measurable but the amortization of it in these days of high income tax is a difficult element to include in the remunerative pattern.

The Tangible (Measurable) Portion.

The pure service, that is the tangible portion which can be compared from doctor, to doctor, service to service and place to place can be determined by time-motion analysis. A fee could be established for this portion of remuneration which would bear some relationship to service rendered. This would be of the utmost value in the purely economic negotiation with government and other third party interests.

The Intangible Portion.

The non-measurable, intangible items embraced in the psychological support, training, cogitation, etc., would seem to be very nearly the same for comparable doctors and from place to place. Remuneration for this component could more logically be made by some form of basic salary with increments.

Remuneration by Formula — Why?

Thus, it is proposed to erect a formula system of remuneration for medical care. There are six reasons for doing so.

- (I) Red tape and administrative control could be kept to a minimum;
- (II) The dislocation from established pattern of practice would be minimal;
- (III) Essential care would be available for all without any "means-test";
- (IV) The economic climate would be changed sufficiently to assure better distribution of the medical resources;
- (V) By preserving in part fee-for-service, the continued interest of both doctor and patient is assured and the balance between the twin abuses of over-service and under-service can be more easily established;
- (VI) Finally, it should be a lot cheaper.

The Synthesis.

If the state were responsible for that portion of the remuneration covering the intangible items of medical care, this could assure essential coverage for all. The amount for this segment of the remuneration to be determined by negotiation between the organized profession and the government. The amount should reflect the economic climate of the country and thus should be re-negotiable from time to time.

Payment for the tangible, measurable portion of the remuneration should be the responsibility of the patient. That portion of remuneration paid by government should have reduced the pure fee portion by at least one half. Therefore, it should be possible to insure for one half of present costs. Thus many more people should find it possible to buy protection.

The people's representative (the government) will have made payment, and while strictly speaking the items are not comparable, the amount most likely would suffice to pay for care to all those who could not afford premiums. Thus resolving the need for an onerous "means test" in this (**state-subsidized scheme**).

To obviate the need for government establishing large control apparatus, the profession must evolve a system of control to ensure quality and quantity, practice. At this time, the only means at our disposal to exercise any control is to strike the doctor's name from the medical register and this only for a major misdemeanor. The lesser "crimes" are not "punished" at all.

The profession must set up a judicial system where all grades of deviation and dereliction of duty can be judged; punishment indicated—and ethical control maintained. The inference here is that if the profession will set up adequate apparatus, there will be little need for elaborate controls by government.

It is difficult to estimate the cost of such a scheme with any accuracy. Certainly, it should be much less than any of the presently proposed government-sponsored comprehensive schemes.

Every human undertaking is at some point an act of faith. In this article, my faith is placed in the ability and willingness of the medical profession to face any question and master any problem that challenges their freedom or that of their patients.

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EXPERIENCES IN THE TREATMENT OF RESPIRATORY FAILURE*

IAN E. PURKIS, M.B., B.S., F.F.A.R.C.S. (Eng.)*

While the early anaesthetist sprang from the ranks of the physicians interested in internal medicine, and rapidly established anaesthesia as a necessity for most surgical operations, the demand for anaesthetic services led first to the establishment of the competent technician. During the last two decades, however, those anaesthetists who retained a firm grounding and primary interest in remaining physicians first and technicians second have made substantial contributions to the store of medical knowledge. While technicians still remain, as for example, the nurse anaesthetist in the United States, today's specialist anaesthetist is rapidly becoming a medical interpreter, bridging the gaps between the specialist in medicine, surgery and the basic sciences.

It is not surprising therefore that the anaesthetist's special knowledge and aptitudes should have led him to research in problems of circulation, pharmacology, and respiratory physiology. It is a logical progression for the anaesthetist to apply the knowledge derived from his own research and from that of workers in other fields to the clinical treatment of patients with respiratory problems outside the operating room.

The purpose of this paper is to describe the wide range of disease states in which respiratory assistance may be helpful or life saving, to describe the evolution of the care given to patients in respiratory failure in the Victoria General Hospital, Halifax, N. S., and to describe some of the apparatus and methods necessary for the successful treatment of these patients.

Parallel evolution in this field has been in progress in other hospitals in this country, and in other parts of the world, so that no particular method or piece of apparatus is original and the particular arrangements in force in any hospital are a reflection of local circumstances which are constantly changing. The process of evolution is far from complete and every centre is aware of the constant challenge to improve the results of treatment in respiratory failure.

UNDERVENTILATION

Inadequate ventilation can occur if the respiratory apparatus is damaged. Different disease states may affect different parts of the respiratory mechanism, either depressing the respiratory centre or the nervous pathways leading from the brain, attacking the myoneural junction, damaging the chest wall, the bronchi or the lungs themselves, and even through altering the circulation through the lungs. Whatever the point of attack, the end result is effective underventilation, leading to an inability to supply adequate amounts of oxygen to the tissues, and/or an inability to eliminate CO_2 formed by tissue metabolism.

*From the Dept. of Anaesthesia, Victoria General Hospital and Dalhousie University, Halifax, N. S.

*Based on a Paper read before the Atlantic Regional Meeting, the Canadian Anaesthetists Society, Moncton, April 1962.

It must be emphasized that the first effect of underventilation is carbon dioxide retention, rather than anoxia. If because of disease, ventilation cannot be increased without artificial means, carbon dioxide will continue to accumulate until the patient dies, or until ventilation is assisted.

CAUSES OF UNDERVENTILATION

The diseases in which underventilation occurs are many, and a partial list is given here under the main point of attack on the respiratory apparatus. Obviously many diseases affect more than one part of the respiratory apparatus, as for example chronic bronchitis, where there is destruction of lung tissue, alteration in the perfusion of areas of the lung with blood, retention of secretions, and depression of central responses to anoxia and CO_2 accumulation.

(1) **Central depression**

Anoxia

Hypercarbia

Oedema following trauma, haemorrhage or thrombosis

Drugs

(2) **Spinal Cord**

Poliomyelitis

Tetanus

Polyneuritides

(3) **Myoneural junction**

Myasthenia gravis

Electrolyte imbalance

Excessive dosage of, or increased sensitivity to, muscle relaxants

(4) **Lungs**

Pneumonia

Broncho pneumonia

Emphysema

Pulmonary Fibrosis

Pulmonary Oedema

Surgical resection of lung tissue

(5) **Bronchi**

Chronic bronchitis

Asthma

Retained secretions due to cachexia or postoperative depression

(6) **Larynx and Trachea**

Obstruction by Oedema

Tumour

Stenosis

Pressure

Foreign bodies

Reaction to major surgery of the neck

(7) **Pleura. Chest Wall and Diaphragm**

- Pneumothorax
- Pneumomediastinum
- Effusion
- Open chest wounds
- Thoracotomy
- Crushed chest syndrome
- Phrenic nerve injury
- Surgery of diaphragm
- Splinting of diaphragm and chest wall following upper abdominal surgery

(8) **Pulmonary Circulation**

- Pulmonary hypertension
- Vascular malformations
- Cor pulmonale
- Cardiac failure

THE EVOLUTION OF CARE GIVEN TO PATIENTS IN RESPIRATORY FAILURE

In any hospital where major surgery is performed, operations carried out on patients with coexisting respiratory disease occur from time to time. The immediate postoperative care of these patients' respiratory difficulties devolves upon the anaesthetist whose preoperative assessment of the patient will involve judgement as to which of three categories the patient falls into, depending on the severity of the disease and the nature of the operation planned.

