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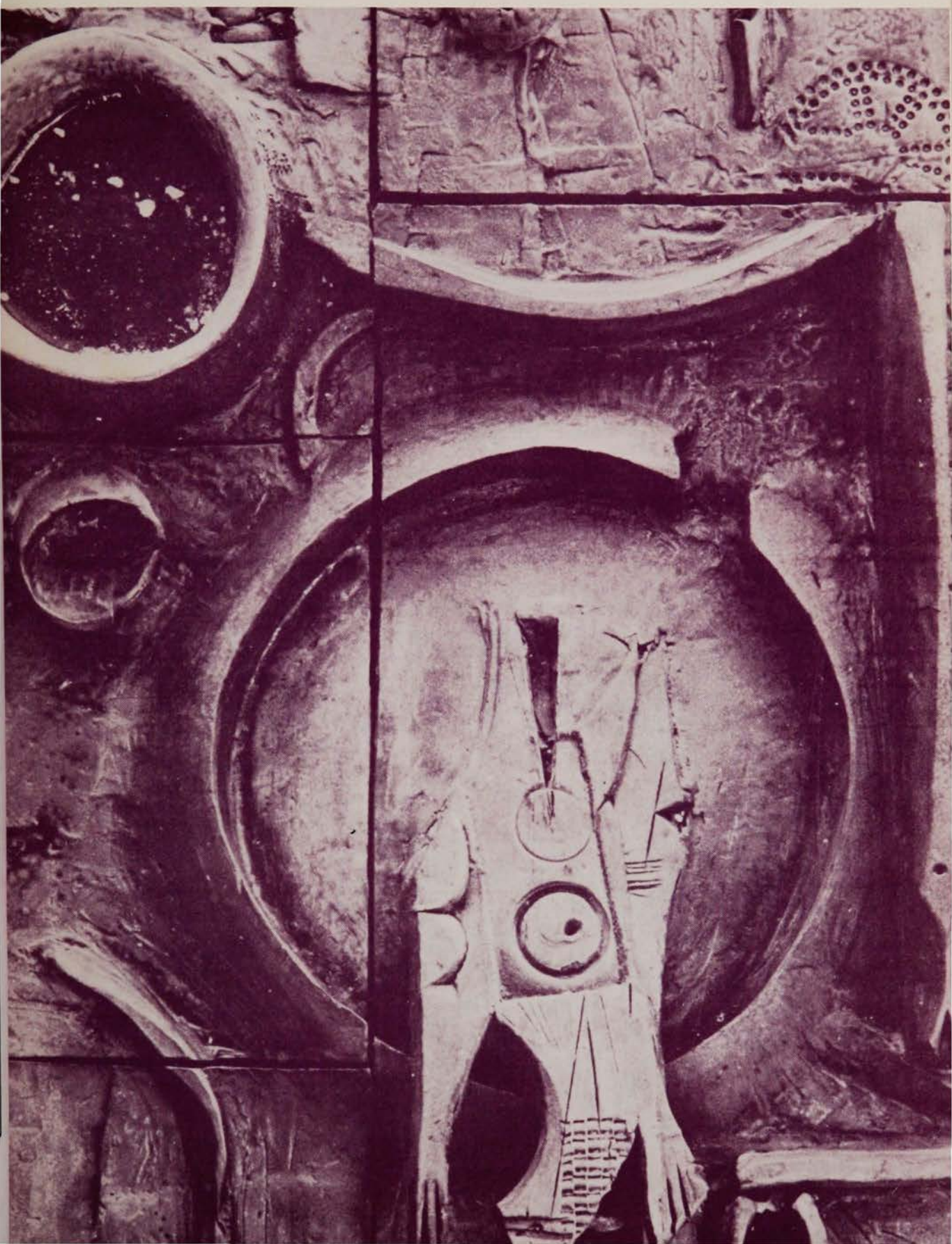

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THE UNIVERSITY OF WESTERN ONTARIO

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CONTRIBUTIONS will be accepted with the understanding that they are made solely to this publication. Articles should be of practical value to students and medical practitioners. Original research work is most welcome. Articles should not be longer than 3,000 words, and we will more readily accept those of shorter length. Introduction and summary of conclusions, should be included. Drawings and photographs will be accepted, the former to be in black ink and drawn clearly on white cardboard.

All articles submitted must be typewritten, on one side of paper only, with double spacing and two inch margins on each side. Canadian Press (American) spelling must be adhered to. The format for references is as follows: For books: author(s): title of book, publisher, place, year. For Journals: author(s): title of article, name of Journal (abbreviated as in the World List of Scientific Periodicals), volume: page, year.

Contents

Editorial

1. IN THIS ISSUE

I am pleased to say that both students and faculty have contributed enthusiastically in this issue. There are many interesting articles that, I am sure, required a lot of time and energy by the authors. The readers will find some of them very informative. The article, "Multiple Sclerosis Epidemiology, Current Directions and the Future", by Dr. D. W. Paty, clarifies the current thinking on multiple sclerosis, one of the most notoriously long and debilitating diseases. In his article, he also indicates the future plans of this university to carry out clinical trials toward the understanding and management of multiple sclerosis. I have enjoyed reading his paper and endorse it wholeheartedly.

2. CARING OF THE CHRONICALLY ILL IN A HOSPITAL SETTING

The above mentioned article brings me to say something regarding the management of *chronic* vs. *acute* care in a hospital. Chronic illness, such as stroke, malignancy, motor vehicle accident aftermath, Parkinson's disease, asthma, emphysema, multiple sclerosis, etc., somehow does not seem to generate much enthusiasm among interns, residents and/or consultants in the hospital. Obviously, factors such as priority of beds, hospital economics, overworked personnel, etc., definitely play a role in this situation. However, underlying these adverse conditions, the major problem (in my mind) lies in the inadequacy of medical knowledge of the understanding of the natural history and/or psychodynamics of chronic disease as an entity. There is an old medical saying—"when a problem is not fully understood, it is best to leave it alone". This "do no harm, do little" philosophy is quite evident at times in most medical wards. Little wonder, then, why some chronically ill patients are depressed, withdrawn, frustrated, and sometimes extremely hostile. Although there may be no obvious solution to this problem, some new directions may be helpful. There ought to be more utilization of the nursing assistants to partake in the follow-up of chronically ill patients. G.P.s who are responsible for the patients outside of hospital should assume a more important role in the patient's continuing progress or decline in hospital. And, certainly, a more reassuring medical staff would, in my opinion, yield a more rewarding result.

3. PROBLEM-ORIENTED SYSTEM IN PATIENT CHARTS

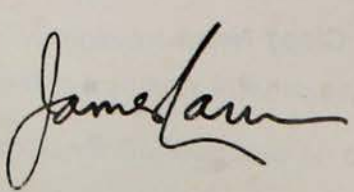
Problem listings should be implemented in *all* charts in *all* subspecialties of medical practice in hospital. Personally, I find the problem lists streamline my treatment and management plans of patients. It has kept me up to date, helped me assess the response of patients to therapy, and, more important, to detect any sudden turn of events. Of course, when problems are resolved, these will be deleted from the lists. This concept is simple to implement, it provides problems at a glance and has made my ward duty much easier.

4. THE OUTPATIENT CLINIC

The outpatient clinic is an excellent place to learn the "bread and butter" of medicine. Whoever contemplates family practice sometime in their medical career will certainly benefit from the exposure to the various subspecialty clinics. Presently, this is not very well attended by medical students, especially in the lower years. I feel that the medical school should adjust the timetables of all undergraduate years to allow students time to attend these clinics.

5. THANK YOU, MEDS' WIVES

Some Saturday nights, alone over a machine-brewed cup of coffee in a deserted interns' lounge, I can't help thinking about the kind of abuse my wife is taking because I am a medical student. Truly, she and other doctors' wives—this special breed of women—have weathered the imposed separation with grace and dignity. I wish to dedicate this issue to all Meds' wives, for your quiet understanding, for your ability to help boost the ever-deflated morales of your husbands to yet another long working day. Maybe, just maybe, some day your husbands may get more than two weeks in a year to spend their time at home without calls.



Editor

Multiple Sclerosis Epidemiology, Current Directions and the Future

D. W. Paty, M.D., F.R.C.P.(C)

The classical descriptions of clinical multiple sclerosis were made in the latter part of the 19th Century. When we think of the early descriptions of multiple sclerosis we usually think of Charcot. Actually the first pathological descriptions of multiple sclerosis were made in Paris in the middle eighteen hundreds. In 1868, Charcot, published his lectures that described the typical clinical and pathological features of the disease. From Charcot's description is derived the classical "Charcot's Triad" of multiple sclerosis: that is, Nystagmus, scanning speech, and intention tremor. We now know that these symptoms of multiple sclerosis are seen only in the most advanced cases. Most of the cases of multiple sclerosis that are seen in a neurologist's office in 1972 are much more benign than those that were originally described.

Many different theories have emerged as to the cause of multiple sclerosis. The most prevalent theory during the early days was that multiple sclerosis was related to some sort of infectious process. Pierre Marie, in 1884, especially emphasized the relationship of multiple sclerosis to various infectious diseases. In the early nineteen hundreds there were many attempts to transfer multiple sclerosis to animals to test the infectious theories. The results of these experiments were, of course, negative for the most part. Whenever there has been a report of transfer of multiple sclerosis by infectious agents it has been unable to be confirmed.

Today we know a great deal more about the pattern of the disease, but we know very little more about the etiology. The typical pathological change in multiple sclerosis, especially the acute cases, suggests some sort of inflammatory process. The more accepted theories of etiology now relate to possible virus infections and/or other environmental influences during childhood. These influences, combined with an autoimmune attack against the myelin of the central nervous system are thought to combine in the pathogenesis of this disease.

To make the diagnosis of multiple sclerosis we must rely on clinical judgement and the clinical course of the patient. There is no laboratory test which can do anything more than confirm the physician's clinical impression. The accepted way of establishing the diagnosis of multiple sclerosis is to demonstrate that there is dissemination of lesions in both space and time. The time involved is usually taken to be over a period of at least three to six months. In most authorities' hands this is always qualified by the admonition that the symptoms must not be produced by any other disease process.

The most common initial symptoms of patients that later turn out to have multiple sclerosis are:

1. A blurring of vision in one or both eyes.
2. Diplopia, usually transient and on lateral gaze.
3. Numbness and parasthesiae in one to four extremities.
4. Weakness of one to four limbs.

Less common initial complaints are vertigo and/or vomiting, and disorders of micturition.

These initial symptoms usually clear spontaneously. After the initial attack most patients return to a normal state. It is only after a number of minor attacks that the majority of patients develop a permanent neurologic deficit. It is not unusual for a patient to have had symptoms, on and off, for five or six years and still not have any significant permanent neurologic deficit. Throughout that period of time they may have many brief disturbances of function as noted above. The diagnosis is usually made anywhere from one to twenty years after the onset of symptoms.

It is becoming more and more evident as we learn more about the natural history of this disease that a significant number of patients with multiple sclerosis run an exceedingly benign course. Recent studies have shown that approximately 20% of patients might be expected to remain with minimum disability twenty years after the onset of symptoms. A recent study in the armed forces of the United States has shown that 76% of men diagnosed as having

multiple sclerosis were alive twenty years after the onset, and 69% were alive twenty-five years after the onset of their disease. On the basis of these studies it is calculated that a 25 year survival rate for patients with multiple sclerosis is 74%, compared with an 86% expected survival. In a study in Rochester, Minnesota, approximately two-thirds of patients surviving after 25 years of illness were still ambulatory.

One of the most interesting aspects of the epidemiologic study of this disease is that the incidence of the disease generally increases with northern latitudes. To this day it is considered uncommon in sub-tropical and tropical countries. It is considered an exceedingly rare disease in southern India, Central and Southern Africa, and in the Caribbean. Why this should be so is unexplained; of course many theories have evolved. One theory which is yet to be conclusively evaluated is that the pattern of exposure to viruses is quite different in southern latitudes.

As mentioned above, from the days of the original descriptions of multiple sclerosis infectious agents have been thought to play a part in the etiology of the disease. Today most theories of the etiology of multiple sclerosis include exposure to viruses in some way or another. The two viral theories, that today are most prevalent, can be thought of as the "obvious" and the "subtle".

The "obvious" theory is that the disease might be due to exposure to a virus at a young age, the virus being an uncommon virus which only attacks a small portion of the population. Of this small portion of the population attacked, only a small percentage would develop clinical symptoms of the disease. This sort of epidemiology might be compared with that of the rather rare encephalitidies such as eastern equine encephalitis.

The "subtle" theory is that the virus or viruses that cause the disease might be distributed ubiquitously. Children that are exposed to this virus at a very young age would develop a natural immunity to it and, therefore, not develop the disease. Children that are protected against exposure to this virus until a more relatively advanced age would not be able to develop an effective immunity and in future years possibly come down with the disease itself. This "subtle" hypothesis has been compared with the epidemiology of enteric infections such as polio. This second hypothesis has wider acceptance today than the "obvious" hypothesis. It is thought that a combination of this type of viral exposure in late childhood, associated with an autoimmune attack directed toward central nervous system oligodendroglia and/or myelin results in the neurological syndrome that we now call multiple sclerosis.

The viral exposure could well be to any of a number of viruses. It is doubtful if any specific virus could be implicated in this fashion. It is more likely to be a combination of factors, only one of which is viral exposure, that culminates in clinical disease.

Research into the etiology of this disease has been hindered, to a considerable degree, by the lack of any experimental models. Experimental allergic encephalomyelitis (EAE) is the experimental disease that has been used as a model for multiple sclerosis. This is, in truth, a very poor experimental model for the M.S. as it presents clinically. EAE is a monophasic disease that is produced in experimental animals by the injection of whole brain homogenates or myelin basic protein combined with Freund's adjuvant. Approximately two weeks after injection the animals develop a nervous system disease evidenced by paralysis and ataxia. The pathology of the disease is characterized by perivascular infiltration of mononuclear cells and in some species demyelination. The problem with EAE as a model for multiple sclerosis is that EAE is not a relapsing and remitting disease.

Here, at the University of Western Ontario, as a part of the patient care, teaching, and research facilities at the University Hospital, we plan to establish a clinic for multiple sclerosis patients. This clinic will be attended by the faculty and resident staff of the Department of Clinical Neurological Sciences. In this clinic we plan to provide the best available medical care for patients with multiple sclerosis. At the same time, we ask the co-operation of these patients in our teaching and research programmes. It is hoped that over the next few years we will get several hundred patients on our active list. From these patients we will be able to select subjects for studies designed to test the various theories of etiology of the disease. At the same time we will be selecting other patients for co-operation in controlled trials of therapy in multiple sclerosis.

Currently there is no accepted treatment that is known to alter the long-term course of this disease. There are certain standard treatments that are used in the acute exacerbation and in the treatment of complications which we would be using in our clinic. Other therapies would be accepted

only after demonstration of effectiveness in a therapeutic trial. After the collection and cataloging of a suitable number of patients with multiple sclerosis we will be in a position to evaluate proposed therapies in a controlled fashion. Without such studies we would never be in a position to say that we had a definitely effective drug. The course of the disease in itself is so variable that any uncontrolled trial is virtually worthless.

