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Amputations Ancient and Modern

B. J. S. Grogono, *M.B.

Halifax, N.S.

Two recent developments in Nova Scotia have brought a fresh impetus to the study of design, production and provision of prosthetic devices for amputees.

First, the amalgamation of all prosthetic and orthotic production services in Nova Scotia has now been achieved at the Rehabilitation Hospital in Halifax. This move had been carefully planned, although for the past year, some uncertainty about arrangements had led to difficulties at Camp Hill Hospital where the manufacture of prostheses has been carried out successfully for many years by the department of National Health and Welfare. Many hundreds of veterans and civilians have been supplied by this Centre, and an Amputee Clinic with a full team of doctors, physiotherapists and prosthetists have been held regularly since 1967. Now, prosthetics and orthotics appliances are available from the new centre to any doctor upon the necessary prescription, although it is strongly urged that patients are referred to suitable specialists or clinics.

Secondly, a Society under the chairmanship of Nancy Doane has been founded specifically for amputees. Like other disabled people there is a real need for mutual discussion of information, cooperation and general lobbying of problems. The Ostomy Association has brought tremendous help to colostomy, enterostomy and others wearing similar appliances. The Paraplegic Association is well known for driving a dogged and determined course to serve the lot of the paralysed. Similarly, the blind and the deaf have associations. Disabled people do not want to be segregated, they want to integrate by sharing common concerns and have a better chance of community or political action.

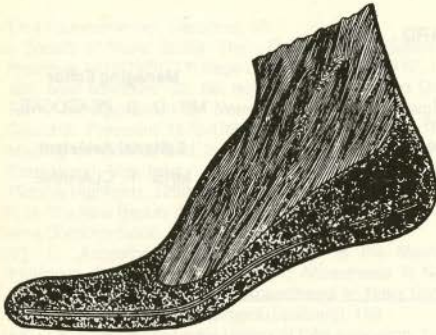
Do amputees get a fair deal? War Amps of Canada has been very active in their help of the Veteran Amputee. They have sponsored many Civilian and Junior Amputees, and have agreed to support children with myoelectric prostheses, an undertaking that may cost many thousands of dollars. They have been critical of many of the older devices, urging Veteran Amputees not to accept second best and even pressing for such luxuries as a provision of swimming legs.

There is still no standard way of paying for an artificial limb. Many agencies exist that will help, voluntary organizations often assist, but unlike provinces such as Manitoba there is no specific arrangement for Government funding.

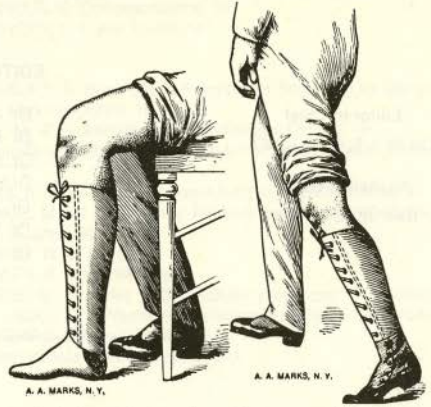
Most amputations are performed now for arterial disease. How many of these elderly patients are fitted with prosthetics, how soon are they supplied and is there any regular method of follow up? How many have complications or have stumps in which previous vascular procedures complicate the provision of an effective artificial limb?

In this issue, we are pleased to present an article by Nancy Doane, a physiotherapist who worked at Camp Hill Hospital Amputation Clinic and who took a special interest in the early fitting of prosthetics. The technique she describes is time consuming, but is remarkably effective in suitable patients and compares well with other methods of fitting temporary prosthesis until the definite limb is supplied.

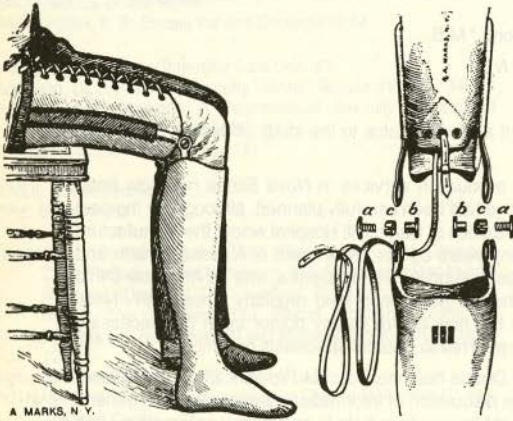
*Chief of Orthopaedics, The Halifax Infirmary, Halifax, N.S.



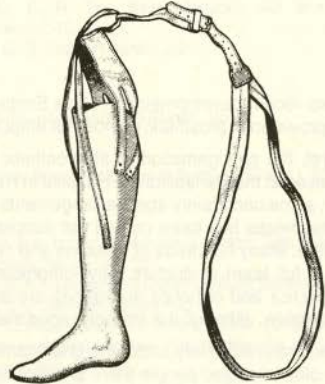
The Rubber Foot — Note how mattress springs were cushioned between the rubber to give resilience and stability and enable the wearer to climb ladders and go over rough ground.



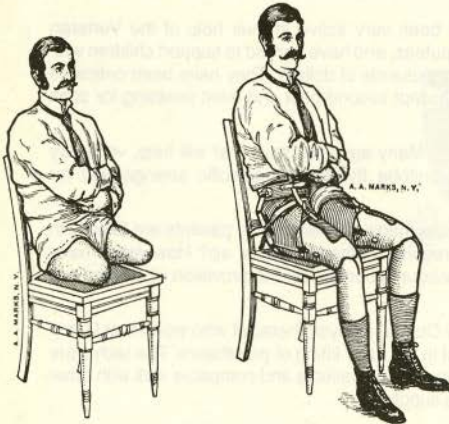
Prosthesis for Instep Amputation — This was made of aluminum and leather and took the weight partly on the shin.



Below Knee Artificial Limb — Note carefully constructed hinges and thigh corset. Hinges were tested to withstand stresses equivalent to a 200 lbs. man walking three miles for six years.

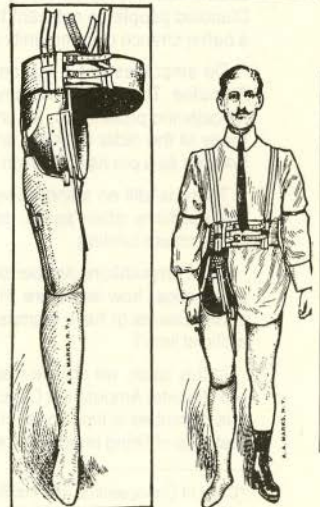


Thighless leg — Closely resembles patella tendon bearing prosthesis.



Double Leg Amputation — Railroad accident victim learns to control these legs without knee locks.

Hip Joint Disarticulation.



Amputation through the Ages

The loss of a limb is a devastating experience. Time, courage and determination are required to adjust to the new circumstances. David Doig discusses some of the personal aspects in today's society. In a primitive environment, the amputee is left to his own ingenuity and enthusiasm to become a beggar, limping or crawling around the world depending on the whims of the sympathy and charity of others.

Artificial limbs were probably began with simple contrivances such as peg legs, although Pliny describes an iron hand in the Second Punic War. Iron artificial limbs were fashioned by makers of armoury. Ambrose Parey was one of the first to give a detailed description of the various types of artificial limbs designed for the wounded soldier and an effective artificial leg was described by Verduin in 1696.¹

Surgical Techniques

The first successful above-knee amputation was recorded by William Clowes in 1588.² However, most mid thigh and above elbow amputations were fatal at that time. When Nelson had his arm amputated, a ligature was used to control the hemorrhage. A public holiday was declared in England when it successfully separated without complication.

Sepsis continued to plague the results of most amputations even though a good surgeon could amputate a limb in thirty seconds and complete the operation in three minutes. A few centres, however, appreciated cleanliness and in 1752, 99 amputations were recorded at the Edinburg Royal Infirmary with only eight deaths³ and when antiseptic surgery was discovered amputation became a reasonable procedure.

Modern Techniques

Modern techniques of amputation originated in the First Great War. Unfortunately, bulbous end bearing stumps like a Symes amputation and bulky stumps in which muscles were sutured at one end of the transected bone, were discouraged by limb fitters. Conical stumps were preferred and it was not until after the Second World War that amputation stump and prosthetic were again studied as a unit.

The New World seemed to have been well ahead in this concept of functional and adaptation. Thanks to the American Civil War and the Spanish American War, amputees were abundant on this continent one hundred years ago.

A remarkable book *Manual of Artificial Limbs* was published in 1907 by A. A. Marks in New York.⁴ The Marks factory was the largest artificial limb manufacturer in the world and was founded in 1853.

Marks System of Artificial Limbs

Artificial limbs were provided for almost any amputee from childhood to people of over eighty; for all types of traumatic and congenital amputations; and for severe deformities. Some of the principles included:

1. *Loss of a limb* is a serious personal deprivation but it is not irreputable.
2. Many thousands of amputees walk and mingle with other people without disclosing their loss.

3. Design of artificial limbs were based on sound principles according to the studies of Kinesiology.
4. All the prostheses were well built, relatively simple, individually fitted and based on good workmanship.
5. A standard cost (approximately \$100.00) included a follow-up service.

The Marks Artificial Limbs

Most limbs were manufactured of solid wood. The lower limb contained a rubber foot and a mattress sole and a solid ankle. For amputation of the foot and ankle region a part aluminum and leather prosthesis closely shaped to the lower limb allowed the amputee to walk comfortably. Below-knee amputees wore a thigh corset and knee hinge to relieve the strain on the stump. A thighless below-knee artificial leg was used for some patients anticipating the patella tendon bearing prosthesis by one hundred years. Marks warned that the danger of this thighless suspension system and advised that those with short stumps and with demanding occupations to use the thigh suspension system.

Artificial legs were supplied for hip disarticulation, above-knee amputees, and those with fixed flexion deformities of the knee. The greatest triumph was the successful fitting of a bilateral above-knee amputee. Over a hundred bilateral amputees were supplied satisfactorily.

Marks' Aphorisms

1. Arrangements and 'set' of foot are important factors which can only come from experience.
2. Ease and comfort depend entirely on how the socket receives the stump.
3. Fitting is an art. The only safe way is to get a block of wood, excavate it to its proper shape and size.
4. A plaster cast that fits the stump and a cast of the inside of a socket are no more alike than the last upon which a shoe is built.
5. Wooden sockets are best. The only way is to get strength is to ensure proper distribution of suitable material.
6. An artificial limb must be strong enough to sustain the wear and not break under sudden stress.
7. It is possible to localize the weight so that it will feel lighter than one weighing half as much.
8. The artificial limb should be durable.
9. The immediate fitting of an artificial leg allows the wearer to dispense with his crutches at an early moment, to gain freedom of his arms attend his vocation, and take healthy vigorous exercises. If a stump is permitted to go for six months without performing its share of work, it will become weak.
10. It is safe to say a limb can be fitted judiciously as soon as the wound is healed. The surgeon who has studied this subject in all his bearings unvariably agrees.

THE MARKS SYSTEM

Artificial Upper Limbs

These were robust and effective. A satisfactory suspension system controlled by the shoulder allowed the amputee

AMPUTEES IN ACTION 1907



Pictured Clockwise

Chaffeur (Essex Co., New Jersey) — "I have been a driver for two years and have been driving a Peerless motor car with good results"

Magician (Montreal) — "When I appear on stage my steps are elastic and never portray the fact that I wear an artificial leg"

Tailor (Nova Scotia) — "I had both my legs amputated 20 years ago and have been wearing artificial limbs with ankle joints with much dissatisfaction. After purchasing your artificial legs with rubber feet I have no trouble. I do all my cutting and go about the store without a cane."

Labourer — "My artificial leg is my best friend"

Policeman (New York) — "I have been obliged on several occasions to use violence in order to hold my man and instead of using a club I use my rubber hand. One man told me that he thought that he was hit with a cannon ball"

Soldier (Mexican Republic) — "Although I have lost one leg and part of the other foot I continue in the service of my country"



to manoeuvre his limb. A rubber hand was used with fingers which could be set. Alternatively, a variety of tools could be fitted in the wrist enabling the wearer to continue in a remarkably wide range of jobs.

Numerous illustrations are given to show the artificial limbs and the wearer using them. Many familiar with prostheses will notice how closely they resemble some of the similar devices used by veterans during the Second World War.

Modern Achievements

New materials such as fibreglass have enabled different methods of construction of artificial limbs. Better understanding of Kinesiology and the gait analysis have enabled engineers to design prostheses which more closely reproduce normal function.

In the lower limb the patella tendon bearing prosthesis⁵ with cuff suspension, designed originally at the University of California, has largely replaced the old conventional prosthesis with thigh corset suspension, which although functioning very well led to quadriceps atrophy.

A wide variety of below knee systems is now available. Most of them utilize some supracondylar technique. In this method the prosthesis extends above the knee and pressure is taken on the supracondylar region. Another variety has a supracondylar removable medial wedge made of flexible or even inflatable material.

The wedge is inserted above the limb after the limb has been donned. Suction socket systems, used in Germany with success in above-knee amputations, have also been tried in below-knee stumps. A rubber suspension system has been used successfully by Canadian Veterans for many years. The rubber ring has to be replaced at regular intervals.

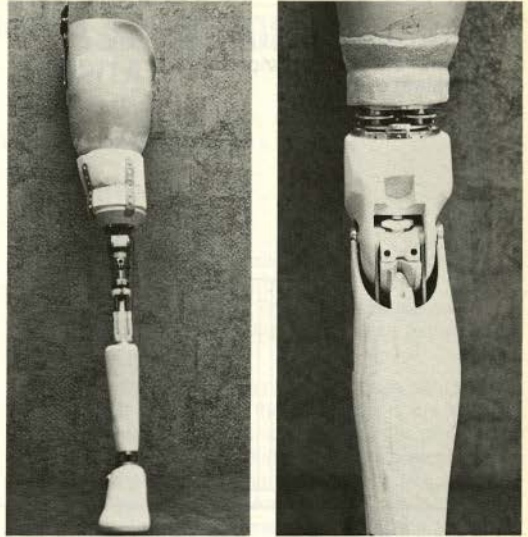
Modern Upper Limb Prosthetics

The thalidomide tragedy, during which thousands of phocomelics (seal like) congenital amputees were born, caused a great stir in the interest of upper limb prosthetics. Whilst most of the complicated engineering appliances have been abandoned, myoelectric prostheses are now practical but expensive. In the Centre for Crippled Children in Ontario a number of children have already been fitted and learn to use their limbs with skill. These prostheses are now being studied in the University of New Brunswick where Dr. Scott has pioneered in this field. It is anticipated that some suitable amputees may be fitted in Halifax. The cost is considerable and it is important to select a suitable candidate carefully.

Modular Systems

Prosthetics have now been rationalized by a number of different companies using a modular system. The Otto Bock Company unit is now available in Halifax.

Such a modular endo skeletal system comprises a central core of components, knee, ankle and foot pieces supporting the socket, and an outer cosmetic cover. A variety of components allow different types of prostheses to be provided. Each must be individually aligned, but the system is flexible enough to be able to accommodate the heavy muscular woodsman or the frail geriatric patient with vascular disease.