- (1) Slight respiratory disadvantage, no adjustment in anaesthetic technique necessary, no additional postoperative measures likely to be required.
- (2) Marked respiratory disadvantage, attention required to ensure adequate ventilation, caution needed in the use of muscle relaxants during anaesthesia, possible use of spinal or epidural technique instead of or in addition to general anaesthesia. Will almost certainly require assisted ventilation via an endotracheal tube for some hours postoperatively.
- (3) Severe respiratory disadvantage, elective operations should be undertaken only with a full realization of the added hazard involved. Imperative operations should be undertaken only after careful preparation of patient to reduce secretions and bronchial spasm, should terminate in a planned tracheotomy, and envisage a one to three week period of assisted ventilation by a mechanical respirator.

While the course of events usually follows the predicted pattern, a proportion of patients in category (2) do less well than anticipated, and tracheotomy is required. It has become our practice to return the patient to the operating room, anaesthetise him, and carry out a quiet leisurely tracheotomy under good lighting with full sterile precautions.

Similarly, in patients seen in consultation with the surgeon, suffering from non-operative respiratory problems such as crushed chest syndromes, tetanus, and open chest wounds, if tracheotomy is required, the patient is first

lightly anaesthetized, intubated in good conditions provided by the use of muscle relaxants, and subjected to a careful bronchial toilet. Following this, a period of a few hours is spent in restoring the biochemical changes towards normal, and, when the patient is in good condition, a leisurely tracheotomy is performed.

As a result of the more widespread use of tracheotomy, and the tendency to avoid rushed operations under local anaesthesia in patients ill suited, because of anoxia and hypercarbia, to withstand the operation, the anaesthetist has been called in consultation by his medical colleagues to see cases of respiratory failure on the medical wards.

Continued consultation has resulted in closer cooperation, so that consultation between surgeon, internist, and anaesthetist occurs early in the history of any patient with respiratory problems. This has had the great advantage that the resources of all the departments are available to every patient, whether of medical, operative, or non-operative surgical origin.

As the experience of the group has grown, there has been more rapid and effective treatment of the initial problem, and more systematic, and thus more successful, management of the day to day problems. Where previously technical accidents and misjudgments placed many patients in jeopardy, and the outcome was often doubtful, there is now confidence that a controlled situation will result in a successful recovery.

METHODS AND APPARATUS

(A) **Assessment of underventilation**

Where underventilation is suspected, a thorough clinical examination of the patient is carried out, with particular attention to the pattern of respiration, degree of dyspnoea, presence or absence of paradox, bronchospasm or retained secretions, and a search for evidence of anoxia and hypercarbia. The presence of restlessness and confusion, with a progressive rise in blood pressure and pulse rate, associated with a warm, flushed, sweating skin strongly suggests carbon dioxide retention.

Next ventilation is measured using a ventilation meter (Wright's Anemometer) and the measured ventilation is correlated with the expected ventilation as predicted by a nomogram (Radford).¹

If these tests indicate that underventilation is probably present, an arterial sample of blood is taken and analysed for carbon dioxide tension ($p\text{CO}_2$) and pH, to indicate the extent of the biochemical imbalance produced by the underventilation.

(B) **Immediate treatment**

The patient is intubated with an endotracheal tube under light anaesthesia using a muscle relaxant. Hyperventilation is carried out manually at first, later by the use of a respirator. Care is taken not to wash out carbon dioxide too rapidly, as this may result in a severe fall in blood pressure. As the patient awakens, sedation is given as necessary to enable him to tolerate the endotracheal tube. Once ventilation is controlled, the depressant effects of narcotics and barbiturates on ventilation are immaterial, but these agents may cause depression of the circulation in severely ill patients, and in these circumstances, paraldehyde, or the use of nitrous oxide/oxygen anaesthesia combined with a muscle relaxant may be preferable.

Attention is given to fluid balance and correction of disordered electrolytes. If cardiac failure is present, digitalisation is carried out, and phlebotomy or the use of a diuretic may be indicated.

A careful bronchial toilet is carried out through the endotracheal tube, removing all secretions that can be suctioned from each lung in turn using long, curved-tip catheters.

When the patient is in optimum condition, from one to eight hours after the institution of artificial respiration, tracheostomy is performed under general anaesthesia as an elective procedure, with the removal of at least one tracheal ring, and the insertion of the largest bore cuffed rubber tracheostomy tube that can be conveniently introduced. The James tracheostomy tube with a flanged female 15 mm Horner connector has been found to be the most suitable for this purpose.

(C) **Post Tracheotomy Care**

(1) *Fluid balance*

Adequate hydration is essential to ensure the proper functioning of the bronchial cilia, which transport secretions to the upper part of the bronchial tree. The average allowance for patients on respirators is 3000-3500 ccs per 24 hours, given by the oral, intravenous or rectal route. This must be curtailed in patients in cardiac failure, and is drastically reduced in the dehydration regimes used in the treatment of cerebral oedema. An indwelling urethral catheter is necessary in comatose or incontinent patients.

(2) *Drugs*

Adequate sedation is necessary in the first few days until the patient has become accustomed to the respirator. Analgesics, barbiturates, hypnotics such as paraldehyde, and tranquilizers such as chlorpromazine (Largactil) or promazine (Sparine) may be required on different occasions.

Steroids, in the form of hydrocortisone, ACTH or dexamethazone may be required for effective relief of bronchial spasm. The usual precautions should be taken in administering and withdrawing these drugs.

Antibiotics are indicated for the treatment of established infection, but except for topical use, are not used prophylactically.

Cardiac failure is commonly associated with long standing respiratory failure and will require the use of cardiac glycosides, diuretics, and salt restriction.

(3) *Nursing care*

Without proper nursing care, these patients will not survive their illness. Ideally, there should be a team of nurses with special training in respiratory problems available on a 24 hour basis, but provided the medical team is thoroughly familiar with every detail of the nursing care required, level headed and intelligent nurses with no previous special experience can be used.² The elderly, infirm, or apprehensive nurse is lethal in this situation and if only inadequate nursing care can be obtained, one of the medical team must be constantly present to supervise the management during the first 24-48 hours.

(i) *Care of the patient*

- (a) *General:* Washing, powdering, rubs with particular attention to pressure points, mouth care.
- (b) *Tracheal toilet:* Every half hour, or more frequently if necessary, the nurse must remove all available secretions using long, curved tip sterile catheters. (Catheters are kept sterile by rotating 6-8 catheters through a bath of 1:1000 Zephiran solution). The catheter is connected to suction via a Y connector, the open limb of which is left unoccluded while the catheter is inserted as far into the bronchial tree as it will go. Suction is then applied by occluding the open limb and the catheter withdrawn slowly while rotating it between finger and thumb. The secretions are washed through by dipping in a bowl of sterile water, meanwhile the patient is re-connected to the respirator for a few breaths. The whole process is repeated, directing the catheter first to one lung, then to the other. As soon as the patient is disconnected from the respirator for suctioning, the nurse should hold her breath as a guide as to how long each attempt at suctioning should last, and as to when to re-connect the patient to the respirator.
- (c) *Posture:* Damage to pressure points may be avoided by 2 hourly position changes. Where there is difficulty in clearing secretions or areas of atelectasis the use of the full lateral position combined with a five degree head down tilt is helpful. Every 2 hours the cuff surrounding the tracheotomy tube is deflated to prevent excessive pressure on the tracheal mucosa, and sterile mineral oil eye drops are placed in each eye to prevent corneal ulceration.
- (d) *Physiotherapy:* If no physiotherapist is available, physiotherapy must be carried out by the medical team or nurse, and consists of passive movements of all joints through their full range, but without the use of any force, the encouragement of active movements during the recovery phase, and gentle compression of the lower chest during expiration to assist the clearing of secretions.
- (e) *Nutrition:* Tube feeding, or assisted oral feeding may be necessary during certain phases of the illness. Constant care of intravenous needles has been helped by the use of plastic cannulae.