In summary, multiple sclerosis is probably the most fascinating of the diseases that affect the nervous system. This fascination is in no small part due to the continuing enigma that surrounds the etiology and pathogenesis of this disease. Though we know a great deal of detail about the course of the disease, we still have very little concrete evidence as to its cause. The development of a cure for this disease will, of course, await the discovery of its cause. This should not inhibit us from searching for emperical treatment that can alter its course. Here at the University of Western Ontario we will be engaged in research toward both the cause and the therapy of multiple sclerosis.

REFERENCES

Adams, R. D. and Kubik, C.: The morbid anatomy of the demyelinative diseases. Am. J. of Med. *12,* 510, 1952.

McAlpine, D.: The benign form of multiple sclerosis: results of a long-term study. Brit. Med. J. *2:* 1029, 1964.

McAlpine, D., Lumsden, C. E. and Acheson, E. D.: *Multiple Sclerosis,* a reappraisal. E. & E. Livingstone, Edinburgh and London, 1965.

Millar, J. H. D.: *Multiple Sclerosis, a disease acquired in childhood.* Charles C. Thomas, Springfield, Ill. 1971.

Rose, A. S., et al: Co-operative study in the evaluation of therapy in Multiple Sclerosis: ACTH vs placebo; final report—Neurology *20:* #5, Part 2, May 1970.

Poskanzer, D. C., Scharira, K. and Miller, H.: Multiple Sclerosis and Poliomyelitis. Lancet *II,* 917, 1963.

* * *

Beasties in the Broth

J. Fitzgerald, B.A. (Queens), Journalism '73

We are surrounded by bugs. Thousands of different kinds known and yet to be discovered, countless numbers in all, are swimming in the sea, swarming on the earth and the mass of humanity, and drifting through the atmosphere.

Some can help us (in the production of wine and cheese for example), others are health hazards. Some hide in your hair, your eyes, any human orifice or niche which looks mildly inhabitable. A piece of dental tartar houses more living creatures than there are humans on earth. They can crawl into a crevice in your watchband, in time forming a thin green fungus. But this is not to say that they are necessarily time consuming.

And if you are a little alarmed over this insidious infestation, go ahead and cry. Tears are toxic to microbes and can wipe out a few thousand without batting an eyelash.

Which is all by way of saying that there is a wealth of efficient little machines right under our eyes dying to be harnessed by man's scientific ingenuity. There are more to bugs than meet the eye.

On a scale of relative size, viruses and bacteria fit about midway between the smallest "angstrom" (which is smaller than a molecule and would require a miraculous analogy to adequately describe its minuteness) and the protozoas, which are considerably larger than blood cells. Viruses, like flu bugs, are the smallest known entities which could be called living. The largest bacteria cell is about .005 of a millimeter, which is small enough to wonder where it is, but big and powerful enough, if it is the right kind feeding on the right source of energy, to eat up and disperse an oil spill within hours. At least until the next oil tanker comes along. And with about half a million tons of oil being spilled into our oceans each year, we all know we have a problem we can't slide over easily.

Dr. Raam Mohan, a microbiologist with Esso Research and Engineering, and Dr. Jim Zajic, a professor of Bioengineering at the University of Western Ontario, are but two of many scientists playing around with the idea of oil-eating microbes. The basic problem is finding and isolating the right bug to do the job.

They know now that the rate of biochemical decomposition of oil in sea water depends on temperature, that it would be easier to devour a spill in the tropical waters of Kingston, Jamaica than on a frigid arctic island where there could conceivably be pipeline breaks in the future.

They know now that certain microbes feed on the hydrocarbons of crude oil, that they do it with enzymes, roughly the same kind you see on detergent ads on TV depicted as little blobs with oversized incisors chomping on the dirt in little Jimmy's T shirt. An enzyme is basically a "molecular mousetrap" which snaps shut on a molecule of the compound it uses as a source of energy and food for growth. It's a dirty trick but it works. These enzymes can change one chemical compound into another without being altered themselves. One single microbe can contain a thousand different enzymes, each attacking the molecules of different chemical compounds. With enzymes for a digestive system, says Dr. Mohan, microbes can live on almost anything.

When oil spills into the sea and begins to spread out into a thin film, sunrays destroy the heavy hydrocarbons and then waves break the film up into blobs. Dr. Mohan has grown cultures of micro-organisms which he can freeze dry into a powder, like instant coffee, by draining away the water which makes up 80% of the cell.

A billion of these dried cells can fit on the head of a pin, but they are more useful when applied to the oil blobs. They eat and digest the chemical compounds of the oil, propagating into colonies at the same time, a veritable orgy of activity which breaks down the blobs into increasingly smaller particles, each of which will contain a colony of 600 to 1,000 micro-organisms. In six hours a single bacterium can give rise to 700,000 descendants, which isn't exactly just messing around. As they draw life-sustaining nutrients from the oil, the microbes change it into harmless substances and ultimately eliminate it altogether. When their food is gone, the colony comes to a standstill.

"It's a self-propagating, self-limiting system," says Dr. Mohan, and it's all done by Mother Nature, with a little help from her friends of course.

However there are still drawbacks to be resolved before actual application can be authorized. Biochemical decay produces a variety of metabolic by-products and hydrocarbons of unusual nature which may be toxic and could seriously compound the known degrading effects that oil has on the environment. That is, microbes that digest the oil could become food for slightly larger organisms which are in turn eaten by fish, which could prove dangerous if in fact the by-products are toxic. And as long as there is one contaminated fish in the sea, there will always be the chance of a polluted salmon turning up on someone's dinner plate, rendering one severely polluted, or dead, human being.

There is still careful and extensive research to be done, but there is no reason to doubt that someday this cheap, quick, naturally ingenious method can fulfil a scientific dream of domesticated microbes serving as practical and efficient tools.

Some of the more futuristic-minded in the field have speculated, perhaps somewhat whimsically (but who would have believed in oil-eating microbes fifty years ago) that the diet of future inter-planetary travellers need not be restricted to powdered Tang and vitamin pills: their own excrement and urine could be served up, purified and recycled by those industrious little bacteria, ever ready to perform minor miracles in the service of man's complex needs. That's only one small stool for a man, one giant heap for mankind.

With a vast reservoir of these microscopic machines all around us waiting to be discovered, and with the likelihood that man's curiosity, imagination, and powers of adaptation will continue to outdo himself, there just might come a time when he goes too far. But fortunately, we're living in the fallible twentieth century with our wars and diseases and polluted environments, and scientists still have a lot of unfinished miracles to contend with here and now before launching themselves again headlong into that tiny, elusive, and mysterious world of dirty do-gooders.

* * *

Therapeutic Abortion

P. G. Coffey, M.D., C.R.C.S.
Prescott St., Kemptville, Ontario

The argument about whether abortion is right or wrong is over the question of the foetus' or unborn child's claim to "life".

Naturally, those who have reservations about this point of the foetus being alive and human in the same sense as after birth or who literally think that the foetus is some pre-human piece of tissue, wonder why anyone should object to abortion; and also, naturally, those who think this foetus or unborn child is basically no different from the post-natal child, think it is just as wrong to kill the former as the latter.

The scientific study of this subject points irrefutably to the fact that there is no essential biological difference between the prenatal and postnatal child other than a difference in maturity. Yet, those who believe in liberalised abortion are so enthusiastic about trying to help the mother (understandably and commendably), that they completely ignore the most simple biological facts about the prenatal baby.

There is very little enlightened understanding about the subject of human life before birth, even now in 1972 and even amongst the ranks of us doctors, but especially amongst non-medical people. The general assumption has tended to be that life begins at birth and whatever goes on before this is so mysterious that it can hardly be called life.

The misunderstanding has come about for one main reason and that is because the unborn child cannot be seen. Because it cannot be seen, it is not only difficult to care for it, but it is difficut to imagine what its form is at any particular time and it is easy to have fallacious ideas about it.

I think many are missing an important point, namely that there is no essential difference biologically between the unborn infant and the one that has been born, or if you like to take a specific example, between a two to three month old foetus and a newborn baby except that one is more mature than the other. In the same way, there is no essential difference between, for instance, a newborn baby and a baby of a year old except that one is closer to maturity than the other. We must not forget that developmental changes that have been going on in the foetus are going on after birth too, and not only is this a matter of growth and development but actual differentiation into mature, adult-type tissue takes place after birth or even well after birth, *e.g.* differentiation of bone from cartilage.

The fact that the infant *in utero* is in an earlier stage of development is no reason to assume that it is "not living" or "not human" or not a biological individual. In such a gradually evolving process as the development of the foetus and child, any one event or time or moment or phase chosen as the vital time before which the foetus is expendable and after which it is wrong to kill it has to be purely arbitrary. The most cursory study of intra-uterine human life will show clearly that at the sixth month of this intra-uterine life or thereabouts, no sudden dramatic change comes over the foetus any more than a sudden dramatic change comes over the baby when it turns into a toddler. This particular time, six months of foetal life, is, of course, about the time when up till recently, it was held that the foetus might survive on its own. But, it has lately been shown that this time of viability may have to be put considerably earlier. And after some more years of research in this field, this time may be astonishingly early by our present concepts. It is obvious that the capacity of the foetus or baby to live independently is a gradually evolving process, and I challenge the pro-abortionists to demonstrate any significant biological change or any other change that takes place in the foetus at the sixth month or thereabouts.

The susceptibility of developing tissue and organs to environmental agents *(e.g.* the foetus affected by Rubella virus or drugs or poisons), is not confined to the early foetus. This is evidenced by such phenomena as the maldevelopment of the skeleton of the postnatal child by vitamin D deficiency and the effect on the developing teeth of excessive fluoride and thirdly, as reported by Winnick of Cornell University, prenatal and postnatal malnourishment of the developing child can cause mental deficiency by a retarding effect on the division of the brain cells.

All the scientific information points to the fact that the prenatal child should have a legal right to life just as the postnatal one has. In point of fact, those who say that a law should be passed making abortion a purely medical question and independent of the law, are simply saying that the prenatal child does not deserve any legal right to life whatsoever.

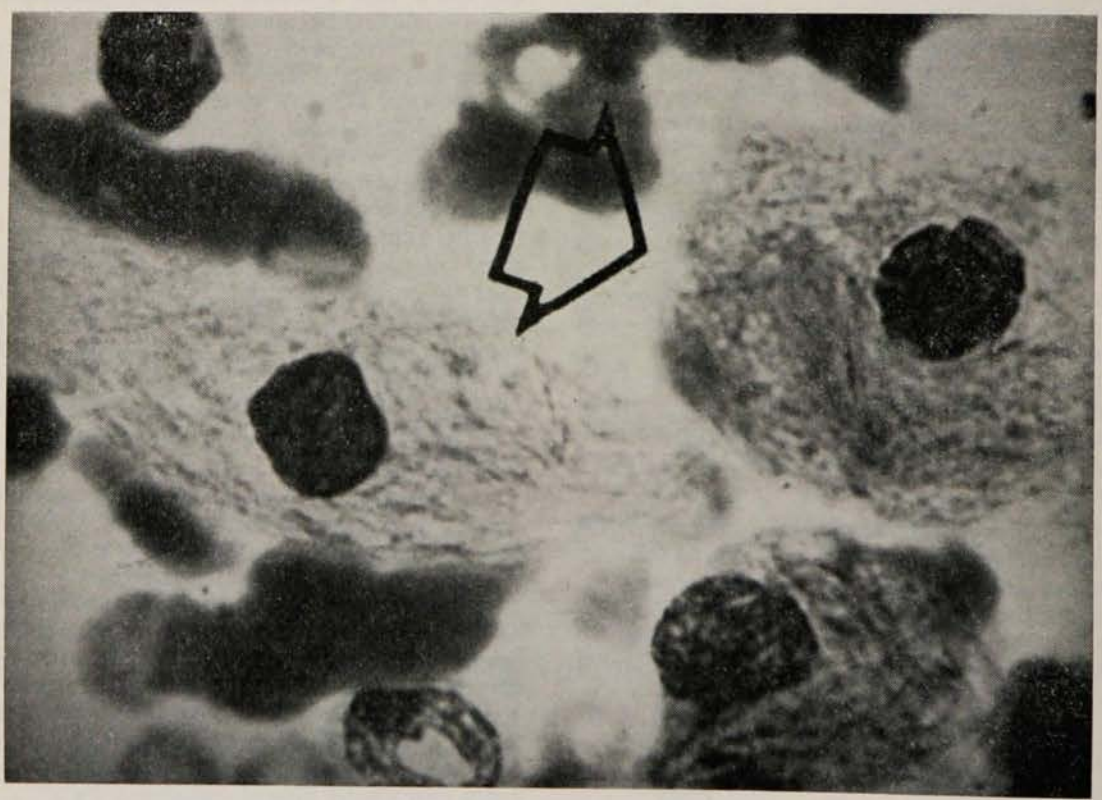
I hope there are many who would ask for a law to be passed giving the prenatal child a legal right to life, for those who think otherwise have their Science horribly mixed up.

Pathological Photoquiz

This is a bone marrow sample similar to the one obtained from the patient to be described.

History: A 48 year old female presented with anemia of several years duration. She complained of episodes of weakness with cramping in her legs for over a year prior to admission to hospital. One week prior to admission she had a fall which gave her a "sciatica-like" pain in her hip. There was no history of significant weight change. A maternal grandmother had anemia of unknown type.

On physical examination no enlarged lymph nodes were present and no external tenderness was found. There was no PURPURA. PINGUECULAE were present in both eyes.



Our thanks to Dr. D. B. Meltzer, St. Joseph's Hospital.

Answer on page 39.

* * *

A doctor, addressing a gathering, told reporters that as he was making the same speech the following week in a neighbouring town, he did not wish to have anything published. The following day he was horrified to read in the local paper:

Dr. Smith delivered an excellent lecture, he told some wonderful stories but unfortunately, they cannot be published.

Recovering from an operation, a patient asked the doctor: "Why are all the blinds drawn?"

The doctor replied: "Well, there's a fire across the street and I didn't want you to wake up and think the operation was a failure."

There's a brand new allergy cure. It was developed from scratch.

Perinatal Morbidity and Mortality

M. Awde '73

Perinatal morbidity and mortality are health problems which need to be examined by every practicing physician and licensed hospital. One definition of the perinatal period is that which begins at twenty-eight weeks of gestation and ends seven days after delivery. The reader should be aware that in other definitions, it may extend from twenty weeks gestation to a period varying from one to four weeks following delivery. The circumstances responsible for the overwhelming majority of deaths in early infancy arise from conditions established before the delivery, or from stresses during the birth process itself. Over seventy per cent (70%) of infant deaths in Canada and the United States (deaths under one year of age) occur during the neonatal period (first twenty-eight days of life). More than ninety per cent (90%) of all neonatal deaths occur during the first seven days, the latter part of the perinatal period. This is, therefore, a critical week in both perinatal and neonatal studies and one which would seem essential in monitoring if mortality rates are to decrease. The earliest deaths are usually associated with misadventure during pregnancy, labour and delivery. Since 1950, progress in reduction of infant perinatal mortality has lagged behind that established in other well developed countries. Hence a knowledge of the causative factors, be they genetic or environmental, and early use of corrective measures in "high risk" pregnancies (twenty-five per cent (25%) of total pregnancies) will surely decrease the the mortality figure of 26.5 per 1,000 births (Ont. Department of Health, 1967).