A. Otto Bock modular above knee prosthesis.
B. Otto Bock knee mechanism and alignment device.

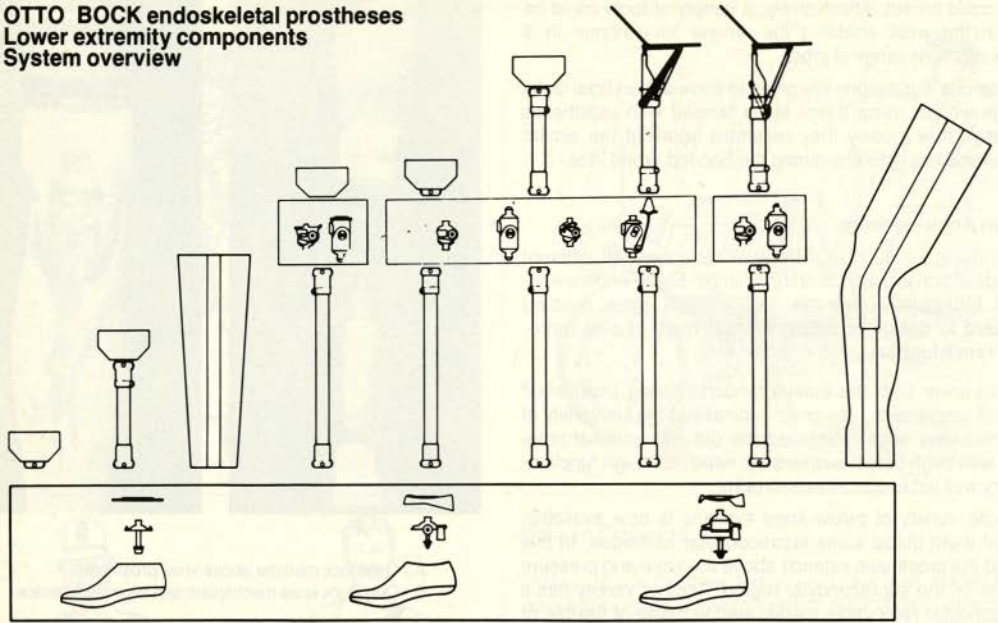


Mr. Jim Roy, President of War Amputations (N.S. Branch) who has been using his prosthesis for more than 30 years.

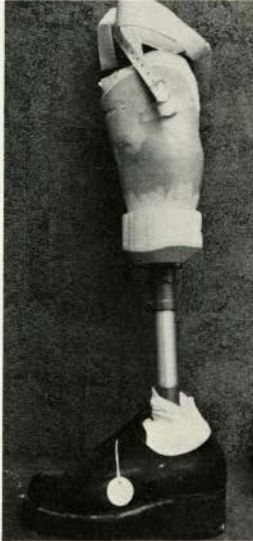
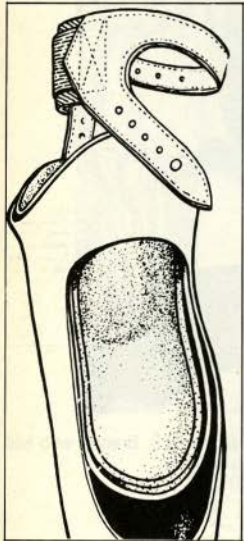
CONCLUSION

Tremendous satisfaction can be achieved by the fitting of a good artificial limb whatever the age of the patient. Shiers reported satisfactory results in the work of the Rehabilitation Centre and this amputation clinic is now based in the new Rehabilitation Hospital. Let us not forget the service provided for over thirty years to the War Veterans and continue to support the efforts to Prosthetists, Orthopaedic Surgeons, Vascular Surgeons, Physical Medicine Specialists and Physiotherapists where ever they work enthusiastically together.

OTTO BOCK endoskeletal prostheses
Lower extremity components
System overview



Otto Bock Modular System — Enables choice of components to suit individual needs. This skeleton is covered with a cosmetic cover.



Modern Counter Parts — Patella tendon bearing prostheses for below knee amputations. Note fibreglass socket, modular system and device.

Team work is essential and much remains to be done to be sure that every Amputee has the opportunity he deserves. Although it is over a hundred years since the excellent, well designed robust artificial limbs were available on this Continent. □

ACKNOWLEDGEMENTS

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Temporary Protheses Programme

CAMP HILL HOSPITAL

Nancy Doane, * Dip. Phys. Ther. (Dal.), B.P.T. (Alta), M.Sc. (Dal.),

Halifax, N.S.

INTRODUCTION

Amputation of a lower limb may be necessary for a number of reasons. Eighty percent of amputations are due to peripheral vascular disease.¹ Trauma, infection, cancer and congenital deformity may also lead to amputation.

The results of amputation affect physical and mental well being. The patient suffers pain, loss of mobility, decrease in muscle strength, possible decrease in joint range and altering of body image. These losses must be dealt with in the treatment of an amputee by the Physiotherapist.

Physiotherapy following amputation aims to improve functional ability by ambulating the patient with aids as soon as possible, increasing muscle strength, instructing the patient in prevention of joint contractures, aiding stump shrinkage and contouring. Early ambulation with a temporary prothesis is widely used as the method to achieve these aims.

TEMPORARY PLASTER PROTHESIS

The principles behind the use of temporary protheses at Camp Hill Hospital are both early ambulation and economic feasibility. The advantages of early ambulation are increased stump shrinkage, increased muscle control, decreased pain and phantom pain, increased psychological benefit, increased circulation from muscle contractions and maintenance of full range of remaining lower limb joints. The patient, when measured for a permanent prothesis, should have a well-shaped, matured stump.

The economic reasons for a temporary prothesis are related to the type of amputee commonly seen at Camp Hill Hospital, most of whom are over 55 years of age. These patients have undergone amputation for peripheral vascular disease and may have other complications of diabetes, cardiac or respiratory disease, and peripheral vascular disease of the remaining limb. As a result, these amputees will be questionable candidates for a permanent protheses, especially the more costly, harder to manage above-knee prothesis. Amputees are fitted with a temporary plaster prothesis, at no cost to them, when their incision is healed. They can then demonstrate their ability to ambulate to themselves and to the amputee clinic team. Patients unable to manage a temporary prothesis would not be recommended for fitting of a permanent prothesis.

It is also felt that early ambulation will decrease the total length of hospital time for the patient. Initially, the patient remains in hospital until he can use his prothesis with two crutches (approximately 2-4 weeks). The patient will usually not need to be readmitted for further fitting or an extended exercise programme. Any socket changes necessary can be

made on an out-patient basis. The patient returns to be measured for his permanent prothesis when the stump is well contoured and shrunk. This eliminates the need for a second permanent socket after the amputee has worn the prothesis for a few weeks.

The above-knee temporary plaster prothesis uses the Otto Boch modular system, and the advantage is the ability to interchange parts without dismantling the entire prothesis. It consists of a prosthetic foot, knee joint and pylons (pipe) with two adaptors placed between the prosthetic foot and knee joint, and knee joint and basket for socket attachment. The adapters allow some adjustment when fitting the prothesis to the patient.

The above-knee socket is fabricated by placing a stockinette sock over the stump with a quadrilateral brim over the sock. Plaster is molded to the stump and lower two-thirds of the brim. (Figure 1). This is allowed to dry for a few minutes and removed from the patient. The socket is aligned on the modular set-up and web straps with buckles are incorporated into the anterior and posterior walls. The prothesis is allowed to dry, fitted to the patient and alignment adjusted as necessary with the patient standing and walking in the parallel bars. Correct leg length is attained by changing to a shorter or longer pylon. Figure 2 shows an above knee amputee wearing his prothesis.



FIGURE 1

Above Knee Plaster Socket.

Gait training is started in the parallel bars. The patient is discharged from hospital when he has progressed to walking properly with two crutches. A new socket is fabricated when

*Student Co-ordinator, School of Physiotherapy, Dalhousie University, Halifax, N.S.

the patient requires three wool stump socks. This new socket is aligned to the same modular prosthesis and the old socket is discarded.



FIGURE 2

Above Knee Amputee with Temporary Prosthesis.

The below-knee temporary prosthesis is fabricated to the criteria for patella tendon bearing sockets outlined by Foort.² Stockinette is placed over the stump, and relief pads placed on the stockinette to protect the anterior border of the tibia, the head of the fibula and the healed incision. Plastizote is molded over the stump and relief pads, applying pressure to form a bar over the patella tendon (Figure 3). The plastizote is then wrapped in plaster, the plaster allowed to set and the socket removed from the patient's stump. The socket is aligned on the Otto Boch modular set-up using the basket to hold the socket, a prosthetic foot and a pylon with 2 adapters to connect the basket and foot. (Figure 4) Plaster of Paris maintains the alignments of the socket in the basket. Web straps with buckles are incorporated into the upper part of the medial and lateral walls.

The plaster is allowed to dry for 48 hours. Cast cutters are used to remove the posterior aspect of the prosthesis to the level of the patella tendon bar, enabling the patient to sit with a flexed knee. The prosthesis is fitted to the patient, cuff suspension attached above the knee and to the buckles, and the alignment adjusted as necessary with the patient standing and walking in the parallel bars. Correct length is again attained by altering the pylon length. Figure 5 shows a below knee amputee with a temporary prosthesis.



FIGURE 3

Fabrication of Temporary Below Knee Socket.

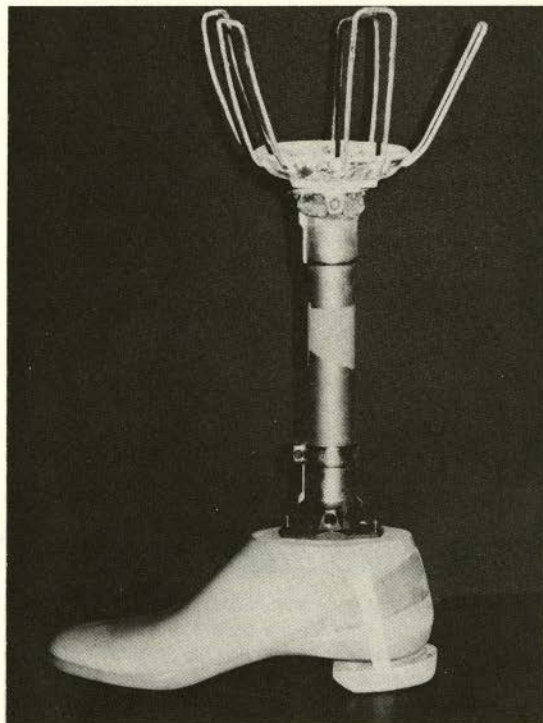


FIGURE 4

Otto Boch Modular Set Up for Below Knee Prosthesis.



FIGURE 5

Below Knee Amputee with Temporary Prosthesis.

OTHER METHODS OF STUMP SHRINKAGE

Temporary prostheses are considered as one method of shaping and shrinking the stump. Other methods are used in addition to or in place of the temporary prosthesis. Plaster can be applied to the stump at the time of surgery, following the same principles as the temporary prosthesis. A pylon with foot may be attached allowing ambulation to begin on the first day post-operatively. Another method now is to attach the pylon at the time of the first cast change (approximately 3 weeks) and begin ambulation then. This last method is favored for the peripheral vascular disease patient.³

Air splints, consisting of a double layer plastic bag with air blown in between the layers, can also be applied at the time of surgery. A progression of the air splint, the Controlled Environment Treatment (CET) or Sterishield Unit, is available at Camp Hill Hospital (Figure 6). A plastic bag, with a pleated superior end, is connected by a hose at the inferior end to a machine. Air controlled for temperature, sterility, humidity and pressure is circulated through the bag and out the pleated end. The amputated limb is placed in this clear bag without a dressing and the bag left connected to the machine for 7-10 days at specified high and low pressures for specified times.

The incision healing can be accurately assessed and the stump can be palpated using the CET unit. Exercises for a below knee amputee and walking short distances with a walker are also possible. The position of the bag is maintained by a shoulder harness. Ideally, the stump would heal in ten days the stitches removed, and the patient walking with a temporary prosthesis and aids two weeks following surgery.

The most common method of post-operative dressing, however, is still the soft tissue dressing followed by contouring with an elastic bandage after the incision is healed and stitches removed.

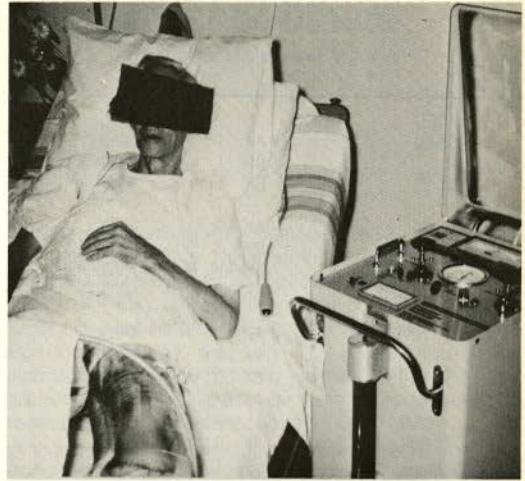


FIGURE 6

Controlled Environment Treatment Unit.

TEMPORARY PROSTHESIS PROGRAMME

The temporary plaster prostheses programme was initiated at Camp Hill Hospital in August 1975. By November 1, 1979, 107 below-knee and above-knee amputations were performed on 76 patients. Forty-six of these patients were not placed on the programme due to poor motivation or prior physical or mental health. Twelve of these patients were bilateral amputees.

Amputees from other hospitals were also admitted to Camp Hill Hospital for prosthetic care. The total number of amputees placed on the programme between August 1975 and November 1, 1979 is shown in Table I.

TABLE I

Number of Patients and Amputation

Number of patients fitted with temporary prosthesis				43
Amputations	AK	25		
	BK	26		
Recommended for permanent prosthesis				
	AK	11	AK/AK	2
	BK	9	BK/BK	3
			AK/BK	1
On temporary prosthesis programme now				
	AK	4	AK/AK	—
	BK	5	BK/BK	—
			AK/BK	1

All of our amputee population except two lost their limbs due to peripheral vascular disease. Table II shows the breakdown of age and reason for amputation.

Three above-knee amputees and four below-knee amputees who were not able to wear their permanent limb were fitted. These four below-knee amputees had been wearing below-knee prostheses with side bars and corset suspension and were fitted with temporary patella tendon bearing prostheses to see if they could adapt to a different concept.

TABLE II
Age and Amputation Distribution

AGE		
30-40	AK 1	cancer
	BK 1	frostbite
41-50	BK 1	PVD*
51-60	AK 9	PVD
	BK 3	PVD
	AK/AK 2	PVD
	AK/BK 2	PVD
61-70	AK 7	PVD
	BK 6	PVD
	BK/BK 1	PVD
	AK/BK 1	PVD
71-80	AK 0	V
	BK 4	PVD
81-90	AK 1	PVD
	BK 2	PVD
	BK/BK 2	PVD

*Peripheral Vascular Disease

Three of the above-knee amputees on the programme did not receive a permanent prosthesis. One patient died due to trauma, one required amputation of his other leg and the third decided against the prosthesis. One bilateral above-knee/below-knee and one below-knee amputee died while on the programme. One below-knee amputee with a 20° knee flex contraction decided not to continue treatment. Poor incision healing prevented one below knee amputee from starting on the programme at this time.

The time from amputation to fitting of the temporary prosthesis varied. Two above-knee amputees and one below-knee amputee were fitted with an immediate post-operative plaster dressing and started gait training a few days after surgery. Seven of the twelve above-knee amputees from Camp Hill were fitted within three weeks following surgery. One other was fitted four weeks post-operative. Only one below-knee amputee healed without the complication of delayed healing and could be fitted three

weeks post-operatively. Twelve of the below-knee amputees including two bilateral amputees had surgery at Camp Hill. These patients were fitted between four and eight weeks post-operatively except for one at 6 months.