(ii) *Recording the patient's progress*

- (a) Vital signs (B.P., pulse, respiration rate) are recorded 1/2 hourly.
- (b) Airway pressure and/or expired air volume may also be recorded in certain circumstances.
- (c) Temperature is recorded 4 hourly.
- (d) Fluid Balance is accurately made up 8 hourly.

(iii) *Medications*

Are administered by the nurse as directed.

(iv) Care of Respirator

- (a) The nurse must be familiar with the sound of the correctly functioning respirator. At every posture change, or with any change in the patient's condition, she must check that the chest expands with the inspiration phase, and empties with the exhalation phase of the respirator.
- (b) In some patients adjustments may be required to the respirator with different postures.
- (c) In respirators that are equipped with nebulizers the fluid level must be kept horizontal, and at a working level. A fine mist should emerge from the exhalation port of the machine on expiration. Nebulizer solution must be made up as required. This may consist of distilled water 400 ccs, to which may be added 95% Ethyl alcohol 100 ccs, a bronchodilator such as Vaponefrin 10 ccs, and/or a liquefying agent for tenacious sputum such as Dornovac 10 ccs.

(v) Emergency procedures

Emergencies may arise quickly during the course of respirator care, before medical help can arrive. Unless the emergency is noticed and dealt with quickly the patient may succumb, and the nurse must be capable of dealing with the situation.

- (a) When a patient is connected to a respirator through an airtight circuit, malfunction of the respirator results in total respiratory obstruction. Because of the possibility of mechanical breakdown, an alternative hand ventilator is always kept with the respirator. The nurse must be satisfied that she can use this to provide adequate ventilation should the machine fail.
- (b) Cuffed rubber tracheostomy tubes provide an airtight seal between the outside of the tube and the inside wall of the trachea. Obstruction of the tube by a plug of mucus, or by downward herniation of the cuff over the lower end caused by overinflation of the cuff will result in total respiratory obstruction. If air from the hand ventilator will not enter the chest, the hand ventilator should be disconnected, and a suction catheter quickly inserted. If this will not pass through the tracheotomy tube, it is obviously obstructed. The cuff should be immediately deflated, and in the patient capable of some respiratory exchange, this will allow him to breathe orally around the tube. If the patient is not capable of breathing or sustaining an adequate exchange, a further brief attempt should be made to use the hand ventilator. If the tube is still obstructed, the entire tracheotomy tube should be removed and ventilation is then carried out by inserting the connector of the hand ventilator into the tracheotomy stoma.

Medical Care of the Respirator Patient(a) *Blood Gases*

After the patient is established on a respirator through a cuffed tracheostomy tube blood gas analysis should be repeated, and ventilation measured until it conforms to that required to bring O₂ and CO₂ tensions to normal. Subsequent daily estimations of O₂ saturation pCO₂ and electrolytes are carried out until the situation is stable.

(b) *Chest X-Rays.*

A chest X-ray is taken as soon as possible after tracheostomy, and repeated the following day. Thereafter, the occurrence of atelectasis or infection may indicate further radiographs, though care must be taken to avoid over-exposure to radiation during a long illness.

(c) *Sputum Culture.*

Daily sputum specimens should be taken for culture, and testing for antibiotic sensitivity, until infection is controlled. Thereafter, cultures taken at two or three day intervals will detect any reinfection. Antibiotic resistance commonly develops, and may only be controlled by the topical application of the most effective antibiotic by placing it in the nebuliser solution. The addition of 250 mg. of Neomycin to each 500 cc. of nebuliser solution appears to prevent the development of infection in otherwise clean cases.

(d) *Tracheotomy tubes.*

These should be changed after the first 48 hrs. and subsequently every four to seven days, to prevent narrowing of the lumen by secretions.

(e) *Urine.*

Urine cultures should be taken daily for the first week, and thereafter as indicated by the presence of pyrexia.

(f) *General Assessment.*

A complete reassessment of all facets of the patient's condition with a full clinical examination should be made within eight hours of the initial examination and daily thereafter. In severely ill patients, more frequent examinations may be required. Brief notes of the findings should be made for future reference.

D. RESPIRATORS

The purpose of a respirator is to move additional air in and out of the lungs. The "Iron Lung" or cabinet type of respirator accomplishes this by alternately creating a vacuum or a positive pressure in a sealed air space that surrounds the patient from the neck down. The intermittent positive pressure respirator (I.P.P.R.) accomplishes the same thing by applying a positive pres-

sure of oxygen enriched air inside the trachea. This inflates the lungs to a preset pressure, at which the machine switches off, and allows the elastic recoil of the patients own lungs and chest wall to drive the air out through an exhalation valve. Since the patients circulation rapidly adapts to the changed pressures, and since IPP machines are smaller and more versatile than the cabinet respirator, they have practically replaced the cabinet type. The outstanding advantage of the IPP machine is that it leaves the patient's body unencumbered, and renders nursing care easier and more efficient.

IPP machines are powered by an electrically driven motor using room air, or by compressed air or oxygen diluted with room air. All the machines in common use have controls for limiting the inspiration pressure, and for setting the rate. Devices for controlling the length of inspiration, the duration of the expiratory pause, and the percentage of oxygen in the inspired mixture are available on many machines. In addition, some machines can add a negative phase during expiration and are capable of being triggered by the patient with minimal effort. It is essential that a means of humidifying, and measuring the volume of the gases reaching the patient should be available.

Reliability and ability to function with minimum attention and cleaning are important. Most commercial respirators fulfil these criteria, and we have been satisfied with those that we have used. Currently, we use the Engstrom, Bird, and Bennett respirators in a variety of situations, and have learned how to maintain them and what spare parts to carry.

FURTHER EVOLUTION OF PATIENT CARE

While our present system of close cooperation has led to a very substantial improvement in patient care, there are obvious disadvantages in having equipment spread over many wards of the hospital, and in having to give each new nurse a rapid course in respiratory physiology with every patient. The hospital administration has set aside an area for conversion to a respiratory unit, where all the apparatus can be stored and maintained, and where patients can be treated until their breathing is adequate. Through the cooperation of the nursing service, a permanent staff of nurses will be allocated to this unit, thus making certain that the experience derived from one patient will not be lost, but will be carried over to subsequent patients. As has been shown in other centres (3, 4, 5.) this will undoubtedly result in more successful treatment of these severely ill patients.

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BACTERIAL SHOCK

by

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Bacterial shock is a potentially fatal complication closely associated with infections of the genital tract. The mortality rates range from 23-27% in different series. There is a typical history of an infection in the genital or urinary tract. Following this, profound shock develops, associated with oliguria or anuria and a rising blood urea nitrogen. This condition may progress to death.

The outcome of the disease can be favourably influenced by prompt recognition and careful clinical management.

