

THE NOVA SCOTIA MEDICAL BULLETIN

EDITORIAL BOARD

Editor-in-Chief

DR. B. J. S. GROGONO

Associate Editor

DR. A. C. IRWIN

Dr. A. J. Buhr
Dr. P. C. Gordon
Dr. S. M. A. Naqvi
Dr. J. A. R. Tibbles
Dr. J. P. Welch
Dr. W. Putnam
Dr. T. J. Murray

Managing Editor

MR. D. D. PEACOCKE

Editorial Assistant

MRS. T. CLAHANE

The Woes of Young Women

"Isn't it fortunate I've got such an imagination"

Anne of Green Gables

L. M. Montgomery

Early marriages and large families were the fashion amongst early settlers. On this North American continent, it was not uncommon for girls to have three or four children before they were out of their teens. Maternal and infant mortality were high as can be seen by a visit to some of the old cemeteries. In Bath, Maine,¹ for instance you can find the graves of eight women who died between the ages of 20 and 22, and it is recorded that many women died in childbirth.

The first Governor of Massachusetts, John Winthrop¹ was a father seven times before he was 27. Large families were common and one mother had 26 children which would be regarded as a record in these days of small families.

Most young women were assisted in childbirth by midwives carrying out the tradition and skills brought over from Europe. In fact, the wife of Dr. Samuel Fuller, the earliest practitioner of Massachusetts, was a highly esteemed midwife and came over on the Mayflower.¹

These midwives were widely accepted and practised in New York City and throughout the colonies. Some like "ancient venerable and useful Mrs. Mary Bedwell, of Boston rested from her labors at the age of one hundred years and one day." Others succumbed to a less fortunate circumstance. The most celebrated early colonial midwife was Anna Hutchinson, who came from England in 1634. After delivering a mother of an anencephalic monster she was hounded out of town and subsequently met a tragic end. She was murdered in an Indian raid after she had travelled south to Long Island.

Midwives practised in the Southern states where their fees varied considerably — anything from 100 lbs. of tobacco to 12 hens was acceptable! The widespread services of midwives was common in England and a jealously guarded privilege of women until the invention of obstetrical forceps. This occurred around 1733 when men midwives began to assert their influence.

Edinburgh was the first medical school to introduce a course of obstetrics in 1726, and this teaching was largely confined to midwives. Subsequently, the work of William Smellie and William Hunter brought obstetrics into the world of practical science, based on anatomical and clinical observation. It was John Hunter, the surgeon, however, who discovered that the circulation of the fetus and of the mother were separate systems.

On this continent two pioneers, Dr. William Shippen of Philadelphia and Dr. James Lloyd of Boston, became the first fully established practitioners and teachers of midwifery.¹ From then on the development of obstetrical care diverged on the two continents. Whereas a system of obstetrics in which midwives play a major role evolved in Britain,² they have been largely excluded in the North American continent, where the organization involves obstetricians, gynecologists, general practitioners, and nurses.

The plight of young pregnant women — particularly unmarried mothers — has been the subject of many heart rending stories and the fate of young women — particularly the poor — has often been appalling. One has only to read of the story of the Founding Hospital in London (The Royal Free) or scan the pages of *London Labor and London Poor* to realize the extent of human deprivation wrought by the Industrial Revolution.³

JUN 18 1984

The last century has brought remarkable social and scientific changes almost beyond the dreams of our forebears. During the past two decades the invention and the widespread adoption of family planning has been accompanied by the changing moral attitudes of our society. The advances in gynecology and obstetrics have been remarkable and are continually changing.

Women have been liberated from unwanted pregnancies, obstructed labor and can even be warned of certain defects in the fetus such as neural tube defects. Mothers are no longer ostracized if they are unmarried and can expect to have their babies safely in clinical cleanliness of a well organized obstetric unit. Furthermore, their own medical condition and that of the fetus can be accurately monitored so as to almost completely eliminate the risk of childbirth. The terrible fears of puerperal sepsis, obstructed labor and cataclysmic hemorrhage which were the plague of the lying-in hospital a century ago, are no longer with us.

What impact has this scientific, social and sexual revolution had on young women? Are all their troubles eliminated?

We are fortunate in being able to present an excellent series of articles on adolescent obstetrics and gynecology. First, "when does a girl become a woman?" is discussed skillfully by Susan Sherman. Then, Dr. T. Corkum's two contributions will dispel many of the myths about teenagers and give an accurate assessment of the situation in Nova Scotia.