The times from recommendation of a permanent prosthesis to receiving this prosthesis are not available.

CONCLUSION

In conclusion, there are no data to support the hypothesis that the use of temporary plaster prostheses decreased the amount of time the patient is in hospital. The advantages of any temporary prosthesis are the early fitting when the incision is healed and the patient has a limb to use until the permanent prosthesis is completed. □

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Impact of Amputation on Self and Others

David Doig,* M.A.,

Halifax, N.S.

DISABILITY AND DISABLEMENT

Across the spectrum of disability, amputation is not regarded as major a disruption of functioning as is paraplegia and other conditions involving the central nervous system. However, it can be argued that severe cases of amputation, such as bilateral hip disarticulation and quadrilateral amputation, shade well into the area occupied by severe disorders of the central nervous system, with loss of sight at the far extreme of the spectrum. Many feel it is useless and morbid to speculate about the comparative severity of disabilities. For the purposes of this article, however, the foregoing serves only to introduce the point that within limits there may be very little, if any, association between the degree of objective severity of disability and the subjective impact felt by the individual.

There is no convincing evidence at present to suggest that either type or degree of disability constitute sufficient cause for maladjustment, whether temporary or permanent. Individual differences and reactions seem to be of prime importance. The more significant personality determinants are:

1. Self-definition

A person develops an image of an ideal self, the self he would like to be or ought to be. Different persons have different ideal selves, depending on the importance they attach to various attributes. Subjective personal worth depends on the extent to which the individual feels he meets the standards of his ideal self. Other things being equal, the impact of an amputation will vary according to the degree to which the loss is seen as preventing him from being or doing what he values highly. People, for example, differ in the importance they attach to their own physique or to athletic skills. The individual also tends to assume that what is valued by him is valued by others, which further compounds the downgrading effect that an amputation can have on the self. Resolution of the impact of amputation usually requires reappraisal and possible revision of the person's value system, and the more the affected person can learn about the value systems of others, the more realistic his own solution will be. In fact, there is some responsibility on the part of the amputee's friends and associates to rethink their own value systems so as to be in a better position to give the amputee the kind of information and support he needs to have.

2. Abilities and Interests

The loss of a limb can certainly make a difference in many cases to the person's capacity to carry on his chosen occupation. This is one of the very first concerns that crosses the mind of the new amputee, especially if he has lost an arm and his training currently confines him to the unskilled or skilled labor market. Depending on age, aptitudes, and

training opportunities, the amputee usually has enough adaptability to change. However, in low density population areas, the range and number of jobs are limited. A successful job transfer may require the amputee to move out of his locality or even his province, and this may be seen as too high a price to pay, especially if he is well-rooted in the community. There are no ready answers for this and other dilemmas that the amputee can face as he attempts to re-establish himself. Although the work ethic may be changing, people still assign high value to having satisfying work, relating as it does to achievement, usefulness, and ultimately to self-esteem. In especially trying circumstances, the amputee may be tempted to de-emphasize this value (as do many non-amputees) and to accept a more comfortable situation that gives temporary relief but which ultimately endangers his personal growth and happiness.

Similarly, the range of his or her recreational interests may have to be narrowed or shifted, depending on the pre-amputation emphasis on physical recreation, and on the type and severity of the amputation. The arm amputee may still play tennis but is at a disadvantage in golf compared with the leg amputee. For sailing, one might need two hands but not two feet. Each sport has specific problems for the disabled.

The older amputee may be content to lower his standards of achievement and enjoy participation in an activity "for the fun of it", especially when he is not so likely to be involved in team sports. The younger amputee, especially of teen-age and under, may find it harder to accept this approach because there is greater social pressure to conform to normal standards of skill. There is little place in team sports for the person who doesn't have adequate speed and agility. The young amputee may not want to take a chance on exposing himself to the possible indictment of his peers even when team play is not involved. There is then a greater likelihood of reduced participation, and in the extreme, complete withdrawal. Depending on the extent that this happens, there is resulting frustration and the beginnings of isolation and rejection. Since physical and social recreation merge into one another, and involve many of the same persons, there is also the danger that the sensitivities of the amputee and the attitudes of his peers will be transferred to his social life, aggravating what problems may already exist in this area.

3. Personality Characteristics

Certain specific personality characteristics probably have a bearing on the person's response to amputation. To lead a normal life, the amputee must do for himself the same basic things he did before, even though they may now be more difficult and time-consuming. The *dependent* person will find it harder to resist the temptation to let others help him too much, and therefore may never learn to fend for himself. *Self-reliance* is the opposite side of the coin, and is something to be cultivated — up to a point. The danger here is in over-compensating so much that acceptance of help in

*Psychologist, Camp Hill Hospital, Halifax, N.S.

any form is considered a sign of weakness. It is probably a sign of weakness not to be able to accept help at the right time. It could save a lot of trouble, and make some things possible that could not be managed alone.

The *secure* person has an advantage in assimilating the impact of amputation, because by definition he has more trust in himself, and by implication he has more trust in others. Amputation of necessity requires fairly extensive changes in life style and possibly objectives. This will pose a greater challenge to the *rigid* person, who at this point in time has yet to learn to think in terms of options and contingencies. Sex has implications for personality because physique should be considerably higher in the value hierarchy of women than men. Other things being equal, amputation should have greater impact on females.

To over-simplify a complex set of relationships of *age* to other variables, it is submitted that amputation matters much less when it happens in the latter half of life, and that in the earlier half the impact peaks in the age range 10 -15; that is, the time when the shift begins from childhood to maturity, when the child is relatively unstable and in turmoil, and when more vulnerable to peer pressures and social approval than at any other time in life.

EFFECT OF THE NON-DISABLED ON THE ATTITUDE OF THE AMPUTEE

Although the attitudes and values held by the amputee are the prime determinants of the quality of response made, the behaviour of non-disabled persons will have considerable influence in strengthening or modifying these attitudes. At some time following amputation, the amputee cannot help but wonder whether his disability will make him so "different" that he will be marked as "odd man out". There can be discrepancies between the imagined and the real on both sides, for this is probably something new and strange in the lives of all concerned.

Although the amputee does not necessarily have an accurate view, he may be convinced that he is the only one who knows what it is like and feel that it is the non-amputee who has to change. A period of tension, misunderstanding, and trial and error may ensue, from which the significant people emerge with a more realistic appraisal of the disability, and more genuine acceptance of it.

The extent to which such conflict is glossed over affects the extent of the resolution and adaptation of the amputee. Both sides have some responsibility in this matter and, ideally, it should be a shared experience of a joint problem. During this period, certain problem themes emerge between the amputee and society and repeat themselves, and dealing with them is essential to successful adaptation to the disability.

1. Over-estimate of the Limitations Imposed by the Amputation

The amputee may shy away from participating in an activity because he thinks it is physically beyond him. Alternately, he might like to try, but be concerned about the inconvenience to which the non-amputees are supposedly put. The non-amputee may not want to embarrass the amputee, or he could feel the amputee to be a burden in this particular situation. The non-amputee may underestimate the motivation of the amputee and the length to which he might

be willing to go in order to participate, e.g. modifying his role so that he umpires, or just watches. Slight changes of plans can often make participation easier without major inconvenience. It is reasonable for the non-amputees to ask the amputee to participate, and then leave it to the judgement of the amputee. The danger of hurting his feelings if participation turns out to be impossible will be less than if he were not asked at all (one assumes that the participants will have enough sense not to joke about the amputee's difficulties).

2. Over-estimate of Disfigurement

There can be a discrepancy of belief (by both amputee and non-amputees) as to how "unsightly" is the amputation, usually in the direction of overestimation. This can result in hesitation in inviting participation or in accepting the invitation. Such reactions are more anticipatory than real, and will be lessened by exposure and familiarity. Limiting social contact because of the expectation of aversion stops the learning process which the amputee calls "getting used to" the disability, and unnecessarily isolates him.

3. Apparent versus Genuine Acceptance

The amputee can be given access to normal social life and still feel rejected. The anxiety of some disabled persons causes them to ascribe unfavorable motives to others when they do not exist. Some non-amputees feel a sense of superiority over amputees and cannot accept them as equals. Others, with misplaced sympathy, attribute to the disability more loss and suffering than is really the case and, as is more obviously true of the dying, are uncomfortable in the presence of one who they feel cannot live properly any more, and prefer to avoid him. Both types are "nice" to the amputee out of a sense of duty, but their real feelings will not go unnoticed for long. Such persons are of course very much in the minority, but in the uncertain state of mind of the amputee, the minority may well be magnified into the majority.

CONCLUSION

Challenge and struggle are part of living. These are essential for growth because without challenges there are no inducements to change. Some challenges turn out to be too easy; others too hard; others "just right," and optimum growth accrues from the experience of surmounting them. We cannot always choose our challenges. Even if we could, we might not pick the ones that would do us the most good.

Major amputations is one of the more formidable challenges, and most amputees would surely wish that fate had provided some other kind of growth opportunity. It is hoped that, if many will never come to say they were glad it happened, they will be satisfied that their personal gains ultimately, outweighed their physical losses. * □

NOTE:

This paper emphasizes the importance of understanding individual problems of each amputee and the impact that the attitude of society plays on his or her ability to solve them.

Ed.

Changing Patterns of Orthopaedic Infections

A COMMENT

Brock Vair,* M.D., and William D. Stanish,** M.D., F.R.C.S. (C), F.A.C.S.,

Halifax, N.S.

In 1884 Alexandre Rodet, a French surgeon, presented the first documented experimental model of hematogenous osteomyelitis.⁴ By intravenous injection of a "yellow-orange micrococcus" he was able to reproduce the characteristic clinical and pathological features of localized infection in bone. Since that time the spectrum of bone and joint infection has undergone considerable variation in clinical presentation, site of localization and causative organisms. In addition, advances in medical and surgical therapy have introduced an entirely different population as host for infection.

The classic model of infection in bone, acute hematogenous osteomyelitis, accounts for approximately 20% of all cases and is in most instances, a disease of the pediatric age group. *Staphylococcus aureus* has been the most frequent infecting agent usually reaching the metaphysis of long bones during an episode of bacteremia. However, a focus of primary infection can be found in less than half of the patients, with the usual site of origin being a soft tissue infection or surgical wound. The clinical pattern of high fever and systemic toxicity precedes the radiographic features of structural lysis and reactive bone formation by several days. Prior to the use of systemic antibiotics, such as a process was accompanied by a mortality rate of between 15 and 25%.⁵

As the following case presentations illustrate, hematogenous osteomyelitis in 1979 is a changed disease. Unusual clinical features, etiological agents and anatomical localization have become increasingly common; refined diagnostic techniques together with improved medical and surgical therapy have greatly altered the prognosis.

INFECTIONS IN THE UNCOMPROMISED HOST

Case 1

G. S., a 24 year old male, was seen in the Emergency Department complaining of pain in the left elbow of sudden onset. He was assessed as having sustained a soft tissue injury and was treated conservatively. Over the following two days his pain worsened with associated fever and localized swelling prompting his admission to hospital. He had experienced similar symptoms five months previously following an injection for desensitization.

Physical examination revealed a well nourished male in some distress. His temperature was 38.5° orally. Systemic examination was unremarkable and there was no lymphadenopathy. The volar surface of the upper left forearm was warm, swollen and tender with pain on movement. Investigations on admission were normal apart from an ESR of 83 mm/hr and X-ray of the left forearm disclosed soft issue swelling with no bony abnormality.

*Resident, General Surgery, Dalhousie University, Halifax, N.S.

**Orthopaedic Surgeon, Assistant Professor, Dalhousie University.

He was managed initially as a streptococcal cellulitis and following needle aspiration of the involved area he was started on Penicillin G, 1 million units IV q4h. The aspiration revealed 100 WBC/mm³ but no organisms were visualized and culture was negative, as were blood cultures.

Despite intravenous Penicillin his symptoms worsened to the extent that fasciotomy was considered for increasing soft tissue swelling. His antibiotics were changed to Cloxacillin 1.5 gm IV q4h with dramatic improvement and he was discharged following a ten day course of therapy. Repeat X-ray examination prior to his discharge again demonstrated no bony abnormality.

When reassessed ten days following his discharge he was well, apart from local weakness. However, one week later he again noted increasingly severe pain as well as an enlarging mass in the left forearm. Radiologic examination demonstrated extensive lytic destruction of the left radius compatible with infection or Ewing's sarcoma.

On readmission to hospital he was afebrile and physical examination was again normal apart from a tender 6 cm mass overlying the extensor surface of the left radius. Laboratory investigations were also within normal limits apart from a mildly elevated alkaline phosphatase.

Open biopsy was elected and, at surgery, he was found to have extensive degeneration of the outer bony sleeve of the radius with extensive sequestrum formation. Multiple samples for culture and histology were taken and decompression yielded no pus. Following confirmation of *Staphylococcus aureus* osteomyelitis he was given a six week course of Cloxacillin 2 gm IV q4h with gradual improvement in his radiologic and clinical profile.

Case 2

B. K., a 57 year old male, was well until two months prior to admission when he experienced a three week episode of "flu like" symptoms, including fever and myalgia with a 20 pound weight loss. This was followed by increasing pain of a stabbing nature, radiating from the left shoulder to the neck and anterior chest, associated with weakness of the proximal muscles of the arm. One month prior to his admission he noted a firm, non-tender mass overlying the left sternoclavicular joint which on excisional biopsy was found to be an area of chronic suppurative inflammation within bone containing gram positive cocci. More definitive curettage later was productive of a mixed culture of *Staphylococcus aureus* and Beta hemolytic streptococci.

He was admitted to hospital for definitive therapy at which time examination disclosed no evidence of systemic disease. A decreased range of motion was evident at the left shoulder joint with weakness of the biceps and triceps muscles. Reflexes and sensory examination were normal.

During a six week course of high dose intravenous Cloxacillin, he improved clinically and remained afebrile. In light of the bizarre presentation of his osteomyelitis, laboratory evaluation of immunoglobulins and neutrophil functions were obtained but these were within normal limits.

Case 3

C. M., a 68 year old farmer, was admitted to his local hospital complaining of pain in both hips accompanied by fever. Examination revealed generalized muscle wasting and marked limitation of hip movement because of pain. After blood culture disclosed an *Escherichia coli* bacteremia he was given a one week course of high dose intravenous Keflin followed by oral Ampicillin. A second blood culture during therapy was given again positive for *E. coli*. Urine culture and IVP were negative, however, cystoscopy demonstrated meatal stenosis and evidence of prostatitis.

Despite a return of his temperature to normal the pain in his hips worsened to the extent that he was unable to walk. On admission to hospital in Halifax he was found to have an ESR of 110 mm/hr with a normal leukocyte count. A gallium scan demonstrated possible osteomyelitis at the thoracolumbar junction and a TC scan revealed increased uptake at L1/L2 compatible with discitis. Tomograms of the lumbar spine disclosed destruction of the disc spaces of L3 and L2. High strength PPD challenge was negative and all cultures were non-productive.

With a presumptive diagnosis of hematogenous gram negative osteomyelitis and discitis, he was started on high dose intravenous Ampicillin with a dramatic improvement in his systems. By the 5th week of therapy his ESR had fallen, a gallium scan was normal and a TC scan revealed minimal uptake in the lumbar region. He was discharged ambulant to his home after six weeks of therapy.