The following is a case of bacterial shock recently seen at the Victoria General Hospital:

A 29 year old white female was admitted to the Gynaecological ward at 6:30 p.m., March 24, 1961. She was gravida III, para II, last menstrual period was September, 1960. Each month since then she had had some dark vaginal discharge at the time of her period. She began to bleed on March 23, 1961. Associated with this bleeding were clots and lower abdominal cramps. At this time she began to have fever and chills. Twelve pads were used during the day prior to admission.

When first seen, her temperature was 104.2°; pulse, 108 per minute; and she was bleeding vaginally. Blood pressure was 80/50, mm. Hg. she was pale and perspiring, and it was evident that she was in shock.

8:00 p.m. examination revealed the following: chest clear; heart sounds weak, but regular; pulse 100/minute; Hb., 11.7 gms%; WBC, 4,000; blood pressure, 70/44 mm. Hg. Abdominal examination revealed a hard, tender uterus 4cm. above the symphysis. Pelvic examination revealed moderate bleeding associated with a foul odour. The cervix was hard and the os admitted one finger. The uterus was enlarged to the size of a three month pregnancy, and was tender. No other masses were found.

In the preceding one and one-half hours there had been no urinary output. The diagnosis at this time was septic abortion with Shwartzman-like reaction. The latter is seen in rabbits when a toxin is administered twenty-four hours after a preparatory dose of the toxin has been given. The chief pathologic lesion seen is cortical necrosis of the kidney.²

Immediate Management:

1. Uterine and blood culture
2. Penicillin, 1 million units q.l.h.
3. Solucortef, 100 mgm I.V.
4. 5% glucose and water I.V. was started.

9:15 p.m. A few drops of urine were obtained. A consultant bacteriologist found the following on a direct smear from the uterus: gram positive cocci, streptococci, staphylococci, enterococci, and gram negative coli. He recommended that, in addition to the penicillin, intravenous tetracycline be used.

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11:30 p.m. BP. 110/80 mm. Hg., temperature 102°, and the patient passed a four-five month foetus, but retained the placenta.

March 25, 1961, 9:00 a.m.: BP. 100/70 mm Hg., temperature 98.6°, and drops of urine were obtained.

12:00 noon. BP. 80/40 mm. Hg., temperature 98, Vasoxyd 5mgm I.M. ordered stat and prn. to keep systolic pressure above 80 mm. Hg.

March 26, 1961: BP. maintained at 80-90/60 mm. Hg. for the next 12 hours, after which an Aramine drip was started and the BP was kept stable at 100-110/70-80 mm. Hg. Urinary output was 100cc. for the past 24 hours and increased daily from this time.

In view of the virulence of the organisms seen on smear and the presence of necrotic placental tissue with continued release of toxic substance, it was decided that the uterus should be emptied. A pitocin drip was started, and under a general anaesthetic the uterus was emptied of foul smelling, necrotic placental tissue.

Forty-eight hour culture reports from the uterus showed a heavy growth of bacteroides, anaerobic streptococci, and micro aerophilic streptococci. Blood culture grew anaerobic streptococci and micrococci. All organisms were sensitive to both penicillin and tetracycline.

Improvement was continuous from this time. Table I illustrates this progress. The urinary output increased gradually from the first day but did not appear adequate until the 9th day. By the fact that the BUN continued to rise for 8 days and then began to regress, it was indicated that the renal function was now improving. This is in keeping with tubular necrosis.

Acidosis was apparent, not correcting itself until the 12th day. In spite of apparent renal failure, hyperpotassemia was not a problem in this case. The temperature became subnormal quite dramatically, then rose to normal levels and remained there for the remainder of the stay in hospital. This is a frequent finding in this condition.

DISCUSSION: The criteria used to establish a diagnosis include: 1. Apparent bacterial infection, 2. Hypotension with no other cause present, 3. Oliguria and/or a rising BUN, and 4. Bacteria may or may not be found on blood culture.¹

The causal organism is usually a gram negative bacillus, but this is not always the case as was demonstrated above. As the bacteria degenerate, they release a potent endotoxin. This substance is a poly-saccharide and is the initiating factor in producing vascular collapse.

Preceding the shock, the typical picture is one of an elevated temperature followed by a depression of the temperature to below normal. The leucocyte count depressed at first is later markedly elevated. A metabolic acidosis develops.

MECHANISM OF ACTION: In studies made by Weil et al.⁶, it has been shown that the endotoxin acts on the splanchnic venous bed causing marked dilatation and pooling of the blood. There is a constriction of the hepatic venules. Consequently, there is a reduction in the amount of blood returning to the heart. This results in a decreased cardiac output with inadequate arterial blood volume. Myocardial ischemia becomes evident and causes impaired cardiac contractility with further decrease in the cardiac output. In addition, there may be myocardial damage by the toxin.

The shock was thought to be initiated through the central nervous system³; however, this view was not supported by Weil et al⁵ in their experiments with cross circulation in dogs.

Adrenal insufficiency as a primary factor is questionable, because: 1. Adrenal haemorrhage and degeneration seen in these patients can be a result of intense stimulation, 2. The blood pressure may respond to pressor drugs without corticoids, and 3. Hydroxycorticoids are usually present at normal levels.¹

Renal ischemia, (due to shock and perhaps tructa shunt), plus direct effect of toxins and possible hemoglobinuria, leads to acute tubular necrosis.

Anuria is rare. Oliguria is common and may last for 2 days to 6 weeks,⁴. BUN and serum potassium are usually elevated whereas serum sodium, chlorides, and calcium levels are usually below normal. Diuresis occurs as healing takes place in the renal tubules, and the electrolyte imbalance adjusts itself.

MANAGEMENT:

Early recognition is paramount.

1. Combat hypotension with pressor agents. Plasma expanders and blood are not effective and may produce pulmonary edema.
2. Take blood and uterine cultures for organisms and sensitivity.
3. Treat infections with penicillin and a broad spectrum antibiotic, until culture reports give specific guidance. Continue these for 10-15 days.
4. Empty the uterus within 12 hours. The placenta presents a large surface providing toxins to the maternal blood. If curettage is not advisable, do a hysterectomy.
5. Hydrocortisone is usually given by most groups, but its action is a controversial point.
6. Restrict fluids so as not to cause pulmonary edema or cardiac failure.
7. Restrict potassium.
8. Give a high carbohydrate diet to prevent protein breakdown.
9. Determine electrolytes, BUN, and CO₂ combining power often—preferably every two days.
10. Artificial Hemodialysis may be indicated by:
 - (a) pulmonary edema
 - (b) severe acidosis
 - (c) hyperpotassemia
 - (d) marked symptoms of uremia

All of these measures except the last were carried out on the above mentioned patient.

SUMMARY:

1. A case of bacterial shock has been reported.
2. The physiology and biochemistry of bacterial shock has been reviewed.
3. Clinical management of bacterial shock has been summarized.

TABLE I

Date	IN		OUT		CO ₂ Comb. Power	BUN	Na	Cl	K	Ca	WBC	Hb
	Oral	I.V.	Emesis	Urine								
Mar. 24	1320	1280	300	Drops	21.2	12 †	129	100	3.1		4,000	11.7
25	710	1450	610	100	21.1	20	132	95	3.5		27,900	10.8
26	0	1520	670	197	14.4	54	134	93	3.8		21,000	11.0
27	0	2000	135	840	15.8	70	128	97	3.7		31,000	12.5
28	120	1870	30	1495	19.5	84	132	89	3.6		18,500	12.5
29						98					16,000	12.5
30					17.2	124	125	94	4.5	8.3	12,900	11.0
31						152	142		4.6		13,300	10.5
April 1		NIL		1400 - 2000	14.2	140	134		5.0		14,000	10.3
2			17.4		132	134.2	106	4.1	8.3		10.8	
3			19.5		104			4.2		13,500	10.5	
4			23.0		83	136	109	3.8		10,000	10.3	
5							50					
6							34				6,300	10.5
7							22					

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BOOK REVIEW

AN APPRAISAL OF PRESENT CONCEPTS IN ANAESTHESIOLOGY. Edited by John Adriani. 267 pages. The C. V. Mosby Company. Price: \$7.75.