The perinatal disorders may be likened to an unrelenting struggle between man and nature with the physician being the decisive factor. His efforts prenatally with the mother and postnatally with the infant will most assuredly make a positive contribution towards reducing morbidity and mortality. Scientific knowledge surrounding the disorders is generally available, but social, cultural and familial factors interact to produce a most difficult challenge for the physician. It is hoped that by means of the following brief description of four common perinatal disorders, the concerned family doctor may gain insight into the dilemma which he encounters many times in his practice each year.

Erythroblastosis fetalis is a disorder of the fetus and newborn occurring in 1:200 pregnancies, which is characterized by hemolytic anemia and compensatory erythropoiesis due to maternal isohemagglutins. Approximately five per cent (5%) of all Rh negative pregnant women will show some degree of sensitization. Nearly all of these occur in multiparas with less than six per cent (6%) occurring in nulliparas and in these there usually being a history of either abortion or transfusion previously.

The primary prevention (prevention of occurrence) involves the modification of environment and modification of the individual. In the case of erythroblastosis the cause is maternal Ig antibodies directed against the fetal Rh positive cells. Many Rh negative girls could be discovered earlier during routine paediatric or later during premarital examination. Appropriate measures could then be implemented when they decided to have a family.

The prevention and disability involves early detection and treatment of the disease. The antibody levels may be used in this case but do not correlate well with the clinical appearance of the child. This is where aminocentesis is valuable. There is excellent correlation between concentration of bilirubin in amniotic fluid and development of kernicterus.

However, inevitably some infants develop severe Rh disease despite the knowledge available in treatment.

Kernicterus is the gravest complication of hyperbilirubinemia. Many infants die. Those who survive are likely to manifest severe neurologic damage after a three month apparent recovery.

The empathetic family physician's role in these proceedings is to co-ordinate the effort of the psychologist and treatment centre and to offer encouragement to the family during the difficult early adjustment period they are encountering.

In essence, Rh disease is totally preventable.

Prematurity is a particularly dangerous health hazard to the fetus. A premature infant is one whose birth weight is under 2500 gm or who is born before the completion of thirty-seven (37) weeks gestation. There are many listed causal relationships which represent only forty per cent (40%) of the etiology of prematurity. Sixty per cent (60%) remain undiagnosed as to cause.

It has been estimated that the Negroid race in the U.S.A. has a prematurity rate of fifteen to eighteen per cent (15-18%), compared to the national average of five to seven per cent (5-7%). This may be due

to different quality of nutrition enjoyed by the rich mothers as opposed to poor mothers. The cost of food and medication, such as iron tablets, may be too great a burden on an already stretched income. It might also be argued that lower socioeconomic groups are of poorer genetic constitution which predisposes to complications of pregnancy and delivery. The logical question is the "why only eighteen per cent (18%) premature?"

Prematurity also occurs in high incidence in very young or very old mothers. This may be hormonal in origin due respectively to immaturity or dysmaturity of the mother as an age related factor.

Closely spaced pregnancies lead to an increase of prematurity. Presumably this is related to maternal distress caring for first child with second child in utero.

Urban living and overcrowding also become suspected agents in prematurity. Again this may be due to environmental influence on the genotype.

It has been documented by several large controlled studies that if the physician is able to keep the baby in utero for thirty-six weeks, the mortality rate is greatly diminished. The prevenion of occurrence of prematurity in terms of modification of the individual involve proper medical management of maternal medical conditions. The first contact that a physician has with an expectant mother should be aimed at good rapport with the patient so that she will come back and be willing to follow his prescribed pre-natal care.

The prevention of disability primarily centres around detection of known social, medical, or obstetrical conditions already specified above which predispose to premature birth. The early detection and prompt, strict medical supervision will most assuredly control the disease. However, depending on the severity of the predisposing disease, the physician may have to terminate pregnancy himself. This again leads to another cause of prematurity, the iatrogenic, but in this situation it is a controlled termination of pregnancy, one in which the medical staff is prepared fully for delivery. The same ill effects of prematurity are experienced by the fetus but the unexpected hazards of sudden ill prepared delivery are eliminated.

Many hospitals are establishing premature intensive care units which will be able to care for such infants born before term. With the constant medical supervision available in such centres, which is not present in many rural hospitals now in existence, it may be possible in the future to reduce the mortality associated with prematurity and to decrease the morbidity of the chronically handicapped paients as a result of prematurity. It seems to me that the only feasible solution to the reduction of the morbidity is the aforementioned which in terms of cost and time may be well worth the effort. The main motivating factor should, however, be that preliminary results have shown significant reduction in mortality of premature infants. These infants seem to be equal in scholastic achievement compared to their cohorts born at term.

Birth injury is another major area of concern in perinatal statistics. It can be defined as avoidable and unavoidable mechanical and anoxic trauma incurred by the infant at birth. Most lay people interpret birth injury as meaning avoidable trauma incurred through lack of skill or medical attention.

Any device which interferes with transport of oxygen to fetal brain may result in anoxic brain injury. Intracranial hemorrhage without obvious cause may follow normal birth, but more often than not the fetus has been subjected to abnormalities of labour or other internal complications. These fetuses may exhibit extensive intracranial hemorrhages at different sites without evidence of mechanical injury.

Although the preceding factors causing perinatal mortality are not in the strictest sense examples of birth injury, they are linked closely to birth injuries of traumatic origin.

The more classic ideas of birth injury predisposing to perinatal morbidity and mortality are traumatic in nature. Injury may be caused by faulty forceps delivery or the use of mid or high forceps which traumatize the infant in the birth canal. Application of mid or high forceps contributes less to fetal morbidity than the abnormality of labour that require their use; nevertheless, depressed skull fracture or intra cranial hemorrhage are distinct hazards. Another example of traumatic disorder is the difficult breech extraction in which the infant's arm or leg is fractured, peripheral nerve palsy results or ruptured artery occurs.

The prevention of occurrence (primary prevention) involves modifying the environment and the individual. In any uncomplicated delivery, the attending physician must be competent at both determining when forceps are to be employed and in manipulating the forceps in the birth canal with minimal risk to the fetus. With respect to dystocia of uterine origin, prepartal conditioning of the patient does much to allay her fears and anxieties and seems to improve the quality of other labour if other factors are favourable. Avoidance of induction and limitation of heavy anaesthesia early will ensure the quality of

labour. Early recognition and proper treatment of dystocia due to abnormal uterine action will usually prevent serious complications.

In any high risk patient about to give birth, the attending physician should seek the consultation of fellow obstetricians. Valuable pre-delivery advice or aid in delivery of this patient may prove rewarding in decreasing the incidence of birth trauma. It is far superior for the doctor to have the foresight to admit that the delivery might be difficult than to confess in retrospect that the misery to child and parent could have been avoided.

Birth injury to an infant demands a medical "team" approach to help the parents during their emotional turmoil and furnish the infant a brighter outlook for the future. Depending on the extent and severity of the damage, a markedly different approach in terms of money, time and method will be required.

Congenital malformation of the newborn is an area of great anxiety for parents of such an infant. Approximately twenty per cent (20%) of deaths in the third trimester of pregnancy and fifteen per cent (15%) of neonatal deaths are due to gross congenital malformation. A study conducted in 1957 in the U.S.A. revealed that twenty-two thousand perinatal deaths were a result of malformations. In many cases a cause for the misfortune cannot be discovered and a spontaneous mutation is postulated. In other cases, infective agents such as rubella or syphilis have been discovered. Other causes include rediation to mother either therapeutically or diagnostically and indiscriminate drug usage by the mother during pregnancy. Then there are familial malformations which may pass directly from generation to generation or skip one or more generations. Whatever the cause, congenital malformations present a most challenging physical and psychological problem to physicians. The parents are usually distraught. Some openly reject their offspring. It is then the responsibility of the physician as a friend of the family to explain the etiological agents; and enlist the help of the family for it will be very difficult for the child and medical personnel involved if the parents are not willing to co-operate.

Rubella will be discussed as an example of the way to approach the problem of maternal infection which may result in fetal malformation. Rubella in the first trimester may cause congenital malformations such as congenital heart disease, cataracts and deafness in as many as twenty per cent (20%) of mothers affected. It has been estimated by Michaels and Mellin that the incidence of fetal malformations is forty-seven per cent (47%) when maternal rubella occurred in the first month of pregnancy, twenty-two per cent (22%) in the second month and seven per cent (7%) in the third month. Women not enlightened about a manifest rubella infection face a greater risk than those who have been schooled on its danger. Secondary prevention of rubella is a great task for the doctor. Recognition of pregnant women facing an increased risk of rubella infection (school teachers, nurses, mothers with small children) is the responsibility of the family physician. He must be able to diagnose the infection promptly, realizing that most severe damage is done during first trimester. If he is certain of the woman being exposed to rubella, then he must explain the possible damage of fetus to parents and let them decide whether to continue with pregnancy or receive therapeutic abortion. Immunization, however, in early infancy or before pregnancy for rubella has proved to be very successful primary protection for women.

In any woman who has given birth to a congenitally malformed infant, the physician in charge of the case should take extra time to study the situation. He should question the mother on the medical and surgical history during the pregnancy (including use of drugs, radiology, infections). He should inquire into the family history on both paternal and maternal sides about any relative with a similar defect or any other genetic defect present. Also, the doctor should inquire about previous miscarriages, which the mother may have had but had refused to discuss readily. As many as fifty per cent (50%) of all early abortions are caused by fetal malformation. The doctor should then take buccal smears of both mother and father for chromosome analysis. The infant should also have chromosome analysis carried out on it. In subsequent pregnancies, the physician should realize that women who have given birth to previously malformed infants on genetic grounds will have a greater risk of doing so again. The next pregnancy must be followed very meticulously.

Still, with all of these precautions, infants will continue to be born congenitally deformed. The family unit must be held intact throughout the course of therapy for optimum results. Often the social worker is the key person in this respect. In order to get the parents to understand the developmental problems, a great deal of basic education must be given to them in such a way they will accept this problem. Once a child has been accepted by his parents, the outlook is excellent for the family. Generally, children

RELATION OF MATERNAL AGE TO PREMATURE BIRTHS, CONGENITALLY MALFORMED INFANTS, AND PERINATAL MORTALITY
University Teaching Hospitals, Ontario, Single Births — 1960-1961

Maternal Age	Total Births	Premature Births		Congenitally Malformed Infants		Perinatal Mortality	
		Number	Rate[1]	Number	Rate[1]	Number	Rate[2]
Under 20	4,561	394	8.6	188	4.1	124	27.2
20-24	14,523	978	6.7	460	3.2	330	22.7
25-29	15,196	906	6.0	484	3.2	382	25.1
30-34	10,536	631	6.0	346	3.3	277	26.3
35-39	5,353	380	7.1	200	3.7	185	34.6
40 and over	1,318	113	8.6	66	5.0	58	44.0
All Ages#	51,490	3,402	6.6	1,744	3.4	1,356	26.3

[1] Per 100 total births
[2] Per 1,000 total births
Including three mothers with age unknown

can learn to live with a disability far better than most adults. A slight depression may occur when these children reach puberty and realize their limitations both socially and economically. However, if a child is given a good chance to show its worth, the child should be able to adjust remarkably well to the disability.

CONCLUDING REMARKS

The prevalence of the perinatal disorders in this discussion has been difficult to ascertain and hence mortality was used as a guideline to the magnitude of the problem.

Infants bearing residual effects of any perinatal disorder place a tremendous burden on the parents. The adaptive behaviour of the parents is a facet of the treatment that the physician must specifically manipulate before total therapy of the child can commence. The two critical periods in the life of parent and child occur initially at the onset of the disorder and much later in adolescence, when the patient realizes that the child will not be able to achieve all ambitions both had thought might be be possible years previously. For the first crisis, the family doctor and other paramedical personnel in the treatment centre must convince parents of the necessity to accept child and benefits derived from therapy. In adolescence, a much more challenging role for the physician is to help define attainable goals for the teenager. Adolescence is a crisis filled decade for the "normal" child and will be much more challenging for the child who realizes that he is not like everyone around him. Special vocational workshops in the community for handicapped people is a partial solution to the problem. In this job situation, the person experiences a sense of responsibility, and regains his self esteem since he is working with other people not unlike himself and receives a small monetary return for his workmanship. The important role of the general physician in the rehabilitation of these children is not to allow them to become depressed or experience chronic self pity. A useful life can be achieved by most, if not all of the children, even though it is not the quality of life as enjoyed by the parents or family doctor.

The subject of perinatal disorders is an area of medicine where the impact of social, cultural and familial factors influence to a great extent the outcome of the disorder. Understanding these important factors is the primary responsibility of the attending physician. To ignore such factors is to treat the symptom and not the patient. To be aware of these factors is to treat the entire problem. A doctor's responsibility to the patient is to deliver the best medical care he can possibly provide. This entails acquiring current medical knowledge; being able to recognize when to employ it; and having the competency to administer treatment. The perinatal disorders, more so than any other aspect of medicine, require the total skill of the concerned physician since the lives of two patients are at risk, the mother and the fetus. Many of these disorders cannot be totally eliminated because of present gaps in knowledge pertaining to etiology and pathogenesis. However, many of these disorders can now be palliated or in future cured, if the physician acts promptly utilizing both his medical and sociological insight.

Answer to Pathological Photoquiz

Initial investigation showed the following:

Hgb: 8.5 grams

Hct: 26

MCHC: 33

WBC: 5,000 with normal differential

RBC's showed marked rouleaux formation and some polychromasia, some anisocytosis and microcytosis

Reticulocyte count: 5%

Serum haptoglobins: 200 mgm % (N=125 ± 25 mgm %)

Coomb's test negative

Electrophoresis showed a monoclonal peak in the gamma globulin: IgG = 2520 (N=710—1540)

X-ray showed well-defined lucencies and trabeculation with associated thinning of cortex and some loss of modelling in all long bones. There was evidence of a pathological fracture of the right femur. A bone marrow showed typical gaucher cells.

Diagnosis: Gaucher's disease.

Several months later the patient developed hepatosplenomegaly and a splenectomy was performed because of increasing need for transfusion, low platelet count and development of leukopenia.

Discussion: Gaucher's disease is a rare familial disorder of lipid metabolism resulting in an accumulation of abnormal cerebrosides in RE cells. Clinically it presents as hepatosplenomegaly, skin pigmentation, skeletal lesions and pingueculae. The disease is apparently inherited as a recessive and occurs more frequently in Jewish families. It usually appears in childhood, but the onset may not occur until infancy or adult life.

The characteristic pathologic finding is reticulum cell hyperplasia and the characteristic gaucher cell in bone marrow, spleen or liver biopsy. The gaucher cells are filled with cerebroside, are 20 to 80 m in diameter, and are round, oval or spindle-shaped with one or several small, eccentrically placed nuclei and a fibrillar cytoplasm. No specific treatment is known.

* * *

SECRETARIES SWEAR LESS
UNIVERSITY RESEARCH SHOWS

Scrawled inside the case of an old grandfather clock:

The clock of life is wound but once,
And no man hath the power
To tell just when the hands will stop
At late or early hour.
Now is the only time you own:
Live, Love, Toil with a will;
Place no faith in tomorrow, for
The clock may then be still.