DISCUSSION

A number of interesting features are illustrated by the above case descriptions. In contrast to the observed decrease in prevalence of hematogenous osteomyelitis, the age distribution of affected individuals appears to be changing, reaching the adult population with increasing frequency.¹ In this age group, the most common site of localization is the vertebral column rather than the long bone region as is characteristic of pediatric infections. The explanation for this predilection is unknown but spread from a primary infective focus in the pelvis or urinary tract via the vertebral venous plexus as described by Batson may be contributory. Transport of bacteria to the vertebral body via the spinal artery may occur as well.

Possibly as a result of improved antibiotic therapy of wound and soft tissue infections, the prevalence of *Staphylococcus aureus* as a causative organism has decreased considerably. In contrast, localization in bone by gram negative organisms appears to be increasing.^{1,3} Causative factors include diagnostic endoscopic instrumentation of the gastrointestinal and urinary tracts, procedures commonly provocative of transient gram negative bacteremia. Also contributory is colonization by enteric organisms of wounds, made susceptible to opportunistic infections following broad spectrum antibiotic therapy.

The clinical pattern of hematogenous osteomyelitis appears to be changing as well and the prodromal features of high

fever and systemic toxicity have been replaced by a more subacute form of the disease.² The delay in presentation of radiologic features is well known, but current use of radioisotope scanning has facilitated earlier and more accurate diagnosis of a disease which is often elusive because of bizarre clinical presentation.

Current mortality rates of less than 2%, accompanied by a similar reduction in long term sequelae, reflect notable improvements in medical and surgical therapy. The early institution of appropriate high dose parenteral antibiotics, which must be continued for a period of at least four to six weeks, is critical. This must be accompanied by surgical drainage and biopsy when indicated as typical presentations have become less common.

INFECTIONS IN THE COMPROMISED HOST

The current era has seen innumerable advances in the therapy of chronic diseases including diabetes and disseminated malignancy. Immunodeficiency syndromes, universally fatal in the past, have now been partially conquered. With improvements in long term survival in these conditions, there has emerged an entirely new population of compromised individuals susceptible to infections of all types including musculoskeletal tissue.

Case 4

L. A., a 28 year old male, was diagnosed as having hypogammaglobulinemia at age 20. Having sustained recurrent infections including pneumonia, meningitis and osteomyelitis. Since the time of diagnosis he had been receiving supplemental injections of gammaglobulin.

He presented at the Emergency Room with sudden severe pain in the right hip with a fever of 38.6° orally. Examination disclosed marked tenderness on rotation of the hip with adductor spasm. Aspiration of the joint yielded 6 ml of purulent fluid which was sterile on culture, containing only pus cells microscopically. An ESR was 8 mm/hr with a leukocyte count of 18,500. X-ray of the hip was normal. Total globulins were reduced and immunoelectrophoresis disclosed severe hypogammaglobulinemia.

With a presumptive diagnosis of bacterial septic arthritis and following appropriate cultures, he was started on high dose intravenous Penicillin G and Chloramphenicol. Orthopaedic consultation was obtained and he was taken to the operating room where, following arthrotomy, purulent material was obtained and sent for culture. Closed suction irrigation with Cloxacillin, Bacitracin and Alevaire was instituted post-operatively.

After specimens from the joint aspirate and the blood were found to be positive for *Hemophilus influenzae*, a 10 day course of high dose intravenous Cephalothin was begun. His fever and symptoms gradually improved and joint irrigation was discontinued. He was progressively ambulated and discharged on the 23rd hospital day after receiving further gammaglobulin supplementation.

Case 5

R. S., a 47 year old male, had stepped on a tack with his right foot one week prior to presenting to the Emergency Department complaining of increasing swelling and redness of the foot with blackening of the 2nd and 3rd toes. He had been previously well despite a family history of diabetes.

Examination revealed the right foot to be grossly swollen with redness extending into the calf. A puncture wound was evident on the sole of his foot surrounded by purulent exudate and the 2nd and 3rd digits were blackened. Pedal pulses were normal however, sensation to pin prick was diminished over the distal portion of the lower extremities. Apart from funduscopic evidence of retinopathy, the remainder of the examination was normal. Laboratory investigations disclosed a random blood glucose of 438 mg% with a leukocyte count of 18,100/ml³. Urinalysis revealed 4+ glycosuria and ketonuria.

Shortly following admission he was taken to the operating room where incision and drainage was carried out and he was started on high dose Penicillin G and Cloxacillin intravenously. Specimens for culture grew colonies of Beta hemolytic *Streptococcus* and *Staphylococcus pyogenes*. He did well initially on this antibiotic regime, however, because of an allergic response, therapy was changed to intravenous Erythromycin. His diabetes was satisfactorily controlled with diet and insulin.

In view of his favourable response, it was elected to attempt conservative amputation and 12 days following his admission, he was returned to the operating room where ray amputation of the 2nd and 3rd digits was carried out. The pathology report on the operative specimen disclosed diabetic gangrene with extensive infection involving soft tissue and bone.

Following surgery his infectious process continued to improve. The antibiotics were discontinued and soft tissue defects were closed with split thickness skin grafts. When reviewed in the out-patient clinic following his discharge, the foot had healed well without residual infection.

DISCUSSION

The increased susceptibility of the diabetic to soft tissue infection has been well documented.¹¹ Impairment of delivery of antimicrobial agents, as well as the protective cellular and humoral elements of acute inflammation, exist because of microangiopathic vascular insufficiency, preventing the early localization of infection. Hyperglycemia provides an enhanced culture medium for bacteria and ketoacidosis possibly inhibits the phagocytic activities of neutrophils.¹⁰ In addition, diabetic nephropathy, commonly associated with urinary tract infection, predisposes the individual to gram negative bacteremia and subsequent localization in bone. These factors, together with a diminished protective pain reflex secondary to peripheral neuropathy, make the soft tissue of the diabetic a susceptible focus of infection which may secondarily spread to bone and joints.

The introduction of new chemotherapeutic agents, together with improvements in cancer surgery and radiotherapy, has been followed by prolonged survival in individuals with terminal disease. The unavoidable side effects of these therapies have been accompanied by a significant incidence of infection.

Impairment in immunological defences of both the humoral and cell mediated varieties has been documented most commonly in the hematological malignancies including multiple myeloma, Hodgkin's lymphoma and the leukemias. Cytotoxic and immunosuppressive chemotherapy is accompanied by reductions in absolute lymphocyte and neutrophil counts and also may possibly impair their function.

Therapeutic irradiation has been found to impair secondarily both immunoglobulin production and a cellular immune mechanisms as well as neutrophil production.⁹ Finally, the accompanying protein deficiency characteristic of the malnourished terminal cancer patient is reflected in compromised opsonin and antibody function.

A new portal of entry for infectious agents has been provided with the insertion of catheters into the central veins for the purpose of intensive monitoring as well as intravenous hyperalimentation. Also, easy access for pathogens follows the loss of protective barriers in the urinary and gastrointestinal tracts secondary to tumor necrosis and ulceration.

The list of compromised patients who are potential hosts for musculoskeletal infections is endless. The aged, infants with congenital immunodeficiency syndromes, the alcoholic and patients following surgical or thermal trauma⁹ comprise a unique population in whom early diagnosis and adequate therapy may now be followed by minimal morbidity and mortality.

SUMMARY

The changing features of hematogenous osteomyelitis, as exemplified by patient presentations in 1978-79, have been discussed with stress on improved prognosis followed by earlier more effective treatment. In addition, the potential of the compromised individual as a host for bone and soft tissue infections is presented, with emphasis on a satisfactory prognosis with effective therapy. □

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How the General Practitioner can Determine the Need for Ophthalmologic Referral*

Henry S. Campbell,** M.D.,
Martinsville, Virginia

When should a patient be referred to an ophthalmologist? Are eye drops and sophisticated instruments needed to make the referral decision? These questions are crucial to the proper care of eye problems, whether the patient presents initially to a physician or to a non-medical practitioner.

This study delineates the ways in which the possibility of visual system disease can be recognized in non-ophthalmologic office practice.

METHOD

The author, an ophthalmologist practicing in a semi-rural area of Virginia, documented 1,000 consecutive office patient visits from October 9, 1978, through December 14, 1978. Each of these visits was classified into one of three groups: no disease, new disease, and old disease. No disease meant that the patient had no significant complaints, may or may not have required glasses for normal visual acuity and had no findings of a significant medical problem. New disease meant that the patient gave a history suggesting significant visual system disease and/or was found to have significant visual system disease; new disease patients had not been seen or treated previously for this problem by the examiner or by his partner ophthalmologist. Old disease patients had a significant visual system disease which had been seen and/or treated previously by the examiner and/or by his partner ophthalmologist. Patients with concomitant old and new disease problems were classified according to the new problem. Patients with more than one old disease problem were classified according to the more serious problem.

All patient examinations included history, visual acuity, external examination, slit lamp biomicroscope examination and a view of the fundus oculi through undilated pupils. Tonometry was done in all adult patients without infection. A dilated fundus examination was done in all patients scheduled for a routine examination plus those patients where history and/or other examination indicated the need. Visual field examinations were done where indicated.

RESULTS

In a mature ophthalmologic practice, one expects to see relatively few patients without disease. Indeed, the examiner in this study saw only 284 patients (28.4%) without disease and 716 (71.6%) with disease. In the diseased group, 491 (65.6%) were already under observation or treatment.

Table I lists the means by which disease was suspected. Notice the heavy preponderance of history, visual acuity, and

external examination by hand-held flashlight as the initial clues to disease. These three are, of course, different facets of the same stone and could well be combined, i.e., if a patient states that he does not see well, and if his visual acuity is indeed decreased, then the patient's history is confirmed. In 610 (85.2%) of the 716 patients with disease, this triad indicated visual system disease. Refracting four high myopes or noticing thick spectacle lenses would have indicated the need for careful indirect ophthalmoscopy for peripheral retinal abnormalities.

TABLE I
Examining Elements That Indicated Ophthalmologic Disease in 716 Patients

History	255	(35.6%)
Visual Acuity	198	(27.7%)
External Examination by Hand-Held Flashlight	157	(21.9%)
Refraction	4	(.6%)
Tonometry	69	(9.6%)
Slit Lamp	23	(3.2%)
Undilated Fundus	9	(1.3%)
Dilated Fundus	1	(.1%)
	716	100%

The majority of patients with new disease presented with acute processes, such as infection, iridocyclitis, foreign bodies and the like; here history, visual acuity and external examination by hand-held flashlight again gave the clue. Those patients with old disease had chronic disorders such as cataracts and glaucoma; for these, tonometry and slit lamp examination added meaningful information. The 69 patients found to have glaucoma could have been suspected of the disease by using Schiottz tonometry or non-contact "air puff" tonometry. The nine patients found to have optic atrophy, glaucomatous cupping, diabetic retinopathy, and macular degeneration were suspected by viewing the fundus oculi through the undilated pupil.

Slit lamp biomicroscopic examination gave the clue in 23 of the 716 patients with disease, mainly for diseases of the cornea, silent iridocyclitis, and potential narrow-angle glaucoma. Two new and seven old patients with potential narrow-angle glaucoma were seen. Dilating the pupils of these nine patients could have precipitated disastrous attacks of acute narrow-angle glaucoma, and mydriatic eye drops were distinctly contraindicated.

An asymptomatic superior retinal hole was found in one patient because the history of retinal detachment in the other eye made an extraordinary diligent search of the retina mandatory. Without this history and with only a routine examination of the retina, the hole would have been missed by the examiner.

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**Address correspondence to Dr. Campbell, PO Drawer 3151, Martinsville VA 24112.

Only one patient had a significant abnormality which was not suspected prior to dilating the pupil. Although her benign choroidal nevus was known to her from an examination about one year prior, she did not reveal this to the examiner initially.

Table II sums up how disease was suspected in the 716 patients found to have visual system problems.

TABLE II

How the Non-Ophthalmologic Practitioner Could Have Determined the Need for Ophthalmologic Referral in 716 Patients.

History, visual acuity, external examination (the basic medical triad)	610/716	(85.2%)
History, visual acuity, external examination, undilated fundus	619/716	(86.5%)
History, visual acuity, external examination, undilated fundus, tonometry	688/716	(96.1%)
History, visual acuity, external examination, undilated fundus, tonometry, noticing thick spectacle lenses	694/716	(96.6%)
History, visual acuity, external examination, undilated fundus, tonometry, noticing thick spectacle lenses, slit lamp	715/716	(99.9%)

NOTE: In nine of the above 716 patients, dilation of the pupil with eye drops could have induced an attack of acute narrow-angle glaucoma.

CONCLUSIONS

How, then, can the non-ophthalmologic practitioner know when a patient should be referred to an ophthalmologist? Most often, the study shows, through the basic medical triad of history, visual acuity, and looking at the external eye with a flashlight. Family physicians can take heart at this, and they may be cheered as well to know that the success of this triad obviates the need for sophisticated instruments: In only 23 of the 716 patients suspected of having disease was an instrument required that is not in the office of most physicians, namely, a slit lamp.

As for eye drops, the recommendation is BEWARE. Eye drops can, in certain cases, change a chronic visual problem into a dangerous emergency. Nine patients seen in this study, as noted, had the potential for acute narrow-angle glaucoma, and dilating the pupils of any of these nine patients could have produced an extreme emergency in the office of the general practitioner or non-medical optometrist. Moreover, eye drops may precipitate alarming side effects; in the course of this study two patients with corneal foreign bodies became faint, with decrease in blood pressure and nausea, after application of topical anesthetic drops (although neither patient had a seizure or total loss of consciousness).

In sum, to both the conscientious physician and the conscientious optometrist the need for referral of a patient to an ophthalmologist is usually obvious through the application of history, visual acuity, and external examination by hand-held flashlight, and does not require sophisticated instruments.

Most importantly, do not dilate the pupil. Routine tonometry according to established standards and viewing the fundus oculi through the undilated pupil are the additional needed methods. The use of mydriatic drugs to dilate the pupil risks precipitating acute narrow-angle glaucoma by a 9:1 ratio over uncovering any hidden disease process. □

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NOTE:

I would like to add the rider that not all ophthalmologists would agree with the admonition against dilating the pupil in order to examine the fundus properly *except* in the case of practitioners in outlying areas who do not have rapid access to an ophthalmologist and surgical facilities.

While it is true that there is a risk of causing angle closure glaucoma, in most cases such a patient is destined to suffer angle closure at a later date and probably under less controllable circumstances. We feel that to cause angle closure under controlled circumstances is actually to do the patient a favour, because the surgical emergency can be treated immediately. Delay in treatment in such cases greatly increases the risk of permanent visual loss, but if the patient can be treated within a few hours the risk is abolished for ever. Usually in these cases we advise the patient that surgery on the other eye is required as a prophylactic measure.

If it is decided to dilate the pupil this should be done with Neosynephrine, preferably in the 2.5% solution which is now available. The effects of this drug are easily reversed by a drop or two of Pilocarpine 2%, and the patient should not be allowed to leave the office until the pupil has returned to normal size and Schiötz tonometry shows no rise in the intraocular pressure.

One further word of warning, Neosynephrine should not be administered to patients taking MAO inhibitors as this combination has been reported to cause cardiac arrhythmias or arrest. This applies particularly to the 10% solution as used in the eye and to lesser concentrations as used in nasal decongestants because of the rapidity of absorption from the mucosa. For more complete information the reader is referred to the current edition of the C.P.S. (Compendium of Pharmaceuticals and Specialties).

G. J. Whiston, M.B., F.R.C.S. (C) (Ophth.), Halifax, N.S. □

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The Epilepsy of Dostoevsky

Shannon Murray*, and T. J. Murray,** M.D., F.R.C.P.(C),

Halifax, N.S.