The object of this review is to supply information to specialists in Anaesthesia who are practising outside of university centres and do not have access to scientific journals.

The book is a collection of monographs by residents in training dealing with a number of subjects which are not adequately covered in standard text books. These presentations are, of necessity, less than authoritative and often incomplete but, nevertheless, contain much useful information. It was disappointing to find that such an experienced writer as Adriani had applied a light hand in editing this book.

The style of the individual contributors is varied and is often obscure. Occasionally the obscurity leads to erroneous presentation of the facts. The section on intrapleural and intrapulmonary pressures on page 72 is contradictory as well as erroneous, and in the section on vagovagal reflexes the following sentences appear: "The experimental distention of the stomach, especially the cardia, results in a decrease in coronary flow in dogs. This response does not follow the administration of atropine or vagus section." A specialist well versed in physiology automatically corrects the second sentence to read: "This response does not occur with prior administration of atropine or vagus section." But the busy specialist, out of touch with basic sciences, would easily misinterpret these sentences. The misstatements in writing result from a looseness of expression which is common to residents in training and one would expect that careful editing would have removed them.

On the whole, the subjects are well chosen though I doubt the usefulness of including three sections on cardiopulmonary bypass in a book primarily directed at specialist Anaesthetists outside major centres. With these reservations, the book can be recommended as readable, compact and well presented.

I.E.P.

1000 WORD SERIES (12)

RADIOTHERAPY

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In the treatment of malignant disease, the object of radiotherapy is to lower the growth potential of neoplastic tissue and alter its behaviour pattern within the body so that growth restraint and where possible complete tumour regression can occur. Contrary to a popular notion, the direct radiation death of every tumour cell is not intended nor would such be any more effective than other forms of cautery. Basically, radiotherapy is not the treatment of tumour cells, which by themselves are very resistant, but is the differential treatment effect on both tumour and tumour bed. To list all the common tumours in some table giving their radiosensitivity would not be very helpful since it would not take into account the following factors.

- 1 **SITE:** This determines the health of the tissues making up the tumour bed and especially the oxygen supply to the tumour. For example, tumours of the soft tissues of the mouth and throat respond well and the normal tissues heal well. Tumours involving cartilage are most unresponsive. Some sites such as the perineum, groin, the palms and soles tolerate radiation rather badly and so the therapeutic ratio is reduced. Metastatic disease in general responds just as well as primary and the same factors apply.
- 2 **SIZE:** Very large tumours even without metastases require such a large volume treated that the dose must be limited and the response is therefore slow and incomplete. Again the deeper parts of the tumour may be ischaemic and even necrotic and these tissues do not respond to radiation.
- 3 **SENSITIVITY:** A crude spectrum of the immediate response of various histological types might be assembled but the success in producing a cure must be assessed with all other factors. Tumours are listed in order of decreasing sensitivity at various sites.

Skin: Lymphoma, squamous cell ca., basal cell ca., basosquamous ca., adenoacanthoma.

Mouth and throat: Lymphoepithelioma, anaplastic carcinoma, well differentiated ca., adenocarcinoma, cylindroma.

Intracranial: Medulloblastoma, ependymoma, gliomata grades 111 to 1, meningioma.

General: Very sensitive—reticuloses, seminoma, Wilm's tumour
 Very resistant—malignant melanoma, teratomata, fibrosarcoma. When using the word radiosensitive we make a distinction between that and radiocurability. Many of the most sensitive tumours which produce an excellent immediate response recur either locally or at a distant site and so the response has been temporary. On the other hand, tumours which respond slowly like the well differentiated squamous cell carcinoma are frequently cured by radiation therapy.

The aim of treatment for neoplastic disease should be to allow the patient to live the life which might have been his had he not developed this tumour and to live it in the greatest comfort. The ideal is seldom realized but as in any therapeutic problem, the same factors should guide the physician as with many diseases that are:

1. Progressive
2. May cause pain in the later stages
3. Cause considerable anxiety now to both patient and relatives.

The types of treatment in general can be grouped as follows:

- A RADICAL THERAPY:** A cure is possible. This prospect leads the radiotherapist to spare no effort and the patient to accept moderate present discomfort. Both must also often accept some risk of skin damage, fibrosis and other sequelae of the intensive irradiation. We would ask the following questions:
1. Do we know the probable extent of the disease now and its route of spread?
 2. Is there sepsis, anaemia or other conditions requiring attention prior to radiation?
 3. Have we considered the patient's probable natural survival in relation to the discomfort incurred by radical treatment?
- B PROPHYLACTIC THERAPY:** The surgeon and the radiotherapist are a team. Sometimes pre-operative radiotherapy makes surgery simpler; sometimes post operative radiation is planned from the outset as part of the total treatment.
1. As a surgeon, can I leave the tissues in a sufficiently healthy state to tolerate radiation?
 2. As a radiotherapist can I avoid making further surgery almost impossible?
 3. Is there adequate consultation?
- C PALLIATIVE THERAPY:** There is never nothing to be done. Often this consists of re-assurance and sedation alone but radiotherapy is a valuable tool for the relief of pain in bone metastases and the relief of pressure at many sites. It should be remembered, however, that it is not palliation when symptoms of radiation sickness and the inconvenience and discomfort of transportation are added to the burden of the frail elderly patient with widespread disease.

1. Are there symptoms to be palliated?
2. Can life be prolonged in comfort by slowing down tumour growth?
3. Knowing the natural history of this disease, how can future sequelae be avoided?

There are two further therapeutic situations that require further comment.

THERAPEUTIC TRIAL: Often with unusual tumours we must assess the response of the tumour after the first several treatments to determine if a radical course of treatment is indicated.

THE THERAPY OF RETICULOSES: Diseases such as lymphosarcoma and Hodgkin's Disease form a special category in what could be called palliative therapy. Occasionally patients are seen alive and well 20 years after radiation treatment for Hodgkin's granuloma. The usual patient, however, has a limited life expectancy. Repeated courses of treatment are required often to the same regions and the tissue tolerance must be preserved.

Radiotherapy of malignant disease is here to stay for many years yet. The advances in the chemotherapy of cancer have been impressive but so far there has been little sufficiently specific that the normal proliferative tissues such as the bone marrow are spared. For the time being we could look for a substance that can be tolerated reasonably well but which would enhance the therapeutic ratio for the accurately localized radiation or alternatively would enhance the palliative effects of small doses of radiation to larger parts of the body.

A word should be said for the treatment of benign conditions with radiation. By and large these can be divided into two broad groups:— inflammatory and hyperplastic. After other types of therapy have been tried with limited success it is frequently found that small doses of radiation are of considerable benefit. Under inflammatory could be listed:

dermatitis	carbuncle
herpes zoster	certain warts
keratitis	bursitis
paronychia	

One would consider the following hyperplastic conditions:

keloid	thyroiditis
pterygium	haemangioma

Each of the benign conditions requires a specific pattern of therapy which we cannot list here. For all of these, however, the dictum in "*primum non nocere*".