Glasgow Elective

Angus Maciver, '73

A little over a year ago I contacted the local travel agent of the Scottish Tourist Board, Dr. Andy Wilson, about the possibility of doing an elective in my home sod, Glasgow. The proper channels were opened and after a couple of pit stops to my bank manager (whom I almost had to bring along with me) and getting the elective okayed by Dr. McFarlane, I was off to "dear old Glesgie toon" to spend 9 weeks at the Canniesburn Hospital Plastic Surgery Unit.

The hospital is beautifully landscaped and is situated in the northwest of Glasgow, quite removed from the grimy city centre. It services the plastic surgical needs of the entire west of Scotland, and is staffed by five consultants, two senior registrars (chief residents) and five registrars. Integrated into the unit is the regional Oral Surgery department which complements the plastics facilities. There are five operating theatres, one of which is usually used as an out-patient theatre, as many plastic procedures can be done on an out-patient basis. In addition, each day each consultant and the senior registrars have a half-day clinic, where quite a variety of conditions can be seen in a few hours. Some of the consultants also participate in special clinics such as cleft palate and rheumatoid hand clinics. Each consultant has a certain area of interest in which he is particularly skilled, such as eyelid reconstructions, rheumatoid hands, head and neck cancer, cleft palate and lymphedema, but they all stay clear of isolating themselves in sub-sub specialties, by performing general plastic surgery as the bulk of their work. This includes burns, trauma, congenital problems, skin tumors and scar revisions.

Cosmetic surgery is not done on the fantastic scale that it is done in many parts of the U.$. of A., and indeed many cosmetic procedures had a long waiting list, up to a year for prominent ears, and almost two years for a cosmetic rhinoplasty—even then your nose had to more or less look like hell to get it covered by the National Health.

Every Monday morning it befalls one registrar to assume "malar duty". These were not usually caused by slippery church steps. It is amazing how the poor lads usually fall on their left cheek, though.

Over the summer, there was a good deal to be learned from the oral surgeons, who handled most of the facial fractures. One of the most staggering (pun) operations I saw during my stay was a day long operation to correct a craniofacial dysostosis. This involved close team work between the plastic and oral surgeons.

Other facilities included an excellent medical photography department, and labs where the biomedical engineers toiled with their research on collagen, scars and the like.

The Unit showed me much of the good and the bad associated with the National Health Service in Britain. The good was a relatively high standard of treatment from the patients' point of view, in spite of perhaps having to come a whole day's journey for a clinic visit. The disadvantages include long waiting lists for more cosmetic procedures, which were sometimes done privately by the consultants on their Saturday mornings in a nearby private theatre. Other surgeons operated privately also in this theatre, and I learned that the waiting list for a total hip can be up to two years. This shows the ingenuity and economy of the N.H.S., as a significant proportion of these frail old ladies will have hopefully expired by then. Another disadvantage is that consultant positions seemed hard to be acquired, most registrars being in their thirties and treading water, especially in some of the other specialties.

A highlight of the summer was an invitation to the registrars from a distillery company which gave us a "tour". Perhaps they thought that the plastic surgeons would be grateful for all the Dupytren's they provided.

I've no hesitation in recommending Scotland as I'm sure at least another half dozen in the class who will have done their electives there. Fortunately, the Scots have not yet taken to ripping off North American tourists in the style to which so many of us have been accustomed in other parts of Europe. For me, at least, my elective was indeed a stimulating experience, as my microsomal enzymes will attest.

* * *

Patient: "Sorry to bring you all the way out here, Doc."

Doctor: "That's okay. I'll see another patient in the neighbourhood and kill two birds with one stone."

Tachy 1972-1973

Vincent Van Hooydonk, '73

Tachy for this year has again come and gone. The highlight of every medical student's career is of course the Tachy show. This yearly freak-out is presented to the exhaltation of the medical students and the disgust of the medical staff, as a legitimate way for the students to poke fun and folly at the medical profession.

The show opened with "A Real Boner" starring the Meds Wives in a song and dance number interrupted with some "funny" lines. Their costumes deserve a pat on the bones.

"Dr. Ayer's Cherry Pectoral Plaster Jug Band" was next. The corny jokes were interrupted by some corny music. The five-man band, all members of Meds '74, presented a nice bit of variety, but after two numbers they overstayed their welcome. A one-hand round of applause for you guys.

Meds '76 presented a take-off on the T.V. series "Star Trek". It concerned the adventures of the crew of the S.S. Circumcise in search for the "Wild Thing" on the planet Erectin. The "Wild Thing" turned out to be an aphrodisiac required for the welfare of all medical students on earth.

First year is, of course, the obvious underdog in the contest for that coveted cup presented to the culprits that present the best skit. They have to compete against the seasoned veterans of stage and screen. Nonetheless, the class of '76 put on a skit that was up to the standards of any other down-in-the-gutter mentality of previous years.

The show at some points stumbled along its voyage through a galaxy of old jokes on their way to find "The Thing" that at the end of the journey made their thing swing. More power to you over the next three years fellows.

The B.Sc.N. nurses presented "You're a Good man Charley Bulbitis". It was all about this know-it-all medical student who failed his clinical test. But wait, with the expert assistance and guidance of those angels in disguise, those maidens of mercy, those comforters of the sick (and the doctors), the nuptial nurse, this know-it-all student is able to get through Med school. So there all you high and mighty medical students, I hope you all got the message and pay more attention to those nurses if you aren't already.

The judges this year awarded the class of '75 with first prize. I wholeheartedly approve of their choice. The whole idea was original—funny—well put together. The people responsible for putting the movie together deserve a resounding round of applause.

The skit started with coach Sertoli Cell giving a pep talk to the sperm team with some funny and useful pointers as to how to get to the uterus. The opening scene had a lot of good and funny one-liners in it. This was followed by a black and white movie, complete with a villain sperm, shot in the bowels of the U.W.O. medical school, the Ceeps and Tracy Starr's as the frantic sperm coursed their way to the uterus. The skit ended with a scene where the villain sperm beats out the good-guy sperm and it alone gets to penetrate the egg while the whole stage lights up as a climax to the long race. A standing ovation for you guys.

A country and western band naming themselves "The Country Numbnuts" appeared next complete with Canada's favourite dancing couple Charlie Chamberpot and Marg Aspirin. They were, however, quickly chased off the stage and replaced by a more popular rock-and-roll group. Their beat-music was accompanied by a three-membered dance group making a return visit by popular request from a previous Tachy engagement.

The class of Meds '74 presented a skit based on the "Godfather". It concerned the story of a Goddoctor (strangely enough bearing some resemblance to Dr. McLauchlin) in search for a replacement to his post as leader of the syndicate. The Neurologini Family, the Obstetrini Family, the Medicini Family and the Dermatologini Family all put forward their best arguments as to why they should (or should not as in the case of the Dermatologini Family) be allowed to take over the leadership of the syndicate. The whole problem of course is solved by importing Dr. Duff from Montreal. But does this solve the problem; enter the Chinese delegation ready to revolutionize Medicine with the art of acupuncture. Well done fellows.

John Birss of Meds '73 appeared next as "The Flying Flapper of the Roaring Twenties". He did a good dance routine as a female dancer. The audience was impressed.

The skit of Meds '73 was more in keeping with the standard Tachy-type skit in that it concerned hospital activities and medical staff. The first scene represented the opening ceremonies of the new University Hospital with such impressive guests as Queen Elizabeth and Richard Potter who ends up as the first patient. He is given a quick impersonal going over by all departments and is then finally diagnosed by the department of Family Medicine as a psychosomatic condition of course. A woman by the name of A. Normal presented a funny, if not totally factual, tour of the University Hospital by means of a slide show. Good show you all.

This is what was seen on stage but we should not forget to pay tribute to the masses of people who never appear on the stage but without whom the show would not go on. One integral part of the whole show of course is the orchestra under the able guidance of Bob English and Rob Williams. The orchestra this year was bigger and better than ever. Take a bow musicians.

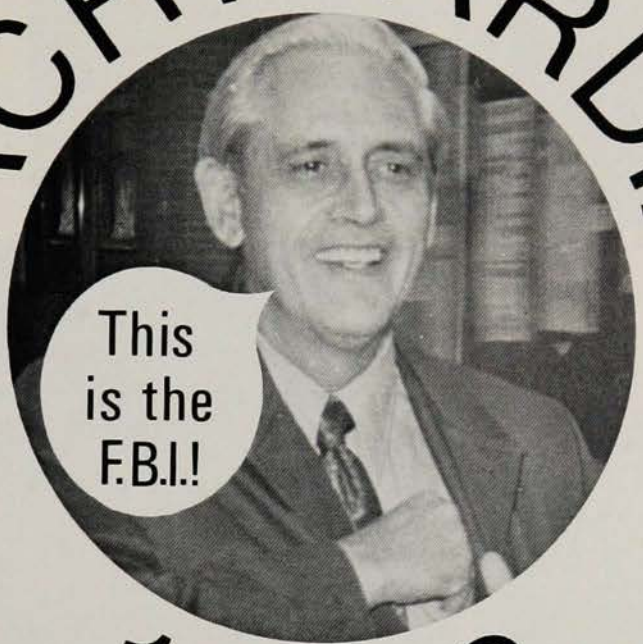
The major responsibility for putting the show together and keeping it running smoothly was the responsibility this year of Syd Crackower as producer and director. This is by no means a small job, well done by an able and talented individual with the help of Tom Downs.

Of course we should also thank the following people for making the show complete: the Med's Merrymakers, the costume and stage designers, the stage crew, the people responsible for audio and lights, the production manager, the people responsible for the programme, the sale of tickets and the Final Night Party. A special thanks for the girls doing the make-up and the usherettes, and the last but not least, the Patrons of the show and the Judges.

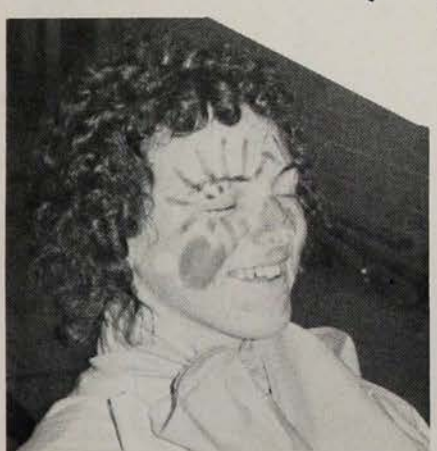
* * *

"THE LEFT HAND IS MEDIUM RARE AND THE RIGHT HAND IS WELL DONE."

TACHYCARDIA



1972



Super nurse in orgasm.

This is a nipple.

What are we doing gals?

♪♪ I'm a women. ♪♪

Are you sure?

Sure I'm sure.

♪♪ Toe bone—toe bone—foot bone. ♪♪

Hi guys!!

Chow time!

Before you go on stage.

"Oh! Oh! Forgot my line."

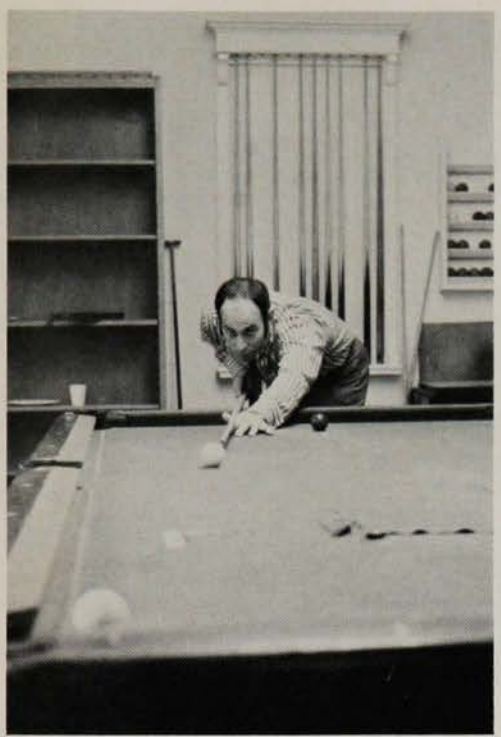
Whad dat fingure for doc?

"Ajax Detergent Band"

Yuppie!! The white lemon.

* The editor is solely responsible for the pictorial comment.

Clinical Clerk Activities at the Shack (Part II)



Clinical Clerk Activities at the Shack (Part II)

Doctor Meets Computer . . . points to ponder

Neil McAlister, '75

WHY THE COMPUTER IS NOT A PRINTING PRESS

Frequently in industry we glimpsed horrible visions of how the uninitiated might be tempted to abuse a computer as a sledgehammer to crack nuts.

"Say there," (some progressive executive might accost a programmer in the hall), "could you get that machine to print up the income tax forms?"

If he were very lucky, the executive might receive a tactful explanation of why it is wasteful and expensive to use the computer for a glorified typewriter:

Old Method (By Hand)

1. Secretary looks in big book and types up income tax forms. (2 hours)

New, Proposed Method (By Machine)

1. Keypuncher looks in big book and types up data cards for income tax forms. (2 hours)
2. Programmer makes program to list cards on income tax forms. (3 hours)
3. Purchasing agent orders special income tax forms with little holes along the side for the computer. (10 minutes)
4. Programmer tests the new program. (1 or 2 hours)
5. Computer prints up income tax forms. (13 seconds)

It should be evident that the old method is far more efficient than any "computerized method" could ever be. As a Golden Rule of Computing, a computer can *never* be used economically for a small, "one-time only", specialized job. The cost and effort of developing a new program must be written off over numerous uses of the program before any savings occur. A computer is not a printing press; computers are meant to do *big* jobs, jobs that involve hideous and lengthy calculations, repetitive and dull jobs that daily take hours to complete and that could be done in a matter of minutes by machine, freeing people for creative and interesting tasks. Unfortunately, most organizations have to learn the Golden Rule of Computing the hard way, and annually many resources, both human and financial, are squandered foolishly on the "automated data processing" of tasks that are better done by other less sophisticated but more appropriate means.

One suspects that many people in the health sciences have been "burned" by the improper use of computers, or that they have heard of others who have suffered such a fate, for the evangelistic computer fan rapidly learns that most clinicians seem to be apathetic, if not overtly hostile to the real advantages that this marvelous tool can have to the intelligent practice of modern medicine.

STATISTICS IN THE ALLERGY CLINIC

Last summer it was my privilege to work with a London doctor whose progressive and open-minded attitudes led him to seek out the use of electronic computers for precisely the sort of problem for which they were designed, at a time when most clinicians were not really aware of what a computer could do. Dr. John Toogood of the Allergy Clinic at Victoria Hospital had great mounds of statistical information that he had been accumulating about asthmatic patients throughout the course of their treatment, for research purposes. Periodically, this information was analyzed by various tests of statistical significance in order to determine the effectiveness of drug therapy. Did a drug help? By how much? Many such questions were of interest. Those of you who have laboured over a "chi-squared" test will appreciate that one hundred such calculations would be tedious to say the least. And in statistics as practised in the real world, there are numerous other tests, infinitely more complicated, that make chi-squared look like grade two arithmetic. So substantial was Dr. Toogood's workload that he hired a full-time statistician, and as the quantity of repetitive calculation increased, he talked to his friend Dr. Jim Mullen, professor of Computer Science here at Western, about the possibility of using automated methods in some of this analysis. Some of the professor's students applied themselves to the clinician's problems, thereby making a little money by the routine completion of a required term project. The result was a hefty and impressive-looking program with the ability to perform in seconds some calculations that used to take the statistician hours. Dr. Toogood was "hooked"!