INTRODUCTION

Dostoevsky had epileptic seizures throughout much of his life and was greatly affected by them. Many of the main characters in his novels suffered from the same problem. This paper reviews the features of Dostoevsky's epilepsy and the symptoms of epilepsy he transferred to his fictional characters.

THE EARLY LIFE OF DOSTOEVSKY

Fedor Mikhailovich Dostoevsky was born in Moscow in 1821, the second son of a local surgeon and landowner. His mother died of tuberculosis in 1837, when he was sixteen. He was then sent to St. Petersburg to enter the Army Engineering College, but he detested his three years there, consoling himself by reading the works of Hoffmann, Schiller, Goethe, Balzac, Shakespeare, Hugo and Dickens. In June 1839, Dostoevsky's father, who had retired two years before to a small estate near Moscow, was murdered by the peasants he treated so badly. When he heard of his father's death, Dostoevsky felt considerable guilt because he had hated his father's hot-tempered, morose and suspicious manner and often wished him dead.

Dostoevsky's first novel, *Poor Folk*, completed in 1845, received some critical acclaim. Vissairon Belinski, the most influential critic of the day, was very complimentary to Dostoevsky and the young writer became one of Belinski's radical followers. Later, a falling out occurred between the two men and Dostoevsky joined a more radical organization. They set up an illegal printing press and Dostoevsky began campaigning for the abolition of serfdom, freedom from censorship and reform of the law courts. Dostoevsky and some of the other radicals were arrested and taken to the infamous Peter and Paul Fortress. After his trial, Dostoevsky was sentenced to death as he was considered the most important of the radicals. The sentence was reduced by the Prosecutor General to eight years of hard labour but he and the others were not told of their reprieve and reduced sentences. On the morning of December 22, 1849, they were all marched before a firing squad and only after all the preliminaries of the execution were carried out was their pardon read to them. Dostoevsky and two other prisoners were taken to Siberia and after four years inducted into military service.

It appears that Dostoevsky's epilepsy began during eight years of imprisonment and military service. During this time he also met Maria Dmitrievna Isaeva, and they were married on February 6, 1857. Although he had regained a commission rank in the military, he was discharged when his

epileptic seizures made it impossible for him to carry out his duties. His life then reached a low point as he was unable to write anything that came up to the standard of his first novel, and his marriage was a difficult and trying one. With his recurrent epileptic seizures and her histrionic behaviour, they made each other miserable. She eventually died of tuberculosis in 1864.

ONSET OF DOSTOEVSKY'S EPILEPTIC SEIZURES

The exact age when Dostoevsky's seizures began is uncertain. Sigmund Freud felt that they began after the murder of his father in 1839. The father had been very cruel to the children, had taken a common-law mistress, and had withheld Dostoevsky's allowance when he was in St. Petersburg. Freud felt he had wished for his father's death and then felt extreme guilt when he was killed. Freud stated that Dostoevsky "endured the pathological manifestations of a neurosis usual in such cases and became an epileptic." Dostoevsky's daughter, Liubov, unfortunately a very unreliable biographer, also dates the beginning of his epileptic seizures from the father's death but this is not supported by the reports from Dostoevsky's friends who knew him as a young man.

Dostoevsky himself felt that his epilepsy began as a reaction to the imprisonment while he was in the Peter and Paul Fortress. A childhood friend of Dostoevsky, Sonia Kowalewski, recounted how Dostoevsky described his first seizure which occurred while he was being punished in prison. She mentioned his isolation which was broken on an occasion by a visit from an old friend on Easter night. Forgetting the sacredness of the occasion, both began to converse on literature, art, philosophy and religion. The friend was an atheist, whereas Dostoevsky was a believer in Christ and immortality, and an argument started. The heated conversation lasted until early morning when Dostoevsky imagined he heard bells ringing, calling the faithful to worship. When his seizure began, he felt a "sense of ecstasy" as through he were in paradise. During this "ecstasy" he had his first generalized seizure. Later he admitted that no bells actually rang; the sounds he heard were probably part of an auditory aura occurring at the onset of the seizure.

One biographer, Oreste Miller, suggested that his attacks began when he was seven years old, alluding to an upsetting event in his parents' lives at that time but refused to explain, saying, "though the person who reported to me this fact is closely related to the family of the writer and perfectly reliable, I shall not tell what it was." Dostoevsky's second wife, Anya Grigorievna, made a similar allusion to Leonid Grossman but she too refused to tell what had happened. We can only speculate that the event may have been related to the angry, cruel father Dostoevsky hated.

Even before he was deported to Siberia, Dostoevsky was a patient of a Dr. Yanovski; his epilepsy was first diagnosed in

*First Year, English Literature, Dalhousie University

**Professor of Medicine, Dalhousie University and Chief of Medicine, Camp Hill Hospital, Halifax, N.S.

Mailing Address: Dr. T. J. Murray, Clinical Research Centre, 5849 University Avenue, Halifax, N.S. B3H 4H7

1848. About this time he began to borrow medical books, "particularly those which dealt with diseases of the brain and nervous system". However, it appears that he had only about ten major seizures up to about age thirty. During his imprisonment in Siberia the frequency of his seizures increased to about one every three months; however, they were less frequent during his military service when they were described as "nervous spells", and "resembling epilepsy but not quite epilepsy".

Even before his imprisonment, Dostoevsky had been suffering from so-called "neurasthenia", and some symptoms that were described as hypochondriacal. He experienced a lethargic sleep coupled with a state of depression and anxiety about the future. He lived in dream-like states for long periods. Whether these symptoms were due to anxiety with depression or epilepsy or both is difficult to determine. Even before his exile one physician said he was of "the epileptic temperament" and that some of his disturbing episodes were so severe that they threatened his mental integrity.

PRECIPITATING FACTORS FOR HIS SEIZURES

Dostoevsky continually tried to connect his seizures with events outside himself. He kept a diary of when his fits coincided with attacks of hemorrhoids, with public events such as the execution of a murderer, travel, the phases of the moon, the weather and the appearance of aurora borealis. An example of this type of recording occurred on October 22 "in the morning a fit, and after I had fallen asleep, an hour later, another. Expect another fit any minute. A storm outside. The last three nights aurora borealis".

He also related his seizures to travel. "In general it must be noted that I positively can't stand travelling distances of any length by railway. I have a fit everytime."

He also related to them to the pressures of his work. After finishing a new novel he said, "When I wrote that finale I was inspired and it cost me two fits, one after another". He felt ill after finishing *The House of the Dead*, and his doctor recommended a trip to western Europe to recover. His epilepsy also improved during these trips abroad and he worsened when he returned to Russia. It is interesting that he noticed an increase in his literary output just before a seizure and he began recording seizures in the same notebook he used for his writing. Later in life he became a chronic gambler and this also appeared to increase the frequency and intensity of his seizures.

Another interesting association Dostoevsky noted earlier in his life, was the feeling that he tended to have seizures in the presence of women. In 1840 he became unconscious at a soiree given by Vielgorsky when he was presented to their daughter, a celebrated beauty. Another possible example occurred on his wedding night with his first wife. "Leaning, his face a deadly pale, he crashed to the floor in appalling convulsions and lost consciousness. This seizure occurred the moment the two newlyweds were alone together. It was at this time the doctors confirmed that he had epilepsy."

THE AURA

Perhaps the most interesting and best known feature of Dostoevsky's epilepsy was the aura that preceded some of his seizures. The most amazing auras were the pleasurable experiences of ecstasy that he felt set him apart from other

men. He wrote that before an attack "all of the forces of life gathered convulsively all at once to the highest attainable consciousness. The sensation of life, of being, multiplied ten-fold at that moment; all passion, all doubts, all unrests were resolved as in a higher peace; then a peace full of dear, harmonious joy and hope. And then a scene suddenly as if something were opening up in the soul; an indescribable, an unknown light radiated, by which the ultimate essence of things was made visible and recognizable. All this lasted at most a second."

He told his friend Sophie Kowalewski that he had this kind of an aura in his first seizure. He said, "The air was filled with a big noise and I tried to move. I felt that heaven was going down upon the earth and that it had engulfed me. I have really touched God. He came into me myself, yes, God exists. I cried and I don't remember anything else. You all, healthy people, can't imagine the happiness which we epileptics feel during the second before our fit. Mahomet, in his Koran, said that he had seen paradise and had gone into it. All these stupid clever men are quite sure that he was a liar and a charlatan but no, he did not lie, he had really been in paradise during an attack of epilepsy; he was a victim of this disease like I was. I didn't know if this felicity lasts for seconds, hours or months, but believe me, for all the joys that life may bring, I would not exchange this one."

On another occasion Dostoevsky further described his aura, "During a few moments I felt such a happiness that it is impossible to realize at other times, and other people cannot imagine it. I felt a complete harmony with myself and in the world, and this feeling is so strong and so sweet that for a few seconds of this enjoyment one would readily exchange ten years of one's life, perhaps even one's whole life."

Dostoevsky recognized his feeling of ecstasy was caused by disease but he wrote, "What do I care if it is a disease? What do I care whether it's normal or not normal, if in retrospect and in a healthy state, I still feel that moment as one of perfect harmony and beauty, and if it arouses in me hitherto unsuspected emotions, gives me feelings of magnificence, abundance and eternity, and reconciles me to everyone; if it is like a glorious, heavenly merging with the highest syntheses of life".

This aura had a great influence on Dostoevsky and his concept and philosophy of life. Its importance is illustrated by the place it holds in his novels and we will discuss this later. Dostoevsky wrote, "I must tell you I am a son of this century, a son of the unfaithfulness and of doubt, up till now, and, I believe, until my grave. Meanwhile God sends me at times some moments of entire serenity. It is at such moments that I have composed within myself a profession of faith where everything is clear and sacred".

THE SEIZURES

Dostoevsky wrote many descriptions of his own seizures in his diaries. In February 1870 he wrote, "At 3 o'clock a.m. a most violent fit, in the hall, in a waking state. I fell down and hurt my forehead. Not being conscious of anything and remembering nothing, I did, however, carry to my room a burning candle without damaging it a bit. I shut the window and only then did I become aware of the fact that I had had another fit. I awakened Anya and told her. She cried very much seeing my face. I began to calm her and suddenly I had another fit while still awake in Anya's room". In July 1870, he wrote, "fit while asleep, towards morning, a few minutes after

8 o'clock . . . I am told that I had a very strong rush of blood to my head and my face turned blue". In October he wrote, "a fit, towards morning, immediately after I had gone to bed in a waking state. I fell down by the small wardrobe and was lying on the floor. Anya had a great deal of trouble reviving me. A strong fit, I felt a chill."

He also had a number of episodes which resembled dreamy states, which were recognized by Hughlings Jackson as a epileptic phenomenon about the same time. In 1880 He recorded, "This morning at 8:45, interruption of my thoughts, transported into other years, dreams, dreamy states, dreaminess . . . guilt".

There are two recorded accounts by witnesses of his seizures, one by his wife Anya and another by a friend, Stakhof. Anya relates, "Fedor Mikhailovitch was talking with my sister and was very excited; suddenly he became pale, lurched on the divan and began to lean over to my side. I looked with much astonishment at the change in his face; suddenly a fearful cry, a cry that had nothing human about it — almost a howl and my husband continued to lean over more and more." Stakhof witnessed the same seizure and wrote, "He stopped awhile as he was searching forward to say what he meant and he had already opened his mouth. I looked at him with closer attention; I was sure he was going to pronounce some extraordinary sentences; suddenly from his open lips came a strange, absurd and protracted noise, and he fell unconscious in the middle of the room."

Although he had months without seizures, at other times he had seizures quite frequently, often one every two to three weeks, and one seizure was often followed quickly by another. In 1868 he wrote, "Compared with my fits in the past (over the years), the series of fits which have occurred recently, since August 3rd, show an unprecedented increase in frequency of the fits as compared to anything I have experienced since I had the disease; it seems that the disease is entering a new malignant phase. Over the years, I think I wouldn't be wrong saying that the median interval between fits was constant at three weeks (that is just the median or proportional median figure; i.e., there were intervals of six weeks and at ten days, but on the average it would come to three weeks.)"

During the period when he lived abroad his seizures were less frequent and often there were three or four months between fits. While living in Florence in 1869 his seizures were infrequent but, when he went into exile from his creditors, his attacks increased in frequency, often occurring a number of times per week. Most seizures were nocturnal, often during the first few hours of sleep.

POSTICTAL EFFECTS

In contrast with the ecstasy and serenity of the epileptic aura, Dostoevsky experienced many days of depression following an attack. During the four or five days after a seizure he often was lethargic, unable to gather his thoughts and unable to remember the plot or characters in his writing. While writing *The Possessed* he often forgot what he had written and he had to read the manuscript over before continuing the story. "My work progresses very slowly. I am afraid the falling sickness has robbed me not only of my memory but also of my imagination". In another letter he wrote, "I have just had three of my epileptic fits, uncommonly violent and in rapid succession. But after the attacks, for two

or three days I was unable to work, write or even read, because I am a wreck, body and soul."

When applying for a passport, the Governor General wrote the Minister of the Interior, saying, "His epileptic attacks have never been so severe as they have been recently, especially in the last month. With each new attack his memory is more and more impaired, to such an extent that he is no longer able to recognize his closest acquaintances. Moreover, at each such attack, he is seized by a melancholia and fears death which could drive him to utter despair or madness".

He felt very depressed after many seizures and found that this was worse if there was a long period between the seizures. "When I have not had a fit for a long time, and then it suddenly breaks out, then I feel an unusual nostalgia, a moral one. It drives me to despair". In January 1879, after a seizure, he wrote, "As a result of not being used to it so much, my ailing condition persists very long; it is already the fifth day after my fit, and my head still hasn't cleared up". After another seizure he wrote, "I had a headache and my body was aching all over. N.B. altogether the effects of my fits, (i.e., nervousness, shortness of memory, an intensified and foggy, quasi-contemplative state), persists longer now than in previous years. They used to pass after three days while now it may take six. Especially at night, by candlelight, an indefinite hypochondriac melancholy and as if a red, blood shade (not colour) upon everything. Almost impossible to work during those days. (I am writing this note on the sixth day after the fit.)" As the years went on he found that the postictal effects and the depressive sensation and other symptoms became more severe and more prolonged.

His friends also described his appearance after a seizure. "He often came into the room like a black cloud, forgot to greet people and saw opportunities to quarrel. It appeared to Dostoevsky that everything which was said to him was vexing, insulting or was done to excite him. The conversation had to be brought to his pet subjects about which Dostoevsky would then be in the best humor." At other times, "he felt himself a criminal guilty of some offense unknown to him".

THE NATURE OF DOSTOEVSKY'S EPILEPSY

For many years it has been accepted that Dostoevsky suffered from temporal lobe seizures (partial complex epilepsy) with an unusual aura characterized by a pleasurable, psychic sensation. This would suggest a unilateral temporal lobe focus with limbic lobe effects and then generalization of the discharge causing a grand mal seizure.

Dr. Henri Gastaut in his William G. Lennox Lecture, 1977, took a different view of the epilepsy of Dostoevsky. He felt that Dostoevsky had generalized epilepsy and not focal or temporal lobe epilepsy. He felt that the aura of ecstasy described by Dostoevsky and subsequently regarded as a rare but characteristic feature of temporal lobe epilepsy was instead a psychic state, "The poetic and mystical expression of his deep aspiration for such a world of bliss and love, for a theocracy founded on the Christ ideal, and for the earthly paradise which he repeatedly described throughout his writings." He then goes on to argue that neurologists have subsequently adapted the description of Dostoevsky as the prototype of the ecstasy, aura but he argues that this is not a part of temporal lobe epilepsy and was essentially a myth.