“NOVUS HOMO”

The development of Physiotherapy as a profession has been a slow process, and it is doubtful if it could have reached its present status but for the necessary emphasis placed upon rehabilitation by two World Wars. The fact that a person is pronounced well by a surgeon or physician generally relates to the condition that brought patient and doctor together in the first place, it does not necessarily relate to the whole man who, though healed may not be able to occupy his former role in society. The consequences incident upon a lesion bring to the scene the physiotherapist, equipped with the skills to speed the fully integrated rehabilitation of the patient as a complete and useful member of the community.

In the Province of Nova Scotia there are today some twenty-five practising physiotherapists. They are working in hospitals, rehabilitation centres and within the domiciliary service provided by the Canadian Arthritis and Rheumatism Society. With twenty-four vacancies unfilled in the province and a speedily expanding demand upon rehabilitation services the need for trained personnel is great.

The physiotherapist has no exalted opinions of his or her place in the scheme of medical services; they are not essential; they are rather catalysts in the rehabilitation formula. The hemiplegic or the polio patient will both achieve a fairly predictable degree of recovery in time, but the speed, degree, and certainty of recovery can be increased by the use of skilled physiotherapeutic procedures. These skills are learnt at one of the schools of physiotherapy which exist at the major universities in Canada. Upon completion of the course which takes three years, the student is required to complete a satisfactory internship of 5 months, at the end of which the student is eligible for membership of the Canadian Physiotherapy Association. Then the physiotherapist is accepted for membership by the Nova Scotia Association of Physiotherapists and is legally—within the regulations of the 1958 act passed in the Nova Scotia Legislature—entitled to work as a physiotherapist in Nova Scotia.

What are some of the procedures that are made available by the physiotherapist to the medical profession? They range from electronics to exercise, from hydrotherapy to common sense. The most often requested treatment is for remedial exercises. These are of a long term nature and are aimed at prevention, correction, or re-education. Those muscle groups affected by poliomyelitis have been subjected to irreversible changes, but by correctly taught exercises the remaining normal muscle groups can be developed, new skills can be learned and the ground prepared for effective muscle transplanting. Such exercises appear easy at first sight, but the knowledge of anatomy, physiology and kinesiology behind their application is considerable, especially in the new proprioceptive facilitation techniques being used increasingly today. In many cases the request for remedial exercises is preceded with a request for an accurate evaluation of the neuro-muscular activity present in a muscle group. Complete nerve severance, nerve pinching or functional inhibition apparently present the same picture, but within a few minutes by

use of the modern electronic stimulators the true state of affairs can be ascertained. With this knowledge the surgeon can be armed to save time and minimize eventual disability. If re-innervation is expected the qualities of muscle tissue are retained and atrophy prevented by the use of electronic stimulation, until active exercise is possible. The use of remedial exercises in cases of Multiple Sclerosis, Hemiplegia, Cerebral Palsy, and allied nervous system diseases is of great value but is limited to the feasible not the impossible.

If one wishes to be proficient at any athletic skill, practise is essential but brings results; if this is true to raise normal physical abilities to the above normal, the same is true for those who by disease are left with a lower than normal physical ability. The use of remedial exercises has grown over the years from the Swedish Remedial Exercise programs of forty years ago and is now recommended for all manner of conditions, but is especially used in orthopaedic, pediatric, and neurological services. The use of pre and post operative breathing exercises is a common well accepted plan of prevention of post anaesthesia complications.

The days of the diabolical electro-therapeutics with static electricity, shocking coils, anodal diffusion, electrical osmosis, voltaic narcotism and the like are gone. In their place stands a physiotherapist armed with the modern wonders of electronic science. The most widely known piece of equipment used today is the short wave diathermy unit, or 'deep heat' as it is popularly known. Unfortunately there is in many minds the erroneous concept "if you cannot see it deeply heat it". Diathermy is heat pure and simple, but it is the deepest form of heat available. The indications for and use of diathermy are in direct relation to the physiological effects of heat. It is of particular value in the treatment of osteoarthritis and joint diseases of the spine where the inflammatory reactions are in the periphery of the joint, and in the treatment of acute shoulder lesion. The specific effect of calcium absorption is well reported in many cases of deposits in relation to the shoulder joint. Ultrasonics have encroached upon all walks of life and the physiotherapy department too uses ultrasound energy today. This treatment is the least clearly understood physiologically, but is most easily explained as heat produced at fascial planes and interfaces. The dramatic relief obtained in cases of sciatica, nerve root irritation, and soft tissue trauma is well known, while the considerable but less dramatic results upon the diffuse scar tissue associated with varicose ulcers, and tendon surgery are less known.

The use of light energy or actionotherapy is an ancient skill that has been updated, there is little talk of the various effects of different colored lights today—except in the fields of interior decoration and design. In a physiotherapy department use is made of ultraviolet and infrared rays, which lie at opposite ends of the visible spectrum. Ultraviolet has been further refined of late to long and short wave length ultraviolet by the use of phosphorescent strip tubing, to separate the destructive from the tanning rays in treating skin lesions such as psoriasis. The use of ultraviolet in prevention of skin breakdowns with paraplegics is not sufficiently well known so as to preclude all but its occasional use for decubitus ulcers, in conjunction with antibiotics or cod liver oil sterilized by irradiation with ultraviolet light. Infrared rays are used for superficial heating of the tissues and the same effects are obtained by the use of wax baths. The latter being of specific value in supplying soothing heat to the extremities in Rheumatoid Arthritis and following tendon surgery.

The preceding treatments do not require as much space as a hydrotherapy unit needs, therefore physiotherapy departments being usually an after-thought in a hospital plan seldom have the space to indulge in pool treatments. The principle of such treatments is that of Archimedes. The density of the human body being close to that of water means that immersed it is weightless and hence the muscular effort required of a polio patient to produce a movement is minimal in water. It is therefore of prime value, in the re-education of neuro-muscular disorders and the mobilization of rheumatoid arthritics but is seldom used, unfortunately, for earlier weight bearing, or gait training in orthopaedics.

This resumé covers the main fields of the physiotherapists practice, but she is not non-plussed if asked to make night splints to prevent deformities; to give spinal traction; to give pre-or post-natal exercises; to teach the use of prostheses; or to coax, encourage, love and inspire the child with cerebral palsy.

Such is the lot of the physiotherapist, a wide realm indeed that offers her employment both in general hospitals, and in many types of specialized unit. In Nova Scotia today the time is ripe for the recognition of the worth of the services she offers, only with this recognition can the community hope to attract sufficient numbers to make planned physiotherapy departments and full rehabilitation services a reality for the citizens of this province.

The solution is education of the public. This is being undertaken by the provincial officers of the Canadian Physiotherapy Association, and through the good offices of the Department of Health and Welfare. The assistance of the Government of Nova Scotia in obtaining bursaries for suitable candidates to undertake the training course at McGill University is of great value but the present rates of university enrolment will not meet the projected demands for the future and more physiotherapists must be encouraged to work in the province. The education needed is for a public awareness of the role of physiotherapists in the medical world, since the whole spectrum of society is uninformed of the physiotherapist's role. It is in the hope that this state of affairs may be corrected within the medical profession that this account is directed to the medical practitioners of Nova Scotia.



PERSONAL INTEREST NOTES

HALIFAX MEDICAL SOCIETY

June 28, 1962 — Dr. L. A. Rosere, Dartmouth, announced that he is retiring from the private practice of medicine.