COMPUTERS ARE DUMB

Thus was the state of data processing in the Allergy Clinic when our summer research project began last June. A programmer moving into a medical environment could scarcely hope to find such an idyllic situation; already this clinician had learned a rather important thing that can only be appreciated after several months of exposure to electronic data processing, namely that computers are dumb. Therefore the expectations of the doctor were realistic; there were no impossible requests for incredibly complex systems overnight, as if it were only necessary to somehow beseech the machine, in FORTRAN of course, "Oh mighty computer..."! All such supplications invariably go unheard by this idol of the electrical age, since computers are neither omniscient nor omnipotent.

Firstly, they do not "know" what you want them to do unless you tell them in excruciating detail, by means of a program which reduces all your wishes into step by step instructions. Secondly, your plans may not be suitable for the particular computer available, and might thus be better implemented in some other way. For example, it is foolish to try to use a card-fed computer at some remote location for routine calculations that must be performed numerous times every day. If you need answers *now*, twenty-four hour turnaround time at the University Computing Centre is not good enough. Therefore, if a computer is to be any help to the physician, he must first carefully *define his objectives.* Superficially, this initial step sounds elementary: however, reducing vague ideas about all the neat things that he would like to do into a concrete list of objectives in decreasing order of priority requires thoughtful deliberations between the doctor and his programmer. At the Allergy Clinic there was a significant "communications gap" at first, even between the computer-using physician and the medical student programmer. A full week was spent by the programmer simply watching Dr. Toogood and his staff go about their usual routine before the programmer, (here in the role of 'systems analyst'), became sufficiently familiar with the existing office practice and its problems to even decide whether or not some sort of automation would be useful. Only then did we seriously discuss objectives and priorities.

Obviously the misunderstandings between a computer-naive physician and a medically-naive computer technologist are greater, and require longer to resolve. Indeed, this is the usual difficulty when a doctor first seeks commercial proposals from a computer service company. And yet, who could afford to hire an analyst at five and a half dollars an hour to sit around the office for a week? Most of the bad experiences that people have had with electronic data processing thus probably arise from two problems that exist from day one and remain to impede all future progress:

1. The physician doesn't know what he wants.
2. The programmer doesn't know what the physician wants.

Many a programmer has been put at risk of heart attacks, ulcers, and "nervous breakdowns" by employees who, upon receipt of the "finished product", look up with a puzzled expression and ask, "Oh, didn't I tell you about..."! In order to avoid future embarrassment and to prevent wasting a lot of time, Dr. Toogood and I wrote our priorities and plans on the blackboard in his office, where they remained in one form or another all summer long.

PROBLEMS AND SOLUTIONS IN THE ALLERGY CLINIC

It is by no means the intent to present a detailed project report in this space. The reader would fall asleep, and besides, there isn't enough room. A most general description of our plan of attack might prove helpful, though, in explaining the types of things that one should bear in mind when thinking of using the computer in a medical application.

In essence, we reduced all existing problems with the office procedure and all feasible plans for the future into a list of separate projects, to be completed one at a time, starting at the top of the list and working down. In computer work one should never "bite off more than one can chew"; the whole project is doomed to an ignominious collapse amid insoluble errors and countless, obscure "bugs". The easiest projects were to be done first, the complicated ones last.

(1) The statistician was spending a lot of time simply copying figures from patients' record books onto big charts so that the doctor could see all the information about a patient or a group of patients at once. Could the computer do this? This was essentially a printing-press application, but it was by far the #1 office priority to free the statistician for creative and more important work. Since she did this same job very frequently, it could be done economically by a fast computer, providing that the task rode on the coat-tails of a much larger system. Because the statistical

problems would use the same data that was written on these charts, the establishment of a computerized data bank and then the successful completion of this simple printing-press project became priorities one and two.

(2) The program that Professor Mullen's computer science students had written was adequate for occasional use, but it had two substantial faults:

1. It was too inflexible.
2. It could only be used if punched cards were submitted to Western's Computer Science Centre.

Could the program be changed to give it a wider application? Could all data processing activities be moved into the Allergy Clinic? The third priority thus became the improvement of the existing computer program. This was undertaken in "small" steps, since the original work was quite impressively large. Ultimately, this one program was chopped into twelve pieces that could be interlocked in many combinations, depending upon the sort of statistical analysis that was to be performed. By the end of the summer, there was a whole suite of new programs, in which the original work by the university students was scarcely recognizable, but nonetheless their efforts had been the peg upon which we hung our computing hat.

The fourth priority was to find a teletype-like machine that could be used directly from the Allergy Clinic to communicate with the PDP-10 computer here at Western, thus eliminating the need for punched cards and trips to the campus. Many special features were required of this machine: it had to be faster than an ordinary teletype, wider pages were essential, and, because it was to be used in an office, it could be no noisier than an ordinary typewriter. During the summer, many sales representatives from different companies were contacted before the proper device was located and purchased.

(3) When work had been completed on all programs, the staff had to be trained to use them before the programmer left to enter second year meds. The fifth problem therefore was to carefully document every program so that future users could find out how to operate them. The sixth was to actually sit down with the statistician and show her how to use the computer.

At each step, pages of further subdivisions were written out and discussed by the physician, the statistician, and the programmer, right down to the actual methods to be used in calculations and the appearance of the results on the output pages.[1] And throughout the summer, Professor Mullen continued to provide valuable help as an "insider" at Western, and as a technical consultant to the programmer on complex matters. He even wrote some difficult routines for us.

ARE THE MACHINES TAKING OVER?

The computer does not threaten to make people obsolete; Dr. Toogood didn't fire his statistician. Indeed, under the auspices of P.S.I. research funds, he hired two programmers full-time in the fall. While the Allergy Clinic staff actually got larger than it was in the days B.C. (before computers), the *productivity* of the research program increased many-fold—far more than if two statisticians had simply been hired. The lady who used to slave over routine standard deviations, Wilcoxon Tests and the like now has an electronic slave to do the boring work for her, for once a program has been written, any secretary can be shown how to use it without extensive retraining. Statisticians should be doing interesting statistics, not boring piles of arithmetic.

Computers are now being tried in many other medical applications; for medical education, accounting and hospital management, research, epidemiology, and even in mapping the brain in neurosurgery. There are many other examples.[2]

Those who are brave enough to venture into computerized methods in medicine should not expect instant success or spectacular results at first. That will come with time and practise. But they should know that ultimately the success or failure of a computerized solution of a medical problem is determined in the planning phase, long before a line of code is written or a card is punched. The computer can be a useful and economical tool for the health business, or it can be an expensive white elephant; the physician must decide how he is going to use it.

REFERENCES

1. q.v. *Scientific Subroutine Package for I.B.M. 1130*, (International Business Machines Co. Ltd., 1970).
2. *McMaster Builds a Fitting Home for its Innovative Health Care Programs*, C.M.A. Journal, *107*:574, 1972.

* * *

From examination papers:—

'The hydra swims through the water by waving its testicles'.

'Ugleaner is unicellular'.

'The vagina is the female genial opening'.

Carcinoembryonic Antigen: A Review of Current Concepts and Controversies

Eng Hin Lee, Med. IV

Clinical research in the immunologic diagnosis of cancer has recently received much attention, though rather belatedly perhaps, considering that it was as early as 1906 that G. Schone,[1] a research assistant of Paul Erlich, reported the rejection of tumour tissue transplants in mice which had been injected with foetal tissue prior to tumour challenge. In 1930, Hirszfeld and Malber[2] reported the presence of "embryonal antigens" in tumour extracts. But it wasn't until the last decade or so that both basic and clinical researchers have made use of immunologic methods based upon this relationship between foetal and cancer tissue, and applied them directly to the development of tests for the diagnosis of cancer.

As more knowledge was gathered about foetal antigens, and more sophistication in research methods realised, the problem of terminology arose. Alexander,[3] in a recent paper in *Nature,* has proposed a useful classification for these "onco-foetal antigens". Basically, when speaking of such antigens, one needs to differentiate between two types: the first, "onco-foetal-specific antigen", is present only in foetal and tumour tissue, and absent from adult normal tissue; the second, "onco-foetal-associated antigen", is present not only in tumour and foetal tissue but also in some adult normal tissue. When speaking about "antigens" of this nature, one should also bear in mind that there are two quite different situations in relation to cancer, in which the term is used. The first is when immunological methods are used to show that a macromolecule (operationally called an "antigen") present in embryonic or foetal tissue is also present in tumour tissue. This is usually done by raising anti-sera to the foetal or tumour tissue in an heterologous species and after suitable absorptions, showing that the two types of tissue have an "antigen" in common. The other situation is when the substance present in tumour or foetal tissue is shown to evoke an immunological reaction in the tumour-bearing host (i.e. an autoimmune response to the foetal antigens in the case of a host with primary tumour).

In recent years, several such antigens have been described. Some of these have shown promise as diagnostic aids in the detection of digestive tract cancers. The following are a few of the potentially clinically useful ones: (i) alpha-foetoglobulin, which was first detected in primary liver cell cancer (hepatoma) by Tatarinov[4] in 1964; (ii) carcinoembryonic antigen (CEA), a glycoprotein first discovered in digestive tract malignancies by Gold and Freedman[5] in 1965 in Montreal; (iii) gastric juice foetal sulphoglycoprotein antigen (FSA), described by Hakkinen and Viikari[6] in 1969, and associated with gastric cancers; (iv) tumour glycolipids, isolated from gastrointestinal and bronchogenic cancers by Hakomori[7] in 1964; and, (v) foetal alkaline phosphatase (the "Regan Iso-enzyme") first isolated by Fishman et al[8] from bronchogenic carcinoma in 1968 but subsequently also found in patients with digestive tract cancers.
Of these, only the first two have reached the stage at which clinical applicability is possible. Alpha-foetoglobulin has been found to be positive in 70% of patients with hepatoma. It has also been reported to be positive in some cases of metastatic cancer to the liver, terablastoma and hepatoblastoma. Stillman and Zamcheck[9] have written an excellent summary of the current status of some of these onco-foetal antigens in the American Journal of Digestive Diseases, Nov. 1970.

CARCINOEMBRYONIC ANTIGEN (CEA)

Gold and Freedman[5,10] first used this term in 1965 to describe a substance (or a group of substances with a common antigenic determinant) that they detected by the use of heterologous antiserum in all endodermally derived cancers of the human digestive tract, especially cancers of the colon and pancreas. They also found CEA in the digestive tract tissue of human foetuses aged between two to six months. Recently there have been many reports that CEA has been detected in normal tissue and also in nonendodermally derived cancers. CEA as such would most likely fit the category of an onco-foetal-associated antigen, rather than an onco-foetal-specific antigen. CEA has been characterized as a

glycoprotein soluble in perchloric acid and with a molecular weight of 1-2 x 10^5.

METHODS OF ASSAY

Currently, three radioimmuno-assay methods of measuring CEA levels in either serum or plasma are used. Thomson et al[11] devised the first method for serum in 1969, referred to as the "Gold assay". Hansen et al[12] subsequently reported another method using zirconyl phosphate gel. Egan et al[13] very recently have developed another method, using a double antibody technique. The latter two methods use plasma for their assay. All these assays are capable of measuring CEA levels in nanogram quantities. There is controversy over the reproducability of CEA levels as measured by these three techniques. Sorokin et al[14] have undertaken a comparative study of the Gold and Hansen techniques and found an overall correlation of 83-86% ($p<.001$). Apparent "differences" between the two assays were found to be primarily quantitative and related to the arbitrary "cutoff" level of positivity at 2.5 nanograms/ml. of CEA. The Egan (Todd) assay has not been widely used enough to enable a comparison with the Gold or Hansen assays to be made.

CEA IN COLONIC CANCER

The following table, taken from Dhar et al[15] illustrates the reproducability of CEA assays in colonic cancer in five North American Centres. (Table 1) Both assays appear to be equally good in picking up colonic cancers. The reason for the fall in % positivity in the Boston "expanded series" was due to the inclusion of "early" cases of colonic cancers to the study. CEA levels appear to be higher in "late" cases of colonic cancer, and are especially high in metastases. (Table 2)

In fact 18 out of the 18 cases with metastases were positive for CEA (100%) with 11 (61%) of the cases having CEA levels >10 ng./ml.

CEA has proved to have potential applicability to pre-operative and post-operative diagnosis and prognosis in colonic cancers. Undetectable or low levels of CEA pre-operatively, suggest localized tumour and a good prognosis, whereas high levels suggest extensive tumour or metastases with a resulting poor prognosis. Post-operatively, a positive CEA would indicate presence of residual tumour. However, a negative CEA does not exclude residual tumour. Periodic CEA determinations in following up post-operative patients may detect tumour recurrence and thus enable the tumour to be resected at a treatable stage. (See Fig. 1)

CEA IN PANCREATIC CANCER

Thomson et al[11], in 1969 found a positive CEA level in one of their patients with carcinoma of the pancreas (with metastases). Moore et al[16] subsequently reported a 100% positivity in 13 cases of pancreatic cancer. However, this figure fell to 85% when a larger group of patients were examined (Zamcheck et al[17]). (See Table 3)

Lo Gerfo et al[18] and Reynoso et al[19] have also confirmed the positivity of CEA levels in a majority of cases of pancreatic cancer, using the Hansen assay.

The value of CEA assays in the prognosis of pre- and post-operative patients and in the detection of recurrences of pancreatic cancer has not been adequately studied as yet.

TABLE 1—CEA IN COLONIC CANCER;
VARIATIONS IN POSITIVITY FROM SERIES TO SERIES

	Method*	No. of Cases	% Positivity
Montreal	G	36	97
Boston (City Hospital) Initial series	G	35	91
Expanded series		60	72
Present series Preresection (all stages)**		51	59
Postresection with known tumor recurrence		28	96
New York	H	101	86
Buffalo	H	33	83
Boston (Lahey Clinic)	G	33	64

*G—Gold's technique; H—Hansen's technique.

**Positivity varies from 19% in patients with Dukes stage A tumors to 100% in those with distant metastases.

TABLE 2—CEA IN COLONIC CANCER*

Extent of Tumor	No.	CEA-Positive** No.	%	CEA, 10ng/ml or Greater No.	%
Localized to bowel wall (Dukes stage A)	16	3	(19)	1	(6)
Extending to pericolic tissues (Dukes stage B: 3; Dukes stage C: 14)	17	9	(53)	4	(24)
Metastatic to distant tissues	18	18	(100)	11	(61)

*Results in 51 patients tested prior to tumor resection.