However well this outstanding expert on epilepsy makes his argument, it is well recognized that ecstatic auras do

occur in occasional epileptics and pleasant auras of other forms are also seen. Lennox himself found one in a hundred auras were pleasant, and Alajouanine and Penfield describe cases with ecstatic and pleasant auras. Although we have seen two patients with pleasant auras, and one with an orgasmic aura, we have not seen any patients with an ecstatic aura akin to the mystical experience of Dostoevsky. However, it would still seem that there is adequate information to suspect temporal lobe epilepsy rather than generalized seizures with an unrelated psychic experience. For instance, virtually all of these ecstatic auras preceded a generalized seizure.

THE EPILEPTICS IN DOSTOEVSKY'S WRITING

The effect of his seizures on his life and his thinking is illustrated by the importance of epileptics in his novels. There are five major examples of epileptics in Dostoevsky's works. The first is in a short story *The Insulted and Injured*, published in 1861. Nellie, the epileptic, has a grandfather described as "odd", and her mother was "exalted, readily excited and inclined to reveries". This may be an attempt to illustrate the heredity of these problems. Her seizures are described as follows: "after a prolonged stare (at some person) she gave a fearful cry, her face was distorted, and she fell to the floor. After the convulsion she looked fixedly at the same person as if time to collect her thoughts. At last her face lightened up as she began to comprehend. For a long time she could not collect her thoughts and murmured meaningless words. For a long time she did not fully regain her senses. Reality was much mixed with fancies, and it seemed that something fearful excited her soul. Finally she fell into a deep sleep. She was pale and her lips were still bleeding. Her face, despite this sleep, showed great fear and a painful longing".

The second instance is in a short story, *The Landlady*. Murin, the main character, had displayed the same moods in youth that Dostoevsky had. His description of seizures in Murin as an old man are crude, as any layman might view them.

In *The Idiot*, Prince Myshkin had, since childhood, seizures that left him with apathy and depression afterwards. Prince Myshkin was cured of his idiocy in an asylum in Switzerland and it is felt that his "idiocy" was supposed to represent Dostoevsky's own revolutionary feelings which developed in youth but were "cured" in the Peter and Paul Fortress. Prince Myshkin also had ecstatic auras and postictal depressions. His auras were not visionary, however, and "during that moment he did not dream any visions as from hashish, opium or wine, which lower reason and pervert the soul." Myshkin ruined his own betrothal party by having a seizure. Another character, Ganya, collapsed while attempting to reach into a fire to retrieve some rubles that someone threw in as tests. Ganya's collapse was seen to be an imitation of Myshkin's fit at his wedding party. Both were trying to regain their dignity and it was felt that their seizures were brought on by tension and inner conflict. Aglaya teased Myshkin by asking, "will you be capable of taking and drinking a cup of tea respectfully when everyone is watching you?" Myshkin replied, "I think I shall be capable of it". Aglaya replies, "that's a pity. Otherwise I might have had a laugh. Do at least break the china vase in the drawing room. It is an expensive one. Please break it. Make some sort of gesture such as you are always making, hit it and break it. Make a point of sitting near

it." After further taunting Myshkin spent the rest of the night worrying about having a seizure and eventually had one.

In *The Possessed*, Kirilov speaks in monosyllables and broken sentences and his thinking is hesitant. He has no convulsions but did have episodes suggesting psychic equivalents. He had a feeling of heaven once or twice a week, suggesting of focal epileptic abnormality but did not have generalized seizures. Kirilov says, "there are seconds, occurring five or six at a time, and you suddenly feel you have fully attained the presence of eternal harmony. This is nothing worldly; I do not mean it is something heavenly, but something which a man, in a worldly sense, cannot bear. One must either change physically or die. It is a clear and indisputable sensation — as if you suddenly become aware of all nature and suddenly, "yes, this is true, this is good". This . . . this is not a tender emotion but simply joy. You forgive nothing because there is nothing to forgive. It is not that you love, oh — this is higher than love. What is most awful is that it is so terribly clear and such a joy. If it lasts more than five seconds I live a lifetime, and for them I shall give away my life, for it is worth it. To endure ten seconds one must change physically".

His friend Shatov asked if it happened to him often. He replied, "sometimes every three days, sometimes once a week". Shatov asked, "You do not have the falling sickness?". "No." "Then it will come. Take care, Kirilov. I hear that the sickness begins just so". It is apparent that one can recognize Dostoevsky's own sensations and experiences in the epileptic auras of Kirilov.

The last case of epilepsy in Dostoevsky's novels was Smerdjakov in *Brothers Karamazov*, published in 1879. Smerdjakov's mother was an atheist and his father was a debauché. As a boy he was silent and shy and developed a hatred of mankind. He had his first seizure after being whipped, and they continued through the rest of his life.

DOSTOEVSKY'S OTHER MEDICAL PROBLEMS

Dostoevsky died of pulmonary disease, which was first recorded around 1870 and diagnosed as emphysema by his family physician. Mochulsky said, "He was suffering from emphysema, easily lost his breath, controlled his breath with muted and hoarse voice with difficulty". Dostoevsky continued to smoke heavily and often had hemoptysis. Edmund Burke felt that Dostoevsky's death was probably related to pulmonary tuberculosis with tuberculous erosion of a vessel and hemorrhage.

Dostoevsky was sick as a child and appeared to develop scrofula, a tuberculous infection of the lymph nodes, while in school. He also recorded that he had scrofula while in prison. As a young adult he was thin and sickly, susceptible to colds, gastrointestinal disturbances and abdominal pain. In prison and later in Siberia, he was often in the hospital suffering from recurrent indigestion, abdominal pains, rheumatism, "nervous seizures" and frostbites. He suffered from hemorrhoids much of his life and related the attacks of hemorrhoids to his seizures.

Periodically throughout his life he had periods of depression and he often felt that the times of stress and duress were helpful in forcing him to regain his reason and resolve.

Later in life he suffered from angina pectoris, shortness of breath and chest infections.

HIS LATER LIFE AND DEATH

Because of his gambling debts and financial mismanagement, he was forced to flee with his second wife to Germany, and later to Switzerland and Italy. While in exile two daughters were born, only one of whom survived infancy. He began to gamble heavily at this time and attempted to win his fare back to Russia at the roulette tables. He initially claimed that he was gambling to provide more for his wife and child, but later it was clear that he was a chronic gambler and could not stop. Anya always had to bail him out of trouble, pawning all her possessions in order to send him further money. He wrote to her, "I know I have ruined your life, but forgive me and save me just this once more. I am in a desperate predicament and cannot come back. Send me money just for the fare". He gambled the money and wrote to her again "I've committed a crime. I have gambled away everything, everything. Send me money just this once more, even if it is the last you have". Even when she was ill he would leave her and go to the roulette tables at the casinos, always trying to develop the perfect mathematical system for winning at gambling. Finally, in 1871, he suffered repeated losses and eventually gave up gambling. He then made enough money to return to Russia.

The most successful decade of his life was his last. Once he had returned to Russia, Anya took over the control of the finances and worked out compromises with their many creditors. Two sons were born and he became more content and successful. Although his seizures left him unable to write for brief periods, he managed to complete three novels and two of his best short stories. In the last years of his life he finally achieved recognition and fame as a great writer. He became a hero in his Russian homeland, and much sought after by admirers. He died on February 9, 1881. □

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Crisis in Medical Research*

Eldon R. Smith,** M.D., F.R.C.P. (C),

Halifax, N.S.

Medical research is currently in the midst of a crisis which poses a serious long-term threat both to the practice and to the teaching of medicine. We have all been exposed to a great deal of dialogue on the subject, both in the scientific and mass media; the major message which emanates from most sources is that the problem is simply one of inadequate government funding. Whereas inadequate and unstable funding has initiated the crisis, it is my conviction that the problem now is more complex and cannot be resolved simply by an infusion of money. What are the issues?

THE MONEY SHORTAGE

In 1962, the total Federal Government of Canada budget for health science research was approximately 9 million dollars. This increased rapidly during the sixties to reach a total of 42 million by 1970. Since then, however, the increases have not kept pace with inflation so that the budget for 1978-79 was only 75 million. Compare this with the level of financial support provided by the voluntary health organizations during the same period. In 1962, support from all voluntary agencies was 4 million; by 1978-79 this had risen to 53.5 million — a greater than 12-fold increase. Thus, whereas government support, in real terms, has decreased since 1970, the public has demonstrated repeatedly its interest in, and support for, health research by impressive increases in yearly giving. The erosion in Federal Government support is even more apparent when one considers that the Medical Research Council budget declined from 1.12% of total expenditures on health care in 1969 to 0.46% in 1976 — a decrease of 60%. Comparable figures for the United States during the same period also showed a decrease, but from 5% to 3.8%.¹ Thus in Canada, support of biomedical research has been restricted in absolute dollars, and as a percentage of our total expenditure on health care delivery. Moreover, compared with most other industrialized countries, the percentage of our gross domestic product going to health science research has been shamefully low considering the wealth of our nation.

The effects of the restricted funding have been as one would predict. Competition for funds has been keen and many otherwise qualified investigators have not received an initial grant or, in the case of those with prior support, terminal awards have been made. The Medical Research Council alone has terminated support for 400 Canadian researchers since 1969. This has proved extremely disheartening to the research community but perhaps most distressing has been the yearly uncertainty as to what the final level of support

would be. Regularly, there has been a last minute emergency, but always inadequate, allotment of funds in response to the outcry from the scientific community and more recently from organized lay groups. Obviously, we require both a substantial increase in total funding and a firm commitment from government for long-term funding stability. This would quickly alleviate many of current problems. However, it is now possible to recognize another facet to the crisis, one for which the solution may not be so readily apparent.

THE MANPOWER SHORTAGE

Quality biomedical research, whether basic or applied, can only be performed by individuals well trained in the scientific method. During the past decade there has been an alarming decrease in the numbers of people preparing themselves for a research career. This is true to some extent for those with the Ph.D. qualification but the most dramatic change has been in those with the M.D. degree. Although Ph.D. scientists are responsible for much of basic biomedical research, the physician scientist is an essential participant in the process, if advances in basic knowledge are to be translated quickly into meaningful improvements in health care. In the U.S., the percentage of research fellowships awarded by the National Institutes of Health to holders of the medical degree has decreased from 46% in 1968 to 21% in 1977², and the number of American physicians reporting their primary activity as research has decreased by 50%.³ Currently, many American universities are unable to find adequately trained M.D. - researchers to fill their vacant faculty slots. The experience in Canada is perhaps less publicized but the trend is the same and it is now a matter of considerable national concern.

Why has this stampede away from academia occurred? The inadequate and unstable funding base has almost certainly been a significant factor. Young physicians would understandably hesitate to prepare themselves for a career with a financial future as fragile and as subject to the vagaries of federal politics, as health science research in the past 10 years.

In addition to the concerns over unstable research funding, personal financial considerations have also been important. The advent of Medicare provided attractive incomes to family physicians with the result that fewer graduates sought specialty training. Even those who have obtained specialty qualifications have favoured consulting practices in smaller communities rather than an academic career. Consider the alternatives. As preparation for a research career, the specialty trainee has a minimum requirement for an additional two years for which the stipend has been generally lower than that received by clinical residents. This would then be followed by a junior faculty appointment at a substantially lower income than that earned by the contemporary in clinical practice.

*Based on an address to the annual reunion of Phi Rho Sigma Medical Society, February 1, 1980.

**Associate Professor of Medicine, Assistant Professor of Physiology & Biophysics, Dalhousie University, Halifax, N.S.
Mailing Address: Head, Cardiology Division, Foothills Hospital, Calgary, Alberta, T2N 2T9.

In addition to these financial considerations, it must also be appreciated that in the late 60s and early 70s there was a substantial trend among medical school graduates to desire direct patient care. Whether this represented the results of a highly successful recruitment program by the family practice community or whether it occurred because of the financial disincentives of prolonged residency training, the fact remains that the majority of each graduating class chose family practice during these years. This, of course, resulted in a reduced pool of potential clinical researchers. It is of considerable concern, moreover, that as the percentage of graduates going into residency programs has increased again in recent years, there has not been an associated upsurge in the numbers of people seeking research training.

This observation suggests that the current manpower shortage may not be due entirely to the financial considerations noted above. In fact, I firmly believe that a major factor has been, and continues to be, a failure of medical school faculties to present biomedical research as a viable career option. We have failed to provide an adequate role model of the clinically trained researcher, either because the clinical researcher has not been afforded adequate time protection for research (and therefore is perceived only as a clinician) or, because of the need to assure time protection, has been isolated from the students and trainees. Moreover, despite our never ending attempts to improve the curriculum, we have not adequately provided either the medical student or the resident physician with the supervised opportunity to be involved in the research process. Young people cannot make a meaningful choice between an academic and a practice career unless they have had the opportunity to be familiar with both activities. A career involving research will not appeal to all people but is most likely to attract those individuals who have experienced the satisfaction to be derived from designing and executing an experiment, and the exhilaration associated with confirming a new hypothesis.

Of course, the situation is not identical in all medical schools. In a recent study by the Association of Canadian Medical Colleges, the level of interest in a research career was found to be high among students in those schools in which there is an active research involvement by faculty. Unfortunately, many Canadian schools have a distressingly low research productivity, and this tends to be particularly marked in the clinical departments.

This variability in productivity between schools is not explainable simply on the basis of some schools being small and others large, but rather reflects the percentage of faculty involved in serious research. Since schools with low research productivity receive less money in national competitions, the concept of regional disparity in research funding has evolved. The disparity, however, is not really in research funding but in manpower — at least manpower with a serious commitment to biomedical research. If the faculty is not involved in research, it seems unlikely that medical students or resident physicians will become interested enough to seek research training.

Is it really important that medical schools be involved in biomedical research? The impact of research for practising physicians, and particularly for their patients, is readily apparent. Everytime we prescribe a beta blocker for angina or hypertension, or cimetidine for acid-pepsin disease, we

are reaping benefits from the biomedical research effort of the past 30 years. It is also true that advances in medical knowledge are more quickly translated into improved health care in an active research environment.

What about the importance of research to teaching? Most educators agree that the presence of the research environment distinguishes a good medical education from a mediocre or poor one. Indeed, it is frequently stated that a medical education without the investigative milieu will, at best, prepare the graduate for practice in the previous decade. Thus, medical research is essential, not only to find answers to important questions concerning the prevention and treatment of disease, but also as an integral ingredient in the teaching and practice of medicine.

RESOLVING THE CRISIS

Having examined the nature of the current crisis in medical research, what is the outlook for the future? If the current trends are to be reversed, a well-planned and concerted effort is required which must involve the medical profession, the granting agencies, university administrators, the research community and the general public.

Obviously, there is an urgent need for increased financial support for research. The federal government recently announced a 17.3% increase in the MRC budget for next year. This is an important first step and one which should be supported by all of us. In some parts of the country, the provincial governments are taking new incentives to fund biomedical research. To date this has not happened in Nova Scotia and is not likely to occur unless the government is convinced of the priority need in this area. Whatever the sources, it is essential that any increased funding recognize the fundamental problem of manpower shortage and provide new programs for personnel support — not only for the training years, but for long-term support of established investigators.