THE NOVA SCOTIA SOCIETY OF OPHTHALMOLOGY & OTHOLARYNGOLOGY

With the undertaking of the residency training programme in Ophthalmology at the Victoria General Hospital, Halifax, a general invitation is extended to any member of this society to attend weekly Grand Rounds held in the eye clinic of the out-patient department, every Tuesday from 4:30 to 6:00 P.M.

UNIVERSITY

(Editor's Note: Included is a complete list of the accepted first year medical students at the local university, so the profession may know the origin of their confrères).

BIRTHS

To Dr. and Mrs. Benjamin Doane (née Margaret Clarkson) a daughter, Heather Margaret, at the Grace Maternity Hospital on July 29, 1962.

To Dr. and Mrs. R. L. Langdon (née Bernice Parsons) a son and daughter (twins) on September 7, 1962. A brother and sister for Kevin and Patsy.

CONGRATULATIONS

To Dr. Thomas B. Acker, Halifax on his being granted the degree of Doctor of Civil Laws, Honoris Causa, at the summer convocation of Acadia University, August 14, 1962.

To Dr. and Mrs. John W. Merritt, Halifax on the marriage of their daughter, Janice Jenifer, to Mr. Paul Brian Flemming, LL.B. on August 25, 1962.

COMING MEETINGS

Nov. 5-8, 1962 — The 36th Annual Dalhousie Refresher Course, Halifax, N. S.

Nov. 8-10, 1962 — At the Nurses Auditorium, Victoria General Hospital, the First Atlantic Nutrition Conference will be held in conjunction with the Dalhousie Refresher Course. It is intended to present various aspects of nutrition in relationship to human diseases by speakers from the Maritime Provinces as well as outstanding speakers from the United States and Canada. The programme is being prepared with primarily the family physician in mind to provide information to him regarding the recent developments in the field of nutrition. The last day of the Annual Dalhousie Refresher Course will also be the first day of the Atlantic Nutrition Conference. The programme has been diversified and will include such guest speakers as Dr. Emmett Holt from New York City speaking on malabsorption conditions, eczema and diet therapy; Dr. Jeremiah Stamler, Director of Chronic Disease Control Division Chicago, Illinois, who will speak on the relationship of atherosclerosis, coronary disease etc. to fat metabolism and diet; Dr. William McGannity, Professor and Chairman, Department of Obstetrics and Gynecology, University

of Texas, Galveston, Texas, who will speak on nutritional problems in pregnancy and post partum nutritional adjustment; Dr. Donald Fraser, Hospital for Sick Children, Toronto, speaking on various problems of vitamin and mineral excesses; Dr. James Stevenson, Professor of Physiology, University of Western Ontario, who will comment on various aspects of overnutrition, obesity and food habits. It is also intended, with the assistance of speakers from the four Maritime Provinces, to include such topics as nutritional problems in the geriatric patient; anaemias; and several panels on various aspects of nutrition including "Diet Therapy and Medical Diseases".

A dinner will be held on the Friday evening, November 9, 1962, at the Nova Scotian Hotel with an outstanding guest speaker. It is hoped that as many physicians as possible from Nova Scotia and other Maritime Provinces will attend the presentation of recent developments related to nutrition and many medical diseases.

November 19, 1962—Annual combined meeting of the Nova Scotia and New Brunswick Societies of Ophthalmology & Otolaryngology, Halifax. The meeting will commence with clinical presentations at the out-patient department of the Victoria General Hospital, Halifax at 9:00 A.M. followed by a business meeting at 11:30 A.M. and a reception and luncheon at the Lord Nelson Hotel, Halifax, at 12:30 P.M. In the afternoon there will be papers and films, and if necessary, a further business meeting.

DALHOUSIE UNIVERSITY — FACULTY OF MEDICINE

SESSION 1962-63

First Year Students

Akabutu, John Joyce	Dal.	Accra, Ghana
Arsenault, Andrew Gerard	St. F.X.	Ingonish Beach, Victoria County, N. S.
Bethell, Walter Hiltz	Dal.	Clark Street, Summerside, P. E. I.
Bowes, Vernon Franklin	Dal.	3678 Robie St., Halifax, N. S.
Bown, Kenneth Winston	Dal.	12 Baltimore St., St. John's, Nfld.
Bright-Asare, Peter	Dal.	Accra, Ghana
Budd, Charles Frederick	Dart.	3417 West 148th St., Cleveland II, Ohio
Burton, Josef John	Rochester & Utica	R. R. No. 2, Eureka Rd., Rome, N. Y.
Buntain, William LeRoy	Dal.	101 Parkview Road, Kentville, N. S.
Cain, Richard Stanley	Acadia	34 Westwood Avenue, Wolfville, N. S.
Chu, Sik On	Dal.	Macau, China
Culmer, Kirtland Rudolph	Dal.	P.O. Box 5543, Nassau, Bahamas
Cunningham, John Peter	Acadia	Box 295, St. Andrew's, N. B.
Curran, Thomas Nicholas	St. F.X.	188 Maple St., Bangor, Maine
Curry, John Page	Dart. & Col.	Brooklane, Hartsdale, New York
Davison, Ross Brown	Dal.	Kensington, P. E. I.
Day, Edward Austin	Dal.	Duck Cove, Lancaster, N. B.
DesRoches, Peter	St. D.	Montague, P. E. I.
Dolan, William	St. D.	1653 New York Ave., Brooklyn 10, N. Y.
Emenau, Paige Leroy	Dal.	Brooklyn, Queen's County, N. S.
Felderhof, Clarence Herman	Dal.	872 East River Rd., New Glasgow, N. S.
Felix, William Aloysius Luke	Mem.	1 Rowan St., St. John's, Nfld.
Fraser, George Albert	St. D.	304 Richmond St., Charlottetown, P. E. I.
Fraser, Ralph John	Dal.	20 Wenlock Grove, Armdale, N. S.
Garey, Donald Norman	St. F.X.	343 Fund Drive, Lancaster, N. B.
Gill, Rosemary	Mem.	Grand Falls, Nfld.
Goddard, Peter	Dal.	83 Springvale Ave., Armdale, N. S.
Grant, Sydney Gordon	U.N.B.	165 Henry St., Fredericton, N. B.
Green, Lawrence	Queen's & N.Y.	164-28 73rd Ave., Flushing 66, N. Y.
Hale, George Lynton	Dal.	Waterville, Kings County, N. S.