**CEA level of 2.5 ng/ml or greater in each of duplicate tubes of patients' serum.

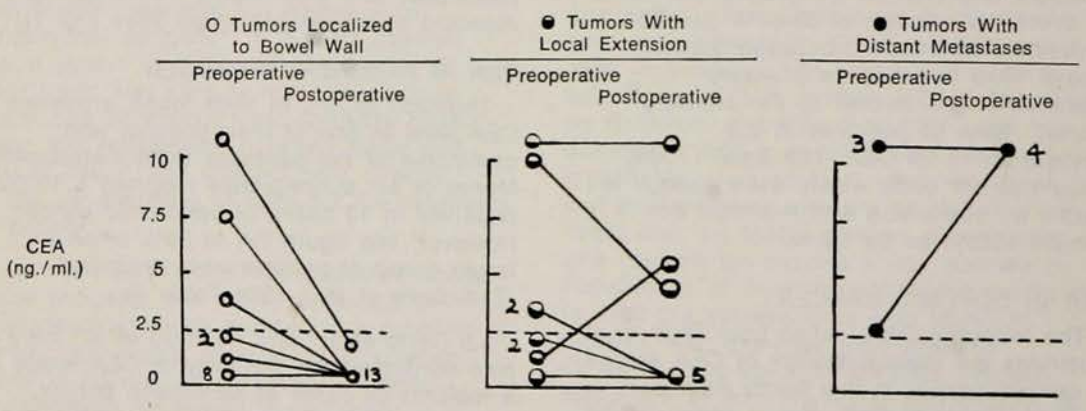


Figure 1—Serum CEA in colonic cancer. Twenty-six patients with both preoperative and postoperative values. Note: Local extension was accompanied by regional lymph-node involvement in all but one patient (star) who had invasion only of pericolic fat (Dukes stage B).

TABLE 3—CEA IN PANCREATIC CANCER

Cancer of Pancreas	No. of Patients	CEA Positive
I. Histologically Proven*		
A. At Laparotomy	14	12
B. Diagnosis at Autopsy	5	5
II. Not Histologically Proven**		
A. At Laparotomy	8	6
Total	27	23
% CEA Positivity		85%

*All patients had metastases

**No metastases seen at laparotomy

A comparison of the reliability of the CEA test to other conventional methods of diagnosis of pancreatic cancer has been made by Ona et al[20]. (Table 4)

TABLE 4—POSITIVITY OF CEA *VS* OTHER DIAGNOSTIC PROCEDURES

		Positive Results	
		Procedure	CEA Assay
Upper GI-Series	23	9	20
Hypotonic Duodenography	6	1	4
Coeliac Arteriography	7	2	6
Percutaneous Transhepatic Cholangiography	5	4	5
Pancreatic Biopsy	4	1	4
Liver Scan	9*	4	8
Total Examinations	48	25	43

*Liver Scan was done in 14 patients but only the 9 patients with proven liver metastases were compared.

CEA turned out to be positive more frequently than any other diagnostic technique. One should bear in mind though, that CEA is *not* specific for pancreatic cancer.

CEA IN OTHER MALIGNANCIES

Positive CEA levels have been found in GI malignancies other than colonic and pancreatic cancers. These include cancers of the stomach, oesophagus, bile ducts and carcinoid tumors with metastases. Also, the specificity of CEA for endodermally derived cancer as suggested by Gold and Freedman[10] has not been confirmed by other groups. Moore et al[16], Lo Gerfo et al[18], Reynoso et al[19] and Laurence et al[21] have reported positive CEA levels in cancers of the lung, upper respiratory tract, breast, female reproductive organs (cervix, uterus and ovary), osteogenic sarcoma, leukemia, lymphoma, multiple myeloma and Waldenstrom's macroglobulinaemia, neuroblastoma, carcinoma of the bladder and of the male reproductive organs (prostate, testes and penis). There have also been scattered reports of positive CEA levels in cancers of the skin, vulva, kidney, thyroid, liver, fibrosarcoma, rhabdomyosarcoma, and Ewings sarcoma.

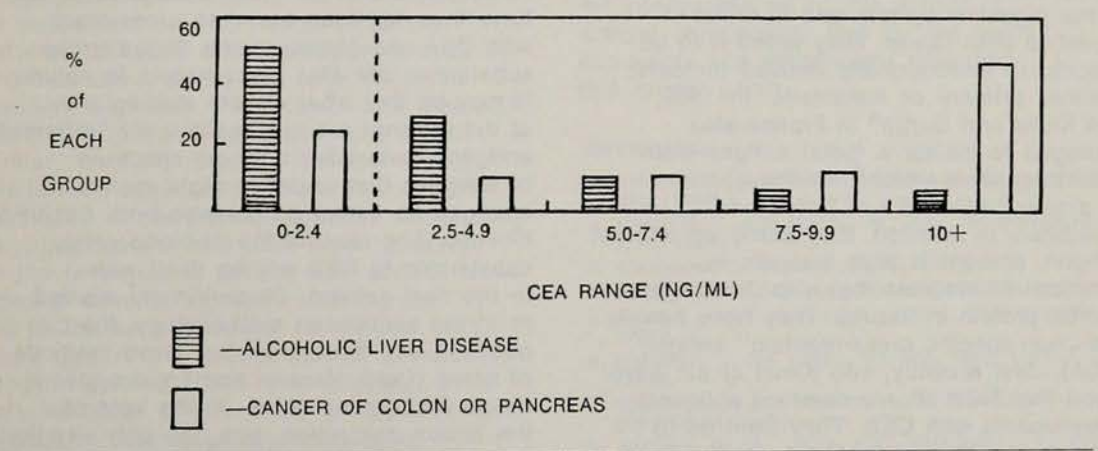


Figure 2—Comparison of CEA levels in benign and malignant disease.

It is obvious that at the two extremes of CEA levels, there will be no difficulty in distinguishing benign from malignant diseases. However, the distinction is not so clear-cut in the intermediate levels.

It must be noted, though, that the above reports are based on three different methods of assay which may be detecting different antigens or antigenic determinants on the same CEA molecule. A more in depth discussion of this possibility will be presented later on in the paper. It should also be noted that, in general, CEA levels tend to be lower in these non-endodermally derived cancers.

CEA IN NON-NEOPLASTIC DISEASES

In 1970, Martin and Martin[22] reported the presence of CEA-like antigen in non-cancerous digestive tissues. Since then, CEA has been detected in many benign diseases of the digestive tract. Burtin et al[23] have isolated CEA in colonic polyps and haemorrhoidal tissues. Moore et al[16,24] also reported presence of CEA in liver disease (with positive CEA, i.e., $>$ 2.5 ng./ml., in 49% of the patients with alcoholic liver disease), colitis, diverticular disease, pancreatitis and kidney transplants). Laurence et al[21] have also recently reported CEA in benign breast diseases (neoplastic and reactive diseases), inflammatory lung diseases, benign uterine and ovarian neoplasms, benign prostatic hypertrophy, nodular goiters of the thyroids and also in some cases of anaemia.

In general, patients with benign diseases tend to have low positive to genative CEA levels. The following diagram illustrates the case of alcoholic liver disease compared to cancer of colon or pancreas. (Fig. 2)

ONE, TWO, THREE . . . "CEA's"?

In 1965, Gold and Freedman[5,10] reported the presence of an antigen (which they called CEA) in extracts of adenocarcinomata of the digestive system and in foetal digestive tract tissue. They found it to be specific to endodermally derived tumours, whether primary or metastatic. In 1969, von Kleist and Burtin[25] in France also managed to isolate a foetal antigen from colonic cancers which they thought to be similar to the CEA of Gold and Freedman. In addition, they found yet another antigen, present in high amounts in intestinal carcinomas, but also present as a normal protein in tissues. They have named this "non-specific cross-reacting" antigen (NCA). Just recently, von Kleist et al[26] have found that NCA shares common antigenic determinants with CEA. They went on to show that NCA and CEA are not the same molecule. Martin and Martin[22] in 1970 were also able to detect two "cancer-related antigens" in cancers of the colon. Small amounts of these antigens could also be measured in non-cancerous colonic mucosa. They postulated that the difference between cancerous and non-cancerous digestive tissues may be quantitative rather than specifically qualitative. Burtin et al[27] in 1971 discovered a membrane-associated antigen (CMA) in normal colonic mucosa. They found this antigen to be absent in carcinomas and diminished in polyps of the colon. This led them to think that there is probably an alternate synthesis of CMA and CEA in man. In the foetus, both antigens are present, but, as the foetus matures, CEA is lost in preference to CMA. In the adult, therefore, there should be no CEA in health. However, as adult tissues become diseased and turn malignant, CMA is lost, CEA being produced in abundance in its place. Interestingly enough, Mach and Pusztaszeri[28] in Switzerland have also found a normal glycoprotein (NGP) of similar electrophoretic mobility to CEA which shares antigenic determinants with CEA. NGP has been detected in normal lung, spleen, liver, prostate, breast and digestive tract tissues. Also, NGP has been demonstrated in perchloric acid extracts of colonic cancer and lung and breast cancer tissues.

Gold et al[29] recently reported the existence of cross-reactivity between blood group substance A and CEA, using a radioimmuno-electrophoresis technique. Sheahan et al[30], working with gastric cancer tissue, have reported the loss of epithelial ABH isoantigens in gastric mucosa as the tissue turns malignant. There is also some suggestion that this loss of ABH isoantigens is somehow related to the propensity of the tumour to metastasize.

It is interesting to speculate at the moment about the relationship of these various "antigens" to CEA. It is more than coincidence that all these substances that have thus far been found to cross-react with CEA are glycoproteins. Blood group substances are also glycoprotein in nature. It may be that what we are dealing with at the moment are not qualitatively "different" antigens, but rather a whole spectrum of antigens that undergo slight molecular changes as tissue progresses from health to disease. The relationship of blood group substances to CEA will be dealt with in the next section. As previously alluded to in the section on methodology, there is question as to whether the three methods of assay (Gold, Hansen and Todd systems) measure the same thing. In the light of the above discussion, one can only say that it is likely that the different assays may be detecting different antigens or different antigenic determinants on the same molecule.

CIRCULATING ANTI-CEA ANTIBODY

In 1967 Gold[31] demonstrated the presence of circulating anti-CEA antibodies in the

sera of 70% of patients with non-metastatic cancer, in most pregnant and post-partum women and in 2 cases of non-cancerous enteric disease, using a haemagglutinating technique. He was unable to detect anti-CEA antibodies in patients with metastatic disease and this he attributed to the presence of a large mass of tumour material which may have removed the anti-CEA from the circulation. Lo Gerfo et al[32] and Collatz et al[33] have since been unable to detect any antibody activity directed against CEA at all, using many different techniques. They commented in their respective papers that Gold may have been detecting antibodies to blood group substances or to normal tissue proteins. Hansen et al[34] found that some of their CEA preparations were contaminated by blood group A substance. Turner et al[35], in a very elaborate experiment, separated out at least two components from their perchloric extract of CEA under density gradient ultracentrifugation in Cesium chloride. One of the components turned out to be a glycoprotein containing primarily blood group A determinants and the other component contained mainly "purified CEA". This purified CEA was found to react with both anti-A and anti-CEA antisera prepared in rabbits and goats. Furthermore, they showed that precipitating out the purified CEA fraction with anti-A serum had no effect on further precipitation of the CEA by anti-CEA antiserum. This led them to conclude that the CEA may contain both CEA and blood group A determinants on the same molecule.

Gold et al[29] recently reported that he has been able to detect anti-CEA antibodies in patients with and without metastases with a radioimmunoelectrophoresis. In addition, he stated that he found cross-reactivity between CEA and blood group substance A, and that anti-A antibodies were found to combine with CEA. They concluded that CEA and blood group A molecules may contain similar "core structures". This interesting relationship between CEA and blood group substance A cannot be explained adequately as yet. Indeed, it may have some bearing on the tendency of people with certain blood types to develop digestive tract cancer. The relationship between individuals with blood type A and gastric cancer is well known. However, there is to date no documentation of this same propensity with regards to colonic or other digestive system cancers.

SUMMARY AND CONCLUSIONS:

Extensive research has been devoted to CEA in the hope of finding a useful clinical test for the detection of cancer. Some of the better known aspects of CEA together with some of the controversial areas have been presented and discussed. Many questions still remain to be answered. Some of these are:

1. What is the relationship of CEA to other "antigens" found in the human digestive system?
2. What is the exact molecular nature of CEA?
3. Why are there discrepancies in the 3 radioimmunoassay methods for the detection of CEA, and what is the basis of these discrepancies?
4. What is the true basis of the relationship found between CEA and the blood group substances?

CEA, at present, promises to be a clinically useful test for the detection and diagnosis of colonic and pancreatic cancers and their extent of spread. CEA has also proved to be potentially useful in assessing pre- and post-operative patients for adequacy of surgical resection of their tumours. In addition, the detection of tumour recurrence with the periodic CEA determinations will doubtless prove to be yet another useful function. And finally, CEA may become helpful in the differential diagnosis of the different neoplastic diseases and also of neoplastic from non-neoplastic diseases.

Great progress has been made within the last few years in the field of tumour immunology in general, and in the field of oncofoetal antigens in particular. What the future will bring will no doubt be most exciting.

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REFERENCES

1. Schone, G.: Munchener Medizinische Wochenschrift, 51:1 (1906).
2. Hirszfeld, L. and Malber, W.: Klin. Wochenschrift, 9:342 (1930).
3. Alexander, P.: Nature, 236:137 (1972).
4. Tatarinov, Y.: Vop. Med. Khim., 10:90 (1946).
5. Gold, P. and Freedman, S.: J. Exp. Med. 121:439 (1965).
6. Hakkinen, I. and Viikari, S.: Ann. Surg. 169:277 (1969).
7. Hakomori, S. and Jeanloz, R.: J. Biol. Chem. 239:PC3606 (1964).
8. Fishman, W. H., Inglis, N.R., Stolbach, L. L. and Kraut, M.J., Cancer Res. 28:150 (1968).
9. Stillman, A. and Zamcheck, N.: Am. J. Dig. Dis. 15:1003 (1970).
10. Gold, P. and Freedman, S.: J. Exp. Med., 122:467 (1965).
11. Thomson, D. M. P., Krupey, J., Freedman, S. O. and Gold, P.: Proc. Natl. Acad. Sci. 64:161 (1969).
12. Hansen, H. J., Lance, K. P. and Krupey, J. Clin. Res. 19:143 (1971).

13. Egan, M. L., Lautenschleger, J. T., Coligan, J. E. and Todd, C. W.: Immunichem. 9:289 (1972).
14. Sorokin, J. J., Kupchik, H. Z., Zamcheck, N. and Dhar, P.: Immun. Communications, 1:11 (1972).
15. Dhar, P., Moore, T., Zamcheck, N. and Kupchik, H. Z.: JAMA, 221:31 (1972).
16. Moore, T. L., Kupchik, H. A., Marcon, N. and Zamcheck, N.: Am. J. Dig. Dis. 16:1 (1971).
17. Zamcheck, N., Moore, T., Dhar, P. and Kupchik, H.: NEJM 286:83 (1972).
18. Lo Gerfo, P., Krupey, J. and Hansen, H.: NEJM, 285:138 (1971).
19. Reynoso, G., Chu., T. M., Holyoke, D., Cohen, E., Nemato, T., Wang, J. J., Cheung, J., Guinan, P. and Murphy, G. P.: JAMA, 220-361 (1972).
20. Ona, F. V., Zamcheck, N., Dhar, P., Moore, T. and Kupchik: Cancer (in press).
21. Laurence, D. J. R., Stevens, U., Bettelheim, R., Darcy, D., Leese, C., Tuberville, C., Alexander, P., Johus, E. W. and Menro Neyille, A.: B.M.J. (in press).
22. Martin, F., and Martin, M. S.: Int. J. Cancer, 6:352 (1970).
23. Burtin, P., Martin, E., Sabine, M. C. and von Kleist, S.: J. Natl. Cancer Instit., 48:25 (1972).
24. Moore, T., Dhar, P., Zamcheck, N. and Kupchik, H. Z.: Proc. First Conference and Workshops on Embryonic and Foetal Antigens in Cancer, May 24-26 (1971).
25. von Kleist, S. and Burtin, P.: Cancer Res. 29:1961 (1969).
26. von Kleist,S., Chavanel, G. and Burtin, P., Proc. Nat. Acad. Sci., 69:2492 (1972).
27. Burtin, P., von Kleist, S. and Sabine, M. C.: Cancer Res. 31:103 (1971).
28. Mach, J. P., Pusztasaeri, G.: Immunochem. 9:1031 (1972).
29. Gold, J. M., Freedman, S. O. and Gold, P.: Nature New Biol. 239:60 (1972).
30. Sheahan, D. G., Horowitz, S. A. and Zamcheck, N.: N. Am. J. Dig. Dis. 16:961 (1971).
31. Gold, P.: Cancer, 20:1663 (1967).
32. Lo Gerfo, P., Herter, F. P. and Bennett, S. J.: Int. J. Cancer, 9:344 (1972).
33. Collatz, E., von Kleist, S. and Burtin, P.: Int. J. Cancer, 8:298 (1971).
34. Hansen, H. J., Lance, K. P. and Krupey, J.: Clin. Res. 19:53 (1971).
35. Turner, M. D., Olwares, T. A., Harwell, L. and Kleinman, M. S.: J. Immunol. 108:1328 (1972).