Finally, new initiatives must be developed to attract holders of the M.D. degree into research training. From the time of entrance to medical school, it takes approximately ten years to develop the knowledge and skills necessary to embark on a faculty research career. Thus, even a major change in the interest level of today's students cannot be expected to have a major impact on manpower shortage in the short term. To provide for the future, a career involving medical research must be viewed as viable, important and challenging by medical students and resident physicians. This can best be achieved by early exposure to the scientific method and, for those with high levels of interest, an opportunity to work in a research environment during the training years.

The recently announced Dalhousie University Faculty of Medicine Research and Development Foundation Studentships are designed specifically to meet this need. First-year students will be provided the opportunity to work in a one-to-one relationship with an active researcher during the first 3 years of medical school. Other initiatives are required to provide similar experience for trainees in the clinical specialties. Only with the success of such programs will we be able to ensure an adequate supply of clinical researchers for the next generation. □

References on Page 89.

Research and Development Foundation

THE DALHOUSIE UNIVERSITY FACULTY OF MEDICINE

Peter C. Gordon, *B.Sc., M.D., C.M., D.P.H., C.R.C.P. (C),

Halifax, N.S.

INTRODUCTION

Shortly after Dr. J. Donald Hatcher was appointed as Dean of Medicine at Dalhousie University (March 15, 1976), he recognized that one of his major priorities would be to stimulate research programs in the Faculty of Medicine. One of the methods chosen was the formation of a discretionary endowment fund to perpetuate and further develop the research base in the Faculty. Thus, the concept of a Faculty of Medicine Research and Development Foundation was born.

In its early formative stages, in the summer and fall of 1978, Mrs. Arthur Balders of Halifax made a major commitment of \$500,000 towards the support of medical research in the Faculty of Medicine through the Foundation which was just then being organized. This magnificent donation launched the fund on its way and on September 28, 1978, the Senate of the University ratified the formation of the Dalhousie University Faculty of Medicine Research and Development Foundation. The Foundation was incorporated as a charitable organization, receiving its Certificate of Registration effective April 1, 1979, with a financial objective of raising ten million dollars.

During its organizational phase the Dean of Medicine, Dr. J. Donald Hatcher, served as Interim Chairman. In May of 1979, Mr. William Sobey was elected to the chair.

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Mrs. Arthur Balders	Halifax, Vice-Chairman
Mr. H. R. Cohen	Moncton
Mr. G. F. Hughes	Windsor
Mr. E. Spafford	Halifax
Dr. W. A. MacKay	Halifax, Ex-Officio Vice-President, Dalhousie University
Dr. J. D. Hatcher	Halifax, Ex-Officio, Dean Faculty of Medicine
Dr. P. C. Gordon	Halifax, Ex-Officio, Executive Secretary

Members of the Foundation

Mr. G. W. Dennis	Halifax
Mr. J. J. Kinley	Lunenburg

Information Officer

Miss Barbara Hinds	Halifax
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*Executive Secretary, Dalhousie University, Faculty of Medicine, Research and Development Foundation, Sir Charles Tupper Medical Building, Halifax, N.S.

Purpose and Priorities of the Foundation

The word "Foundation" connotes a broad platform supporting something substantial. Foundations are the solid base upon which institutions are built, sure beginnings of things that last.

The purpose of the Dalhousie University Faculty of Medicine Research and Development Foundation is the same to establish a discretionary endowment fund to perpetuate and further develop the research base in the faculty of Medicine and its associated teaching hospitals. The Board of the Foundation, on the advice of a Scientific Advisory Committee, has agreed that for the immediate future the basic principle for the use of funds should be primarily to support "brains not bricks". The funds will not be used for constructing new buildings and will not be used to defray operating deficits.

This priority has been set for the following reasons. First, although Dalhousie's medical researchers have achieved national and international recognition, Dalhousie is in 13th place in relation to money distributed among Canada's 16 medical schools. This is primarily because we simply do not have a sufficient number of medical researchers. An increase in the number of investigators will help to establish centers of excellence in specific areas of research and these investigators, in turn, will generate more funds from the Medical Research Council and other granting agencies.

Second, many other medical schools in Canada have Foundations to raise money for research and development from private sources, and some of these have been in operation for many years. Moreover, all Provinces except the three Maritime Provinces directly support research in their respective medical schools. Approaches to the Provincial Governments in the Maritimes have been made and will be pursued. In the meantime, however, we are losing some of our best researchers to other Provinces and have difficulty in recruiting new investigators to this area. This lack of Provincial Government support thus makes it doubly important that our Foundation succeed in reaching its objective.

Third, the importance of a stimulating research environment to exemplary patient care is widely recognized. This was clearly expressed in an editorial in the Halifax Herald. "Research is just as essential to the implementation of medical advances as it is to their discovery. If we lack scientists active in the forefront of medical research, we will have no one capable of making judgements necessary even to import new medical discoveries. Research is the continually revised textbook of modern medicine".

Fourth, increased support for research, apart from the beneficial effects on patient care and teaching, will have

other economic effects in the regions which include: a) increased cost benefit on the investment already being made; b) increased employment for highly skilled technical people; c) the retention of gifted scientists in our health care institutions which may be lost to areas where support is greater; and d) increased competitiveness for Federal grants which would result in an increased flow of Federal research funds, not presently coming to the region.

FUNDS RAISED TO MARCH 31, 1980

At the end of the fiscal year 1980, the Foundation had raised \$1,979,377 in cash donations, pledges, bequests and property. This represents almost 20% of the objective but obviously we have a long way to go.

THE SCIENTIFIC ADVISORY COMMITTEE

This Committee meets regularly to advise the Board of the Foundation on research and development priorities and to evaluate a applications from individuals seeking support. It is composed of the following established Scientists in the Faculty of Medicine:

- Dr. E. R. Smith, Associate Professor, Medicine
- Dr. L. E. Bailey, Professor, Pharmacology
- Dr. A. J. Bodurtha, Assistant Professor, Surgery
- Dr. K. B. Easterbrook, Professor, Microbiology
- Dr. G. A. Klassen, Professor and Head, Department of Physiology; Associate Professor, Department of Medicine
- Dr. C. B. Lazier, Associate Professor, Biochemistry
- Dr. E. R. Luther, Assistant Professor, Obstetrics and Gynecology
- Dr. R. L. Ozere, Professor Pediatrics; Assistant Professor, Preventive Medicine; Lecturer, Microbiology
- Dr. J. T. R. Clarke, Associate Professor, Pediatrics; Lecturer, Biochemistry

RESEARCH PROGRAMS APPROVED

On the advice of the Scientific Advisory Committee the Board approved three programs to be effective in 1980.

I Studentships

A. The Research and Development Foundation Studentships

Three Studentship awards for first year medical students were approved to be effective April 1, 1980. Each award will carry a stipend of \$7,000 over a two year period. In addition, a sum of \$500 will be available during the second year of the award for travel to a scientific meeting and \$1,000 will be available to the student's supervisor for research expenses. The total cost of this program will be \$12,000 in 1980 and \$25,000 in 1981. Nine applications were received from top students and awards were won by: Mr. Sammy Messieh, Mr. Ronald Janes and Ms. Leslie Houck. (see photo)

B. The Research and Development Foundation, W. Alan Curry Studentship in Medical Research

In memory of her husband, the former Professor of Surgery in the Faculty of Medicine, a bequest of \$50,000 was



Ronald Janes, Leslie Houck, and Sammy Messieh have been awarded the Medical Foundation's first student scholarships. Farokh Buhariwalla (far right) receives the foundation's W. Alan Curry Studentship in anatomy.

received from the estate of Mrs. Gladys Curry, the income from which is to be used to support research and development in the Departments of Anatomy and Surgery. On the advice of the Scientific Advisory Committee, the Board approved that the income from this bequest would be used to support one Studentship every second year to a student engaged in research in the Department of Surgery or the Department of Anatomy. The terms, criteria and stipend would be the same as for the Studentship Awards described above. This year the award was presented to Mr. Farokh Buhariwalla for research in the Department of Anatomy.

C. The Research and Development Foundation, Lalia B. Chase Scholarships in Medical Research

A bequest of \$198,750 was received from the estate of Dr. Lalia B. Chase, the income from which is to be used to provide one or more annual scholarships for medical students or residents in training attending the Medical School of Dalhousie University. No awards under this program have been made to date.

These three programs will have a long term effect on the research potential in the faculty.

II Research Fellowships

To encourage and motivate medical graduates to undertake postgraduate training in basic and clinical science for a period of two or three years, the Board approved the Research Fellowship program. The purpose of these awards is to enable the medically qualified individual to undertake an independent career in clinical and/or basic research. The level of support will be determined by the number of years of training following graduation, based upon the Medical Research Council scale for Fellowships. No awards have been made to date.

III Research Associates

The Board approved the awarding of one Research and Development Foundation Associate to be effective in 1980.

This is to be a prestigious award designed to attract new faculty to the Medical Faculty whose primary area of activity is in research. The award will provide for five years of support, renewable for a further five years, at an annual salary up to \$35,000, with a \$10,000 research establishment grant in the first year. Applications for this award are being received and it is anticipated that one of these awards will be made each year. This program will have an immediate impact on the further development of an exemplary research base in the Faculty.

PROMOTIONS

In addition to the fund raising activities of individual members of the Board, the following fund raising and promotional activities were instituted.

1. Mailings to all law firms and trust companies in the area, to promote the inclusion of bequests to the Foundation in wills and charitable annuities.
2. News releases to the Halifax daily papers and electronic media describing research programs and personalities in the Faculty of Medicine.
3. Two special inserts in the Halifax daily newspapers describing the work of the Foundation and the research activities in the Faculty of Medicine.
4. The first annual "Molly Appeal" seeking support in the form of "at least one dollar from every Nova Scotian". This ran from February 4 to February 12, 1980 and included daily newspaper advertisements and interviews on radio with leading Dalhousie medical researchers. To March 31 the Foundation received \$22,635 as a direct result of this appeal. This appeal will be launched again in September and thereafter on an annual basis.



Proceeds of approximately \$5,000, from the show "Laughter is the Best Medicine" which took place March 24 are shown here being donated to the Dalhousie University Faculty of Medicine Research and Development Foundation. Presenting the cheque are Ron MacInnis (left), the show's producer; Jon Walsh (center), the stage and technical director. William Sobey received the cheque on behalf of the foundation.

5. The first annual Faculty of Medicine Variety show, entitled "Laughter is the Best Medicine", was held at the Dalhousie Arts Centre on March 24. Through the enthusiastic performance of Faculty, students and staff and a sell out at the box office this netted the Foundation approximately \$5,000. Planning is currently underway to stage the show for two nights next year. (see photo)
6. A small brochure was produced which, with the cooperation of the Medical Societies in Nova Scotia, New Brunswick and Prince Edward Island, is being offered to physicians for placement in their waiting rooms.

HOW PHYSICIANS CAN HELP THE FOUNDATION

Physicians can help the Foundation in two important ways. First, by bringing the existence of the Foundation and its purposes to the attention of their patients when it is appropriate to do so and second, by making a personal donation. Alumni of Dalhousie are being approached by the Medical Alumni Association and all other physicians in the Maritime Provinces are being contacted directly by the Foundation. □



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ANNOUNCEMENT

Recent Changes in the Income Tax Act Relating to Deductibility of Certain Costs Incurred in Attending Continuing Education Programmes

C. S. Redden,*

Halifax, N.S.

Interpretation Bulletin # 357R issued by Revenue Canada on May 21, 1980, states, in part:—

"Taxpayers may incur other costs of training (in addition to tuition fees**) such as travel, food, lodging, and this Bulletin explains the Department's views when self-employed taxpayers may deduct these expenses."

The Canadian Medical Association, on behalf of Canadian physicians, has continually petitioned the Minister of National Revenue to recognize these expenses incurred in participating in C.M.E. courses as a legitimate cost of earning business income. Other self-employed professionals such as lawyers, accountants and dentists, through their respective associations, have also been active in seeking changes in the regulations. It has been said that the half life of medical knowledge is five years†, and that research doubles the fund of scientific knowledge every ten years.††

Practising physicians are very much aware of this continuing expansion of knowledge and through a sometimes costly process of participation in C.M.E. programmes seek to improve their knowledge and skills, not for personal gain, but for the benefit of their practice population. The continuing desire, or necessity, to expand personal knowledge is highly dependent on the physicians' financial ability to meet tuition fees, absorb income losses during absences from practice, ongoing office overheads and other costs such as travel and lodging.

Until now none of these expenses (excepting tuition fees) have been considered by the Minister as a cost of earning business income.

Probabilities are that the new ruling will be an encouragement, and an incentive, to physicians to participate in C.M.E. courses offered by various education institutions and professional organizations.

NEW REGULATIONS

The general rule is that training is classified as either capital or personal in nature.

Capital training which is not deductible is defined as "acquisition of a new skill," which includes, for physicians,

*Assistant Professor and Administrator, Division of Continuing Medical Education, Dalhousie University, Halifax, N.S.

**Interpretation Bulletin # 1T82R, December 26, 1977, "... in computing income, (a student) may claim a deduction in respect to tuition fees paid . . . provided such fees exceed \$25.00."

† Report of ADHOC Committee on Education for Family Practice Council on Medical Education, A.M.A., Chicago, 1966, P. 28.

†† Royal Commission on Health Services, Medical Education in Canada, Queens Printer, Ottawa, 1965, P. 147.

"training to become a specialist" or any course "which gives a credit towards a degree, diploma, professional qualification or similar certificate."

Personal training is a "course which, for example, enables a professional to learn the latest methods of carrying his profession . . . even if it is in an area in which the professional was not actively involved previously though qualified to do so."

This clause, as interpreted, would permit deduction of tuition and other allowable costs incurred in participating in the usual Continuing Medical Education short courses and seminars as well as updating skills and knowledge through a Clinical Traineeship. Also covered are reasonable expenses incurred in participating in "professional development courses required or recommended by a profession to maintain professional standards."

RESTRICTIONS

Location of Course — "Costs of attending training courses outside the taxpayer's general geographic locale will only be permitted where a similar course is not given locally."

DURATION

Two to three weeks would normally be considered to be the maximum for which expenses are allowable, but longer courses may be acceptable in special circumstances. For example, a course sponsored or accepted by a professional association to maintain the professional standards of its members would generally be acceptable even if it lasts four to six weeks. The total time taken in attending courses in any one year should not be so great that the taxpayer can be said not to have carried on his business or profession for a significant part or all of the year.

DAYS WHEN NO TRAINING TAKEN

No expenses will be allowed for days when no training is taken except for days of arrival and departure and weekends where the course was attended on the preceeding Friday and the succeeding Monday (Tuesday if Monday is a holiday) and it is reasonable for the taxpayers to stay over the weekend. See Table:

A Training course must be distinguished from a meeting of groups of employees or owners of a business or a convention. An employer's cost of *in-house* meetings of employees are usually allowable in full, as are similar meetings of the owners of the business provided that they are reasonable and are incurred for the purpose of carrying on the business. While conventions usually result in the

	EXPENSES	
	Allowed	Not Allowed
Monday — date of arrival	X	
Tuesday, Wednesday — course attended	X	
Thursday — sightseeing trip		X
Friday — course attended	X	
Saturday, Sunday — no courses	X	
Monday to Friday — courses attended	X	
Saturday to Saturday — vacation		X
Sunday — date of departure	X	

acquisition of knowledge by those attending them, the deduction of expenses is specifically covered by subsection 20 (10) and is subject to the limitations of that provision. A convention may be defined as a formal meeting of members for professional or business purposes. The format is normally not that of a classroom, and those attending are normally not expected to study text-books, prepare assignments or take tests. A convention does not become a training course when some of its sessions take the form of workshops. A training course generally has a classroom format and those attending are there for the purpose of learning a subject in accordance with a formal syllabus. It is a question of fact based on the above tests whether a *seminar* is a convention or a training course. There is no provision in the Income Tax Act for an employee to deduct training expenses (other than tuition fees) in calculating income from employment.