Hayne, Ormille Aubrey	St. F.X.	Country Harbour Mines, Guysborough County, N. S.
Haynes, Gordon Ralph	Mem.	Trinity Bay, Nfld.
Hoar, Brian Herbert	Dal.	2293 Prospect Ave., Ottawa
Howard, John Edward	St. F.X.	79 Loch Lomand Rd., E. Saint John, N. B.
Huberman, Jean Pierre	Stanford	310 Highland Blvd., Brooklyn, N.Y.
Klein, Bernard Robert	N.Y.U.	87-48 62 Rd., Rego Park 74, N. Y.
Knickle, David Arliss	Dal.	6 Hospital St., Springhill, N. S.
Knowles, Kenneth West	McGill	Box 862, Nassau, Bahamas
Legacy, Ronald Edward	St. F.X.	36 Copp Ave., Amherst, N. S.
Levine, Leonard Ivan	Dal.	32 Bessborough Ave., Moncton, N. B.
Ley, David Albert	Dal.	4 Rosemount Ave., Armdale, N. S.
Lund, Robert Allen	Dal.	92 Kent St., Charlottetown, P. E. I.
Luther, Edwin Roy	Dal.	Deer Lake, Newfoundland
MacAskill, Maynard Clayton	Acadia	Brenton Cove, Victoria Co., N. S.
McEwen, Diane Marylin	Dal.	1581 deBiencourt St., Montreal, P. Q.
McIsaac, John Joseph Peter	St. Mary's	5885 Balmoral Rd., Halifax, N. S.
MacRae, Donald Kristine	Dal.	6457 Jubilee Road, Halifax, N. S.
Mercer, Isaac David	Mem.	63 Bennett Ave., St. John's, Nfld.
Mitton, Allan Herbert	U.N.B.	181 Church St., Moncton, N. B.
Morgan, Donald Arthur	U.N.B.	97 Rockwood Ave., Fredericton, N. B.
Murray, Douglas Duncan	Dal.	5925 Balmoral Rd., Halifax, N. S.
Murray, Harold Simpson	St. F.X.	131 Main St., Springhill, N. S.
Nickerson, Kenneth Robert Joseph	St. Mary's	Park Lodge, Point Pleasant Park, Halifax, N. S.
Noonan, John William Henry	St. D.	349 Argyle St., Summerside, P. E. I.
Nurse, Eugene Gardner	Mt. A.	Grand Bank, Nfld.
Olmstead, David Wayne	Acadia	Kemptville, Yarmouth Co., N. S.
Parker, Alexander Stirling	Dal.	Bedford, R. R. No. 1, Site 10, Halifax County, N. S.
Parker, Howard Gary	Dal.	Houlton St., Patton, Maine
Power, Gerald Arthur	Mem.	Burnt Cove via Tors Cove, Nfld.
Roy, Thomas Sherrard	Acadia	8 Elmwood St., Worcester 2, Mass.
Seaman, David Howard	Dal.	5830 South St., Halifax, N. S.
Simmons, James Douglas	Mem.	5 Liverpool Ave., St. John's, Nfld.
Smith, Eldon Raymond	Dal.	Hammond's Plains, Halifax Co., N. S.
Touchie, Harold Wayne	U.N.B.	124 Pine St., Moncton, N. B.
Walkes, Austin Cecil	Dal.	Kellman's hand, Black Rock, St. Michael, Barbadoes
Webster, Alfred Ross	Dal.	Malpeque Rd., R. R. No. 7, Charlottetown, P. E. I.
Weir, Andrew F.	Acadia	Hebron, Yarmouth Co., N. S.
Whitman, Edmund George	Dal.	North Main St., Westville, N. S.
Wrixon, William	Mem.	Epworth, Burin, Newfoundland
Yates, Ernest Keith	Mem.	594 Empire Ave. W., St. John's, Nfld.
Young, Marion Christie	Dal.	108 Thistle St., Dartmouth, N. S.

MATERNAL AND CHILD HEALTH DIVISION BOOKS, FILMS AND FILMSTRIPS

The following lists of books, films and filmstrips that are available on loan from the Division of Maternal and Child Health.

A short review of the books and films has been included which may be of some assistance in selecting the educational material for a group or a specific purpose.

Books may be borrowed from this office and kept for a period of one month. An extension of one month will be granted to the borrower on receipt of a letter requesting an additional month.

Films must be returned as soon as possible after use so that other requests can be filled with the minimum of delay.

Requests should be sent to the

Director,
Maternal and Child Health Division,
Department of Public Health,
Halifax, N. S.

EDUCATION FOR CHILDBIRTH—SERIES

1. PRENATAL CARE. Black & White. Sound. 21 minutes. 1951.

This film outlines the principles of prenatal care with emphasis on a confident understanding of the normal processes of pregnancy and childbirth. Film accompanies three expectant mothers at different stages of pregnancy on their regular visits to a physician, illustrating the information and advice they receive from him. Advice is given on posture, diet, clothing, relaxation and exercises designed to prepare the mother for a natural and uncomplicated delivery. The husband enters the picture from time to time.

2. LABOUR AND CHILDBIRTH. Black & White. Sound. 17 minutes. 1951.

Designed to give expectant mothers beforehand knowledge of their hospital, confinement, and an explanation of the mechanism of normal labour. Throughout the mother is seen to cooperate in delivering her baby, employing her knowledge of relaxation and breathing to assist the normal uterine contractions.

3. NORMAL BIRTH. Black & White. Sound. 11 minutes. 1951.

Presents a literal photographic record of an actual delivery under normal conditions and with the mother conscious and able to assist throughout. Preparation, cleansing and drawing of the patient and an episiotomy under local anaesthetic are shown. Animated drawings explain the delivery of both the baby and the placenta. Immediate postnatal care of the infant is shown.

4. POSTNATAL CARE. Black & White. Sound. 12 minutes. 1952.

Deals with postnatal care of the mother. Exercises designed to assist internal organs regain their normal positions and to stimulate abdominal muscle tone are demonstrated. Advice is given on postnatal hygiene for the mother and on breast feeding of the infant. After return home, the film stresses the need for adequate daily rest and cautions against over exertion. Throughout, the emotional value of the new experience of parenthood for both mother and father is noted.

FROM GENERATION TO GENERATION. Colour. Sound. 30 minutes. 1960.

This film tells with imagery and symbolism the universal story of the coming of a baby into a family. Opening on the dawn of a spring day, we follow the seasons. Animation tells the story of the unfolding of new life. Functioning of the organs of human reproduction is seen, the menstrual cycle is observed. Fertilization, stages of development of the fetus are observed until it reaches maturity and is ready to be born. Childbearing is seen as an emotional and spiritual experience for the family.

HUMAN GROWTH. Colour. Sound. 19 minutes. 1948.

A teacher explains the story of human reproduction and growth to her class of junior high school students. Suitables grades 6-9. Also useful in adult classes in child psychology, family living, etc.

KNOW YOUR BABY. Colour. Sound. 11 minutes. 1947.

Illustrates approved methods of psychological care of the newborn infant. A home situation is shown where other children are present, and the consideration and understanding necessary until the family adjusts itself to the demands of the newcomer are noted. The following aspects of infant care are dealt with and their psychological implications stressed; clothing and bedding; the bath; breast feeding; the bottle feeding; maintenance of normal home atmosphere, prevention of any feeling of neglect in older children and the need to develop the interest and participation of brothers and sisters in the care of the new baby.

MOLLY GROWS UP. Black & White. Sound. 4 minutes.

A film designed to explain the physiology of a normal menstruation to adolescent girls. The role of pituitary and ovarian hormones is indicated and the film discusses the following aspects of menstruation: change at puberty, ovulation, the menstrual cycle, normality of menstruation, bathing exercise, posture, sleep, regularity. It also shows how important the mother's role is. A good film suitable for teenagers, parents, educators, doctors and nurses.

VITAMIN D. Black & White. Sound. 4 minutes. 1948.

Produced for the Dept. of National Health & Welfare by the National Film Board and revised from the 1943 production, VITAMINS A, B, C & D. A film to show the source and the benefits of this important vitamin. Relating to vitamin-rich diet the ability to take part in such sports as skiing, the film explains the necessity of Vitamin D in building strong, straight bones that can withstand an occasional tumble. The sun is the best source of this vitamin, but clothes, smoke, even suntan prevent us getting all we need. The next best source is fish-liver oil, so wise mothers give their children the oil every day until they are sixteen years old.

Excellent except for final statement . . . "fish-liver oil is the only dependable source of Vitamin D".