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Clinical Experience at Moose Factory

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Moose Factory is an isolated island in Northern Ontario. It has a population of 1,500 Cree Indians and 250 non-Indians. On May 1st of this year, five nursing students and one faculty member of the Queen's University School of Nursing arrived at Moose Factory to begin a three and one-half week clinical experience in medicine and surgery. This article is the story of that experience.

In June of 1971, I visited Moose Factory to discuss the possibility of a student clinical experience with the Medical Director and the Director of Nursing of Moose Factory General Hospital. They both expressed an interest in having students. The Deputy Minister and the Chief of Nursing of the Department of National Health and Welfare were enthusiastic. Final plans and decisions were made with the Medical Services Branch supervisors.

This clinical experience would provide the students with an opportunity to practice nursing in a hospital and in the community. The northern placement would give them a chance to study nursing practices in an environment different from Kingston and would expand their awareness of Canadian social patterns. The Moose Factory trip would benefit all the nursing students in the third year programme as the involved students would share their experience when they returned. It was hoped this placement would give the school an opportunity to enlarge the scope of its clinical practice in the north.

On May 1st at 8:00 p.m., we left Toronto by train and arrived at Cochrane at 8:30 a.m. From there we took the Polar Bear Express at Moosonee. Moosonee is an isolated community 160 miles north of Cochrane. There is no highway to Moosonee. You arrive by train or airplane. Moosonee is the railhead for the Ontario Northern Railroad. The town has two hotels and one restaurant. There is a Canadian Armed Forces Radar base a few miles away.

From Moosonee we travelled to Moose Factory by helicopter as the river was still covered by ice. We landed in a field next to the Moose Factory General Hospital. In the summer months the trip is made by motorized canoe.

Moose Factory is an island located twelve miles up the mouth of the Moose River. Moose River empties into James Bay. Moose Factory is three miles from the mainland town of Moosonee. There are approximately 1,500 Cree Indians and 250 non-Indians. In the summer the Indians work as guides

for the tourists. During the winter there is hunting and trapping. The majority of the residents are employed by various departments of the federal and provincial governments.

Moose Factory General Hospital is a three-storey building designed in the form of the Cross of Lorraine. The building was originally a sanatorium but is now an acute care 100-bed hospital. The wards are divided into obstetrics, pediatrics, general medical-surgical, and tuberculosis. There are facilities for operating, x-ray, laboratory, pharmacy, out-patient and dentistry. These provide for general care and treatment. The hospital is affiliated with Queen's University who provide rotating pediatric residents and with the University of Western Ontario who provide rotating family practice residents.

There are eight nurses working at the hospital. This includes the Director, one nurse who is assigned to the tuberculosis unit and six nurses who are each assigned to an active care unit. Each ward has one Registered Nursing Assistant. Many of the local Indians work as Ward Aides.

The first order of business was an intensive orientation session involving the Director of Nursing, the head nurses, myself and the students. During this period there were many free and easy discussions. The head nurses reviewed the patients on their wards. They talked about their problems. These problems revolved around staffing and patient attitudes toward illness.

They reviewed the variety of patients that were admitted. Usually the patients were Cree Indians although some were Eskimos from Great Whale River. Many of the Indians spoke English, however, a translator was available for patients who could not communicate in English. The surgical ward had patients with such conditions as hysterectomies, orthopedic problems, cholesystectomies, splenectomies, vein ligations, cancer and tubal ligations. The medical ward had patients with diabetes, rheumatic fever, rheumatoid arthritis, kidney infections and various circulatory and cardiac problems.

The head nurses stated their interest in having the students at the hospital and were prepared for the students' coming. It was indicated I would be available at all times for the supervision of the students. I informed them my clinical specialty was public health nursing and I would be seeking assistance in some of the areas of patient care. They were very receptive to my "cry" for help.

The student activities and assignments were discussed. The hospital staff was asked to identify patients who lived on the island. They immediately provided us with this information. This immediate selection of patients enabled the students to establish contact and develop rapport. The students provided nursing care to the patient in the hospital. They were then able to follow through with the care and teaching required when the patient was discharged. This opportunity to continue the patient's care at home was a valuable learning experience for the student. The student had an opportunity to provide teaching that would contribute towards the maintenance of health and the prevention of recurrence of symptoms. The follow-through visit was planned with the attending physician, nursing staff, student, and faculty.

Our orientation extended into the Moose Factory community health program. With the supervising public health nurse we planned a program for community health experiences. The students would participate in immunization clinics, well-baby clinics, school health care, maternal care, child care, and home visiting.

The students initially planned their visits in the community with myself, the supervising public health nurse, or the community health aid. However, independent visits were encouraged and the students quickly became at ease in the home situations.

The students accepted the responsibility for planning their own work load. They selected the patients that were of interest to them and their evening's homework was to review the patient's history and medical care plan and to prepare the nursing care plan. On Wednesday, May 3rd, 7:30 a.m., they were on the wards, ready to start their clinical experience.

The first nine days the students were on days from 7:30 a.m. to 3:30 p.m. on the Medical and Surgical floors providing nursing care for selected patients. The students familiarized themselves very quickly with ward routines and staff members. They tried very hard to communicate with everyone, the nurses aides, the translator, orderlies, doctors, and the nursing staff. They spent a great deal of time talking with the patients and trying to understand their culture.

Each student had a rather unique experience with her "follow through" patient. It was early in the experience, about the second day, that Sylvia's patient was discharged. Sylvia provided care for a 55 year old Cree woman. Her left leg had been

amputated. She had diabetes and required nursing care and health supervision on her discharge from the hospital.

The woman's name was Jona Butterfly. While she was in the hospital Sylvia provided nursing care for Jona. She irrigated the sinus in her leg. She changed the dressing. She helped Jona prepare for leaving the hospital and returning to her home. Sylvia also planned for the provision of continuing care in the patient's home. On the day after discharge Sylvia visited Jona's home at 8:00 a.m. In order to reach the home Sylvia had to arrange transportation with the hospital ambulance driver. She arranged with the hospital clinic for a sterile dressing tray and with the pharmacy for the necessary medication. It took an hour and fifteen minutes to provide the nursing care. After this care was finished, Sylvia rode back to the hospital in the ambulance, put her uniform on, and was soon on the surgical floor providing care to the rest of her patients. This home care was given daily for four days and then three times a week. In this way the student and the patient were able to plan together for the necessary care.

This was an excellent demonstration of the transition of nursing care from the hospital to the home. The student assumed responsibility for the provision of her nursing care. She organized her equipment, reviewed her medication with the physician, planned for the necessary teaching of the patient and provided the required skilled care. Upon the completion of her home visit she returned to the hospital and resumed her care to the hospital patients.

Each student had a similar experience. They cared for patients with diabetes, rheumatoid arthritis, rheumatic fever and emotional problems.

In caring for the Cree Indians, both in the hospital and the home, the students were concerned about their attitudes. They found some of the Cree Indians to be difficult and stubborn about their health care. Some were totally negligent. They seemed to be almost fatalistic about their illness, "what will be, will be". Many refused to enter into co-operative planning for the prevention of their illness or the alleviation of their discomfort. They had difficulty in considering the potential complications of their illness.

A patient with a leg injury demonstrated this. The students were doing a daily dressing to her leg burn and tried to invite the patient's co-operation. They tried to involve her in planning for her care. The patient's response was, "I don't care. Let the leg fall off!" The students found this response extremely difficult to understand. They were interested in helping her. They tried very hard to reach her and to involve her. The students tried many approaches and spent a great deal of time talking with the various professional staff and local citizens about ways to help change her attitude. In this case there was some progress. The patient eventually demonstrated an interest in her medical care and made an effort to co-operate. We did not always meet with this success.

The time went by very quickly. We were exhausted at the end of the day. We felt we must experience everything, participate in all activities and communicate with everyone. The day shift flew by and at 4:30 we were still with the patients. In the evenings the students faithfully prepared nursing care plans and organized their work for the next morning. When Sunday came, our one day of rest, we collapsed. It was a satisfying kind of exhaustion.

Arrangements were made for the students to attend the clinic in Moosonee. This clinic is provided for Moosonee because their hospital burned down leaving the community without medical facilities. Each day a doctor from Moose Factory is flown in by helicopter to provide services for the medical-surgical, obstetrical, and pediatric clinic. This experience provided the students with an opportunity to talk with the doctors at the clinic. The doctors were interested in the students. They allowed them to help with the examination of the patients. The students used a stethescope, auroscope, palpated abdomens, and entered into discussions about the care of the patients.

During the clinical experience the students spent some time on evenings. At this time they made their community visits in the mornings and the early afternoon. I had the opportunity to visit with the students in the patient's home. The students planned well for their family visiting. They read past records, contacted other community agencies for information, and discussed needs and plans with doctors and nurses. They were aware of the need for care, demonstration and teaching in the home situation. They were well received by the families and seemed to feel at home. They seemed to accept the patient's home environment.

Some of the home situations were shocking. The outside of the houses were filthy. The yards were covered with trash and garbage. It was often difficult to gain entry into the homes. Some of the houses had broken stairs and broken windows. The

squalor outside was reflected inside. The houses were filthy. The floors could hardly be seen. There were orange and potato peelings on the floors. The tables and dishes were unwashed. The remains of dinners were strewn on the tables. The sinks were loaded with dirty pots and pans. The houses were dark and dingy. The children were unkempt and dirty.

This was difficult to accept and yet the student seemed able to understand the home situations and the individuals in the homes. They sought receptivity by the citizens and were well received and allowed entry into their private lives. The students seemed at ease. They walked into the homes, spoke freely with all members, and made a point of sitting down and relaxing with the families.

As a contrast some of the homes were neat, tidy, clean and well kept. The insides were scrubbed, the furniture clean, and there was order. In making visits the students came prepared with health information for the families. At first they found communication difficult as the families responded with "yes" and "no" and smiles. However, as rapport was developed, the conversation flowed easily. The preparation for teaching and the organization of their content was simple and specific. Their vocabulary was well selected for the appropriate level of understanding. Demonstrations were given. Diagrams, pictures and charts were developed for diabetic teaching. Considerable time was taken by the students in searching out ways and means of meeting mutual needs. I feel the students were aware of the communication limitations and were trying hard to seek resolution of this.

The students demonstrated sensitivity, understanding, and receptivity to their patients. The patients demonstrated anxiety in disclosing personal information and a fear of showing ignorance and a lack of understanding. They were concerned with displaying poor living situations and living patterns that could not be changed because of inadequate resources.

This clinical experiment proved to be both exciting and beneficial. Everyone was extremely pleased with the experience. This includes the patients, the professional and citizen community of Moose Factory, the students and myself.

Throughout the experience the student nurse found satisfaction in giving meaningful patient care. It was meaningful because it was designed for, given to and evaluated with the individual patient. By doing this the student found receptiveness from her patient. This was the result of the continuity of care she provided. She cared for the patient during his acute illness in the hospital. She contributed to his recovery. When the patient left the hospital she provided care in his home. The patient responded with an interest and a willingness to work with the same student nurse in planning for the improvement and maintenance of his well being.

Once the student has cared for the patient in both the hospital and his home she will realize the contribution of teaching to nursing care. She will become aware of how limited nursing care can be without teaching. To be fully effective nursing must increase the capability of the individual to cope with his own health needs. Teaching can increase the understanding of his illness and medical care and foster his motivation to attain optimum health.

In the small northern community of Moose Factory the students found an opportunity to practice the continuity of patient care. This clinical experience enabled them to explore and develop their personal integrity, their individual nursing capacity and their basic common sense.

* * *

Concerned about the recent adverse publicity concerning smoking and health, a large tobacco firm was delighted to get news of a man of 89 who had been smoking its cigarettes for more than 50 years and looked a picture of health. Wishing to use him in an advertising film, the company asked whether he could be at the studios next morning at 8:00 a.m.

"I'm afraid I can't manage that," he said.

"Why not?" they asked.

"Well," he replied, "I don't stop coughing 'till 10:00 o'clock."

A PICTORIAL ESSAY ON THE FACULTY OF MEDICINE

D I S I N T E G R A T I O N To be, to be, to cling, to call, to stand, to gather, to witness, to doubt, to be, oh just to be! terrified! to shatter, to scatter standing in different places, divorced, disunited, unrecognized; where am I? who am I? what am I? Get me back, please come back together. OH God Jesus please, love hate, Mother Mom. Oh Mom, Oh Jesus help me, Christ! I'm lost

D E A T H L I F E Afraid, scared, horrified, stricken, to live, to be, to die. Dead ——— ——— Resurrection Life

The Free Clinic Phenomena and Its Status in London

Derryek Smith, '74

Before beginning a discussion of the role of "free clinics", and at the risk of being pessimistic, I think it is best to outline some of the limitations which will be inherent in my discussion. I have been an active member of Clinic Collective, in London for about one year and as such find it extremely difficult to remain objective when writing about free clinics. I have a bias and people reading this article should be aware of it. Secondly, this article is by no stretch of the imagination, a scientific paper such as usually appears in journals. Rather it is a rambling personal account of my experience with free clinics in general and specifically with Clinic Collective.

A SHORT HISTORICAL BACKGROUND

The philosophical basis of the free clinics which have sprung up in increasing numbers both in the U.S. and Canada can be traced rather directly to the "hippy" movement prevalent in the late 60's on the west coast of the United States. In fact, the first free clinic was established by David Smith in the Haight-Asbury district of San Francisco in 1967. The impetus was obvious. A state of cultural war existed between the young, long hair, drug using, hippy community of Haight-Asbury and the older more conservative elements of San Francisco. On virtually every cultural value ranging from sex, to war, to the protestant work ethic the two communities were on opposite sides of a large abyss. Not surprisingly, the medical community, including both hospitals and physicians, were to be found firmly entrenched with the conservative elements of the city. Thus the hip community found itself lacking medical service due not only to a lack of money but also to a two-way battle of cultural antagonism between patient and physician/hospital. To compound matters the relatively new and frequent phenomena of "drug freakouts" put an even bigger strain on an already poor medical relationship, largely because few physicians or hospitals knew how to handle these crisis situations either medically or legally.