An employer who incurs expenses in respect of an employee's training normally may deduct the expenses to the extent that they are reasonable in the circumstances no matter whether the training is for the benefit of himself or of the employee. If it is the employee who benefits and not the employer, a taxable benefit results within paragraph 6 (1) (a). Refer by analogy to paragraphs 17 and 18 of 1T-71R, 'Employees' Fringe Benefits — after 1971. A corporate

employer may not deduct training expenses which have been included in a shareholder's income under subsection 15(1).

PERSONAL OR UNREASONABLE EXPENSES

The Department will look at claims in respect of training costs with a view to determining whether there is any element of personal or unreasonable expense involved which would be disallowed by paragraph 18 (1) (h) or section 67. The Department may question the deductibility of expenses incurred in connection with attending courses held in distant locations or in recognized holiday areas. The fact that a training course in such a location or area was of relatively short duration and was followed by a personal holiday may indicate that a portion or all of the expenses claimed are not expenses of training but are personal expenses. Claims in respect of training courses held outside continental North America, and, generally, such courses held outside the territorial limits of a sponsoring professional organization or a business association would be held to be unreasonable.

COMMENT

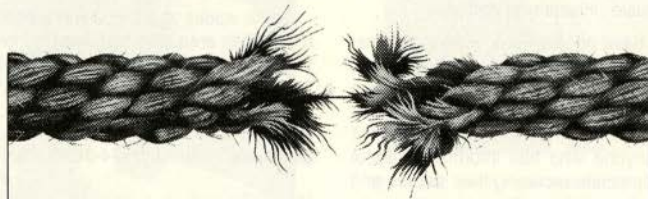
1T # 82R Bulletin defines tuition fees and Bulletin 357R states that in "addition to tuition fees taxpayers may deduct other costs of training." The implication being if the tuition fee is an allowable deduction then other costs are as well.

Tuition is defined as fees paid to "educational institutions inside and outside Canada." The definition of an educational institution generally is a University, College or other educational institution.

In claiming expenses of training a proper certificate from the educational institution which states fees paid and dates of the courses is necessary.


Professional organizations presenting courses for their members may determine if the course meets the requirements by contacting the District Taxation Office in their area.

It would seem that few problems will arise if C.M.E. courses are not of a capital nature, i.e. "acquisition of a new skill," but "maintain, update or upgrade a skill the taxpayer already has." □



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Canadian Mental Health Association

An Appreciation

DR. GERALD J. LeBRUN

Dr. Gerald Jersey LeBrun of Bedford died on March 29, 1980. Born in Grand Etang, Cape Breton, he was the son of the late Thomas and Jeanette LeBrun. During his early years he was a resident of Bridgetown, Annapolis County. He received his B.Sc. degree from Dalhousie University in 1933. Following his graduation from Dalhousie Medical School in 1937 he began his medical practice in Bedford, where he served the community and surrounding areas with singular dedication for 43 years.

In 1950 he interrupted his practice to do a residency in general surgery at the Victoria General Hospital and in 1952 received his certification from the Royal College of Physicians and Surgeons of Canada. He continued his practice of general medicine in Bedford and was on staff at the Victoria General Hospital department of surgery until 1976. Dr. LeBrun is described by Dr. Alan J. MacLeod, president-elect of the Nova Scotia Medical Society, as "a doctor's doctor . . . a skillful surgeon with a broad approach who was somewhat of a pioneer in this area. He pioneered vascular surgery techniques used in the artificial kidney program." He was a member of the Provincial Medical Board for several years, serving as president between 1967 and 1969.

He was a charter member of the Bedford Lion's Club, served a term as president, and continued his interest until his death. He established and chaired a Lions Club Committee for the purpose of eliminating the substantial mortgage on the Bedford Recreation Centre, and personally

burned the mortgage in June of 1979. Prior to this, in 1978, Dr. LeBrun was named "Citizen Of The Year" by the Bedford Service Commission for his years of service to the community. He was actively involved with The Canadian Rehabilitation Council For The Disabled and served on the board of The Crippled Children's Society. His "serious hobby" was politics, and he derived great personal satisfaction and enjoyment as a working member of the Progressive Conservative party.

Surviving are his wife, the former Barbara Longmere; one daughter, Suzanne, (Mrs. John M. MacKeigan), Grand Rapids, Michigan; one son, Dr. Paul LeBrun, Halifax; one brother, Judge Charles T. LeBrun, Bridgetown; and five grandchildren. He was predeceased by one brother, Gordon.

The early days of Dr. LeBrun's practice are affectionately described in Elsie Tolson's history of Bedford, *The Captain, The Colonel and Me*. "For 12 years he was the only doctor in a heavily populated area where one highway covered 45 miles . . . [his service] together with hospital work in the city have earned Dr. LeBrun, the dedicated man who rarely takes a holiday, the unofficial title of Dean of the Medical profession in the municipality."

His 43 years of medical service have left a deep and memorable imprint on the community of Bedford and its people. Our sympathy is offered to his family who were his greatest joy. □

S. C. Fuller, M.D.

Correspondence

To The Editor:

I am undertaking the compilation of a biography of the late Doctor Harold Bengé Atlee who was Professor of Obstetrics and Gynecology at Dalhousie University in Halifax.

If any of your readers have photographs, letters, publications (medical and non-medical), anecdotes, reminiscences, impressions, and personal opinions, I should be grateful if they would make contact with me so that arrangements can be made to enable me to examine the material. In addition, if your readers know of anyone who has information about Doctor Atlee, I should appreciate receiving their names and addresses so that I can approach them.

Too often, valuable material is lost because the people who have it consider it to be insignificant or unimportant. To the contrary, every scrap of information is valuable.

Yours sincerely,

Harry Oxorn, M.D.,
Professor and Obstetrician-Gynaecologist-in-Chief,
Ottawa Civic Hospital,
1053 Carling,
Ottawa, Ontario, K1Y 4E9

To the Editor:

I wonder if you would be willing to include this as a letter to the editor in a future issue of the *Bulletin*, please.

Some weeks ago I received a phone call from a doctor in the Halifax area who was seeking information on an author who had written on a case which the doctor was researching. I now have that information but unfortunately I have lost the name and phone number of the doctor. Please would he get in touch with me again at the School of Library Service, Dalhousie University, 424-3656; thank you.

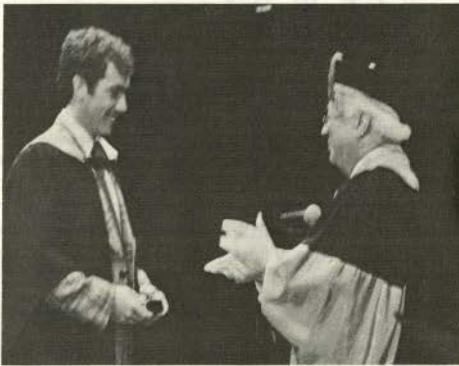
Yours sincerely,

Norman Horrocks,
Director, School of Library Service,
Dalhousie University, Halifax, N.S. □

Personal Interest Notes

1980 DALHOUSIE UNIVERSITY MEDICAL SCHOOL CONVENTION

The 1980 Convocation at Dalhousie University was held on May 23, when 90 students graduated with the M.D. degree, of whom 18 were women. Nine students graduated M.D. with Distinction. In the graduating class 55 were from Nova Scotia, 21 from New Brunswick, 7 from Prince Edward Island, 2 from British Columbia, 2 from Quebec and 3 from the United States.



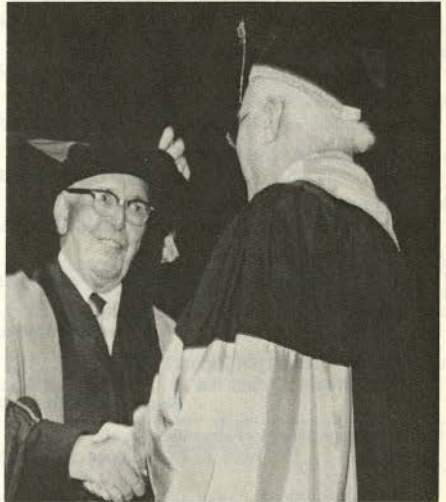
Dr. James Goulding receiving award from President Hicks.



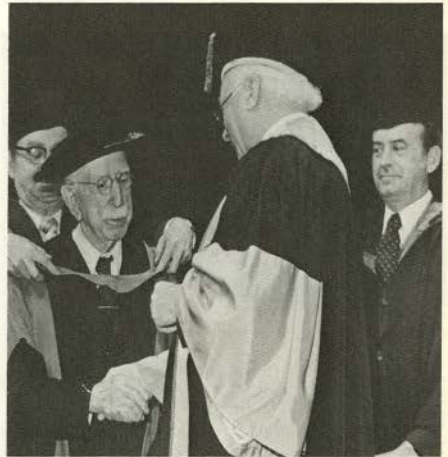
Drs. Kenny and Michael Buchholz receiving M.D. degrees from President Hicks.

Two distinguished Nova Scotians were honoured at the Convocation by receiving an Honorary Doctor of Laws, **Dr. R. C. Dickson**, former Professor and Head of the Department of Medicine, Dalhousie University, and **Dr. Luther B. MacKenzie** of Bedford, N.S.

Dr. Robert Dickson was Professor and Head of the Department of Medicine at Dalhousie University from 1956 to 1974 and has continued part time to this date. In the long list of accomplishments cited it may be noted that among them was and continues to be his interest in the far north which led to the first School of Oupost Nursing in Canada being established at Dalhousie University.



Dr. R. C. Dickson receiving Honorary LLD from president Hicks.



Dr. Luther MacKenzie receiving Honorary LLD from President Hicks, with President-Elect W. A. MacKay looking on.

Dr. Luther MacKenzie, being honoured on his 100th birthday, was a graduate of Dalhousie University with a B.A. degree and two years of medicine at Dalhousie before going to New York, where he received his M.D. from the Medical College of New York in 1904. When he retired in 1953 he was made Professor Emeritus of Clinical Medicine at New York University. He numbers among his former students, Dr. Jonas Salk and Dr. Albert Sabin, noted researchers and discoverers of poliomyelitis vaccine.

Prize Winners At The Convocation Were:

- Dr. C. B. Stewart Gold Medal **James Frederick Goulding**
- Dr. John F. Black Prize for highest standing in Surgery **James Frederick Goulding**
- Dr. Clara Olding Prize for highest aggregate in Fourth Year **Norman David Rosenblum**
- Andrew James Cowie, M.D., Memorial Medal for highest standing in Obstetrics and Gynaecology . . . **Norman David Rosenblum**
- Poulenc Prize in Psychiatry for highest standing in Psychiatry in Fourth Year **Catherine Lynn Shea**
- Prize in Medicine for highest standing in Medicine in all four years **James Frederick Goulding**
- Dr. J. W. Merritt Prize for highest standing in Surgery in all four years **James Frederick Goulding**
- Dr. W. H. Hattie Prize for highest standing in Medicine in Fourth Year **David Paul Cudmore**
- Dr. A. F. Miller Prize for best written review in the field of Respirology in Fourth Year . . **Donald Joseph Boudreau**
- Department of Surgery prize for highest standing in Surgery in Fourth Year **James Patrick McAuley**
- C.A.R.S. Prize for best essay on Disorders of the Locomotor System in Fourth Year **James Patrick McAuley**
Norman David Rosenblum
- Dr. S. G. B. Fullerton Award for Family Medicine in Fourth Year **Sidney John Crabtree**



Dr. Donald C. Brown, Associate Professor of Family Medicine, Dalhousie University, and physician in the Dalhousie Family Medicine Centre, Halifax, received the Canadian Family Physician's research award at the annual meeting of the College of Family Physicians of Canada, held in Vancouver in May. His paper, "Twenty Year Follow-up of Cancer of the Cervix in Family Practice," was published in the September issue of the college's journal, *Canadian Family Physician*, and was judged their best research article of 1979. The award was a cheque for \$1,000 and a scroll.

Dr. Allan Stewart has been selected for the Arms Award of the Society of Clinical Chemists in Boston. He is a founding member of the Canadian Society of Clinical Chemists.

Dr. Luther Burns MacKenzie of Bedford, Nova Scotia received an honorary LLD degree from Dalhousie University on his 100th birthday. His astounding record started with an athletic career and a BA degree at Dalhousie University 80 years ago. Subsequently, he practised medicine in New York, helping to found the famous Bellevue-New York University Complex and specializing in respiratory disease. Amongst his pupils were Drs. Salk and Sabin who were largely responsible for conquering poliomyelitis by vaccination. His early contemporaries include Lucy Maude Montgomery of Green Gables fame and Dr. Angus MacDonald Morton, the Bedford/Sackville country doctor. Dr. MacKenzie, who is still energetic and enthusiastic, must be congratulated on achieving the recipe for a long and successful life.



Dr. Margaret E. Churchill, President, The Medical Society of Nova Scotia, is shown presenting **Mr. Justice Emmett Hall** a reproduction of a '61 Chambers cartoon following presentation of the Society Brief on Health Insurance Programs on April 8, 1980. The old adage "one picture is worth a thousand words" couldn't have been more appropriate than it was in this case. For those of you who no longer have your copy of the November 1961 issue of the *Bulletin*, the cartoon is printed on this page.

NEWS NOTE

Dr. Robert C. Dickson, who is well known by several generations of Dalhousie University physicians and students as Professor of medicine from 1956 until his retirement in 1974, also received an honorary degree from Dalhousie University. During Second World War, Dr. Dickson served in the Royal Canadian Army Medical Corps and was appointed to the Medical Council in 1966, becoming Chairman in 1974.

Dr. Donald J. Rice, Executive Director of the College of Family Physicians of Canada, received an honorary degree from Dalhousie University. A native of Bridgewater and graduate of Acadia University, he served in the army in England and Europe, receiving his MD degree in 1951 after returning to Dalhousie. He was appointed a Director of the Canadian Cancer Society and National Cancer Institute of Canada. He was elected as the first Chairman of the Council of World Organization of National Colleges of General Practitioners and Family Physicians. □

Two Nigerian representatives visited Dalhousie University medical school early in June, seeking faculty members for a new school of medicine at the University of Maiduguri in the North East region of the rapidly developing, oil-rich African country. Dr. Jibril Aminu, accompanied by Chief Bunmi Rotimi of the Nigerian Embassy in Ottawa, said teachers are urgently needed in community medicine, pathology, children's diseases, internal medicine and surgery. The university's academic year starts in October and in January 1981, a new 450-bed hospital opens at Maiduguri.

Common diseases in Nigeria are tuberculosis, tetanus, malaria, typhoid, measles, schistosomiasis, hookworm, Burkitt's lymphoma, ulcers, and all communicable diseases, plus periodic outbreaks of meningococcal meningitis.

The conditions of service and appointment may be obtained from the Director, Nigerian Universities Office, 320 Queen Street, Suite 2210, Ottawa, Ontario, K1R 5A3.

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Halifax, N.S. B3H 3C3

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