The youth community in San Francisco was unique at this time in that it was geographically centralized, was large, and had attracted many enthusiastic and creative people from other parts of North America. In short, it was an aroused, creative and tightly knit community which had a genuine medical need that was not being met. From this situation the concept of the free clinic was born. Naturally it emphasized the qualities that were prevalent in the cultural milieu in which it was conceptualized—nonspecialization, nonconformity, community control, flexible structuring, ready accessibility, and free service to all.

Before long other medically under-serviced groups, especially blacks and Spanish-Americans had seized on the idea of the free clinic and by 1972 about 200 such clinics existed in the States with roughly 20 Canadian counterparts. At present Ontario has to my knowledge five free clinics—3 in Toronto, 1 in Kitchener, and 1 in London.

WHAT IS A FREE CLINIC

How does a free clinic differ from a traditional medical practise? The most obvious and superficial difference is the setting. The vast majority of free clinics are furnished in early Salvation Army style with well-worn couches and chairs being the rule. Actual medical equipment, while probably of the same quantity and quality as found in a traditional practise, is usually second hand, or in the case of many examining tables, home made. Most free clinics are located in the core areas of their respective cities and are housed in old stores, warehouses, or turn-of-the-century homes. Clinic Collective is no exception and is at present located downtown in a large house that is slated for demolition in the near future.

The organizational structure of the free clinic is radically different from a typical physician's office. Unlike the medical practise, which is essentially organized as a business with the physician as entrepreneur and employer, the free clinic is controlled by the medical workers who comprise the staff. Decisions are made democratically and the entire structure is notable for its lack of formalized leadership roles. Sometimes the result is complete chaos and indecision. Surprisingly, most physicians who work in free clinics prefer to have very little to do with the day-to-day decision making processes. One notable exception is

Dr. David Collins at the Toronto Free Clinic, but this is understandable since he is one of the few physicians that I am aware of who practise full time in such a setting. Most physicians, including the ones who work at Clinic Collective, are volunteering their time in addition to maintaining busy private practises. One of the challenges which faces free clinics is to find viable structural alternatives so that the physicians who practise there can find time to participate more fully in the decision-making processes.

Another major difference between free clinics and traditional practises is that clinics de-emphasize specific roles and encourage multi-disciplinary approaches to medicine. To the staff of the clinic this facilitates a real transfer of skills and a more meaningful appreciation of the worth of one's fellow workers. At strictly the medical level, receptionists are expected to learn to take blood, perform pregnancy tests and become familiar with other paramedical activities. Physicians on the other hand are encouraged to take part in some of the more menial work such as cleaning the house and repairing broken furniture. Incidentally, this principle is being used extensively in Red China. Even the most important hospital administrators are expected to mop floors one day per week. The overall effect of this sharing of responsibility is a true medical team where everyone is able to appreciate the skills of the other members and at the same time able to develop these skills in himself.

Clinic Collective has attempted to facilitate this interaction even farther by having medical, law, nursing, dental and social work students all functioning in the same setting. To date, for a number of reasons, this programme has not been entirely implemented. It is interesting to note that the idea of the Health Team and the use of such professionals as social workers in a medical practise, has been evident in the structure of free clinics from their conception.

Although most of the principles that I have mentioned are inherent in almost all free clinics, it is a misconception to view the approximately 220 free clinics as homogenous in regards to either philosophy or structure. To substantiate this point I will compare three of the more successful clinics in Southern Ontario—the Toronto Free Clinic, the Rochdale Clinic (both in Toronto) and Clinic Collective.

THE TORONTO FREE CLINIC

The Toronto Free Clinic has operated for approximately two years out of a large house on Dupont Street. Originally called the Toronto Free Youth Clinic, it has within the past year de-emphasized its role with youth and now considers itself to be a resource for people of all ages within the community in which it is situated. It is extremely unique in a number of ways among which is its source of funding. At present it is an experimental model for the Ontario Department of Health and as such, has not been forced into the constant search for money which is a way of life at almost all other clinics.

The medical person nominally in charge is Dr. David Collins although it is quite clear that he is considered more as an equal member of the team than as a boss. The rest of the people performing medical duties have had virtually no formal medical training previous to their connection with the clinic. Dr. Collins has trained these people to perform a large number of medical procedures without any direct supervision from a physician. Services range from minor surgery, to prenatal care, to birth control advice and prescriptions—in short almost all services provided by a general practitioner's office. All trained medical personnel have been given prescribing privileges under Dr. Collins' name.

The limits of service that any one person can provide are largely determined by that person himself. It is quite legitimate to admit to a patient that his problem exceeds the limits of your expertise and to make a referral to another agency or preferably to ask the patient to return when a more competent person is available. However, most problems are able to be handled at the clinic on the patient's first visit.

In a further attempt to demystify medicine and to train the new people who constantly join the clinic, Dr. Collins has written an extensive and comprehensive book of medicine aimed at the level of a layman. A copy of this book is available at Clinic Collective in London. Not only has the Toronto Free Clinic pioneered the concept of a trained medical layman but it has challenged the whole expensive programme of medical training which up to this time has been the sole property of universities and the Royal College of Physicians and Surgeons. Is it necessary to spend six costly years at university to be able to diagnose and treat an upper respiratory infection? With the cost of education rising and an apparent shortage of physicians questions like this need to be raised.

As is usual for free clinics all services and drugs are free although if a person can afford to pay for his own prescriptions he is encouraged to do so. In addition, free dental service is available from a dentist two or three nights per week. To my

knowledge the Toronto Free Clinic is open 24 hours per day, seven days per week.

THE ROCHDALE FREE CLINIC

In direct contrast to the program of the Toronto Free Clinic, the Rochdale Clinic offers a more traditional type of medical service. All "medical" work is done by trained physicians, many of them specialists, who set up clinics at specific times in a medically equipped office in Rochdale College on Bloor Street. These physicians donate their services but are able to bill OHIP for the few patients who are insured. Nurses are available to assist these physicians. The rest of the clinic staff confines itself basically to the role of counselling patients. This involves giving minor medical advice, talking down drug cases, helping to solve social problems and referring patients to other agencies.

The Rochdale Clinic is also open 24 hours per day, seven days per week. Drugs and services are free but no dental service exists. As at the Toronto Free Clinic patients are encouraged to apply for OHIP coverage and to pay for their own drugs if they can afford it. The case load is in excess of 1,000 people per month.

CLINIC COLLECTIVE

Located at 544 Talbot Street in London, Clinic Collective has attempted to combine various aspects of the previous two clinics and has added a street work programme to complement the medical one.

The impetus for Clinic Collective came about 3 years ago from Mike Noble who at that time was a third-year medical student. With the assistance of Dr. I Vinger and Dr. J. Biehn, of the two family practise teaching units, clinics were held weekly, first at Kinsmen House and then at Chimo House. These places were drop-in centers for core area youth. The medical team consisted of a receptionist-bookkeeper, a physician and a third-year medical student. Thus the weekly clinics provided not only a service to its patients but also was serving as a teaching vehicle for medical students.

During the Spring of 1972 it became apparent to a group of medical and social work students that a great potential existed for expanding this service so as to include a larger patient population and to provide more comprehensive care. With this in mind, application was made to the Opportunities for Youth programme and $23,000 was obtained to operate a free clinic for the summer months.

From the beginning the Clinic's philosophy has been that very few medical or social problems are isolated by themselves but that most problems are multifaceted. However most social agencies restrict themselves to working with only one aspect of a problem. For example, if a physician writes a prescription for an unemployed, penniless transient the medical problem, whatever it may be, can only be remedied when the social problem of obtaining money for the prescription is solved. Whether the person obtains money from welfare, employment, or unemployment insurance is immaterial—the fact remains that only by solving the social problem can one reach a satisfactory solution to the medical one. The offices of most family physicians in London are not able to cope with such social problems.

Another fact of life that the clinic had to come to terms with was that, unlike Toronto, which had large readily identifiable unserviced areas (such as Rochdale College), no such area existed in London. Rather, the individuals we wanted to reach seemed to be spread across the entire city. This necessitated that the Clinic have a mobile service such that we could send a team of a medical and social-work person to peripheral areas of the city or that we could provide transportation for the patient to our central location.

Another facet of the Clinic, not unique to London, was the extensive use of street workers. The street worker is a person, who by his background, is familiar with a certain geographical area of the city and the so-called "street" people who live in that area. In addition, she or he is aware not only of the services offered by the clinic, but also of the services provided by the vast array of other social agencies in London. The street worker spends most of his time on the streets in his area meeting new people and renewing the relationships already established. Most street workers report that for the first few months they are viewed with extreme suspicion as people suspect they are undercover "narcs". Because of this initial suspicion it takes about three months to build up sufficient rapport and trust to be accepted as a person that others can turn to with their problems.

By using street workers the clinic not only became an outreach facility, but was also able to partially solve the problem of effectively serving all London from a central location. It is interesting to note that neither of the clinics in Toronto use street workers.

In addition to street workers the clinic had three house workers in the summer. Two of these people were graduates of the social welfare programme at Kings College and functioned more or less like classical

social workers. During the period of the summer they were able to establish contacts in most other social agencies in town so that not only did they become aware of all services offered but they also had the name of a person in each agency that they could refer to. Information they gathered on social agencies was passed on to the street workers. In addition to this function the house workers also worked up a list of lawyers in London who were willing to either give free legal advice or work through the Legal Aid programme. During the period of the summer in excess of thirty legal problems were thus handled at no cost to our clientel. The third house worker was a treasurer-administrator.

The third group of staff at Clinic Collective is the medical workers. These people are either medical students or graduate nurses and the two groups function interchangeably. They are responsible for operating the medical programme and as such function in a somewhat similar capacity to the medical workers at the Toronto Free Clinic. In the absence of a doctor they are totally responsible for making decisions as to how to handle the presenting problems of their patients. Basically they have four courses of action: handle the problem themselves, refer to a list of family physicians, refer to Emergency or ask the patient to return to the clinic at a time when a physician is present. During the summer, physicians were present two nights per week. Again, as at Toronto, the medical worker has the sole responsibility of deciding when he or she is not competent to handle the presenting problem, and must therefore make a referral. The medical worker is equipped to give information or advice on health matters, do routine physicals, order routine lab work, and dispense non-prescription drugs all at no cost to the patient. Prescription drugs are readily available, at no cost as well, if the patient has a prescription or if the medical worker is able to obtain verbal permission from a licensed physician.

The actual programs that the clinic supported during the summer were:

1. Operation of the Clinic proper, seven days a week, 2 p.m. to midnight;
2. The street work programme;
3. Daily visits by a medical worker to the London Youth Hostel to attempt to aid transients with their medical problems;
4. Weekly visits to each of the eight drop-in centers by a street worker, mostly for the purpose of dispensing information and answering questions on such topics as sex, drugs and VD;
5. A screening programme of pre-school children at a number of London day-care centers;
6. Giving pre-camp physical exams to large groups of adolescents involved in organized day camping programmes;
7. Providing first aid care at rock concerts held in and around the London area.

As with most free clinics, Clinic Collective has been actively involved in an almost constant struggle to maintain adequate funding. Fortunately, as previously mentioned, we were able to secure $23,000 from Opportunities for Youth programmes. In addition, the Clinic was able to solicit about $2,000 from local sources. After the summer the Clinic operated for two months with no funding but has recently been granted $47,000 by the LIP programme. Almost all the expense involved in drugs has been met by donations from the large pharmaceutical houses.

What kinds of medical problems does the Clinic usually see? Surprisingly, to a lot of people, very few drug cases are being seen. The hallucinogenic drug crises that were so prevalent two or three years ago seem to be almost non-existent now. A heavy case load of such things as VD, pediculosis and upper respiratory infections are seen, but with these exceptions, I would suspect that the range of problems encountered is much the same as seen in a general practitioner's office.

At present the Clinic staff consists of five street workers, three house workers, two full time and six volunteer medical workers. One rather unfortunate aspect of the Clinic is that the original teaching function has become less and less effective. Whether the Clinic is a viable structure in which to teach medical students some of the methods of dealing with alienated youth remains to be seen. However, medical students, especially in third year, are invited to participate either as observers on one or two occasions or to function as a medical worker on a longer term commitment.

Where to from here? Is the free clinic to become a permanent part of the health care delivery scheme? There are basically two diverging opinions on this question. One maintains that the role of free clinics is to simply embarrass or harass the more conventional institutions into better serving the needs of the public. My personal opinion is that since free clinics are a response to drastically changing life styles, as long as our society and especially youth remain in a state of constant flux, the free clinic or its counterpart of the future will be with us for many years to come.

Class News

MEDS '73

I don't know how we did it, but '73 managed to survive another and our final year in Tachycardia. Thank you "B" for leading us through it all. I've heard grave rumours (started by Sid of course), that the entire O.B. programme crumbled under our heavy blows. (Doesn't Sid say the cutest things?)

I was busy saving lives in Galt when the Barley Sandwich Party was thrown at the fraternity, but I have it on reliable word, that it was a great success.

A few of us also came out to the Sandoz "Headache" presentation in January and I for one thoroughly enjoyed myself. Dr. McGuinness gave a very informative lecture which was made all the more enjoyable by the fact that we all had drinks in our hands.

Congratulations are extended to Dwight Moulin and his new wife. May you and Bertha and the little one have a happy and prosperous life together.

Hope to see you all at the Third Year-Fourth Year party for what promises to be one of the best nights of your life.

Betty Marchuk '73

MEDS '75

Meds '75 would like to take this opportunity to 'officially' welcome and publicly introduce our two new students, Miss Nazlin Kassam and Mr. Anil Mussani, who have come from Uganda to join the class.

Those of you who were unfortunate enough to miss Tachy this year will not be aware that the second year production "The Great Race" (or, The Last One There Gets a Rotten Egg) won first place. Good show, actors, directors, scene-makers, costumers, musicians, etc. Now, for *next* year, maybe we could do something like *King Lear?*

There isn't a great deal to report that you don't know already; in second quarter, most people had the nose to the grindstone for purposes of passing examinations. Hopefully, the next quarter will be a bit of a respite before the "biggies" at the end of the year.

Neil McAlister, archivist

MEDS '76

First year can really be a drag.

But we haven't yet found out how.

Meds '76 proudly accepts credit or blame for engaging the services of Santa Claus who vociferously made jolly rounds on the last day before holidays, and for the night-time carolers who disturbed the peace and sleep of those fortunate enough to have been chosen as audience for our performance.

Meds '76 also claims full responsibility for an impressive turnout in Ottawa, including: the star of the winning volleyball and basketball teams—Julian Oates; three-quarters of the fastest female boat-racing team ever to shock the profession—Meri Bukowski, Betsy Hall, Marg Morden (challenges by appointment only); the Pitter-Patter-Peter line—Dave McLean, Ian MacLean, Paul Turner—which scored ten out of eighteen goals in two hockey wipe-outs; part of the spectacular girls' team which lost with the close and phenomenal score of 3 to 2 playing—can you believe it —basketball! (Names withheld on request). If you missed out on Ottawa, you missed out on first year in finest form.

Now ask us if we know any medicine . . .

Paula Donahue

* * *

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G. S. BURTON, M.D.C.M. *Medical Superintendent.*