During the nine years which he reviews, the number of teenage pregnancies has remained steady and has recently shown a slight decline. Of the 808 adolescent pregnancies, 467 were aborted and 341 delivered. This corresponds to .77% of the total number — 44,301 patients — delivered in the Halifax hospitals over this period. Of those that continued with pregnancy the only major difference between the teenagers and the more adult mothers was the high incidence of toxæmia. Perhaps the most remarkable fact was that 59% of single mothers elected to keep their babies.

The success of treatment of adolescent pregnancy is shown by the fact that the perinatal (stillbirth plus neonatal) rates were similar to the general adult population, an indication of a high level of prenatal and obstetric care. Regarding the menstrual disorders of teenagers, Dr. Corkum has given a very careful analysis and a method of systematic investigation which should be of assistance to all interested practitioners. As mentioned by Coprac and Kinch,⁴ these young women need careful, private and confidential examination. In the past, teenagers seldom saw a gynecologist but since 1950, when the first pediatric and adolescent clinic was inaugurated in the Chicago Children's Hospital, a new interest in this important aspect of gynecology has been fostered.⁵

Dr. Corkum's second article delves into the more recent endocrine aspects of menstrual dysfunction, yet provides a practical guide.

In addition to these articles, Dr. W. H. Lenco has written an appraisal of Fimbrectomy as carried out in his hospital and Dr. C. A. Maley has given an outline of the present status of tubal ligation.

It seems almost incredible that it was less than a 100 years ago (in 1898) that obstetricians were not called in to see their pregnant patient until delivery was imminent.² In many ways

it was better that no prenatal examination was carried out owing to the danger of infection.

Those that advised cleanliness and the disinfection of linen and instruments were laughed to scorn. This was the fate of Oliver Wendel Holmes in America and Ignaz Semmelweis in Europe.⁷ Of course, no one believed Alexander Gordon of Aberdeen when he said in 1795, "I had evident proof that every person who has been with a patient in the puerperal fever became charged with an atmosphere of infection which was communicated to the pregnant woman who happened to come within its sphere".²

Gynecology has come a long way since Ephraim McDowell of Kentucky⁶ performed the first ovariectomy on Christmas day in 1809. The woman had an enormous abdominal swelling and he made a nine inch incision to the left of the rectus abdominus. "He put a string ligature around the fallopian tube near the uterus and he cut open the tumor which was in the fimbrous part of the fallopian tube very much enlarged." He incised and removed the sac weighing 7 1/2 lbs. as well as 15 lbs. of gelatinous substance.

The operation was terminated in twenty-five minutes. He closed the wound with interrupted stitches leaving the ligature around the fallopian tube outside. The patient made an uneventful recovery and was making her own bed when he visited her five days later.

The fallopian tube remains the subject of much publicity. Apart from ligating it, or re-anastomosing it, some gynecologists are now involving this important organ in realms of 'test tube babies'. In certain instances, when the fallopian tube is blocked and the mother sterile, the ova can be carefully harvested, impregnated in vitro with suitable sperm, and reimplanted into the mother's uterus. This has been successfully achieved by Steptoe and Edwards.

Ova as early as two cells can be successfully transplanted. The age of test tube babies is about to burst upon the world.¹ The possibilities of embryo and ova reimplantation are discussed in a recent article in *The Lancet*.⁷

Truly, women's woes have lead to many diverse discoveries!

□
B.J.S.G.

References

1. Herbert Thomas. *Chapters in American Obstetrics*. Charles Thomas, Springfield, USA. 2nd. Edition, 1961.
2. Walter Ratcliffe. *Milestones in Midwifery*. John Wright and Sons, Bristol, England, 1967.
3. Henry Mayhew. *London Labor and London Poor*. Griffin Boston and Company. London, England, 1861.
4. Caparo V J, Kinch A H. *Adolescent Gynecology*. Seventh Ross Round Table on Critical Approaches to Common Pediatric Problems. Ross Laboratories, Columbus, Ohio, 1977.
5. Huffman J W. *Gynecology of Adolescents*. *Clin Obs Gyn* 1971;14:961-962.
6. Harold Speert. *Obstetrics and Gynecology in America — A History*. Waverly Press Inc. Baltimore, Maryland, 1980.
7. Editorial. Test Tube Babies Whatever Next. *Lancet* 1981;2:1265.

When Does a Girl Become a Woman?*

Susan Sherwin,** Ph.D.,

Halifax, N.S.

The question is one of when does a child become an adult, and in order to answer it, we must decide what sort of criteria to seek. That's what a philosopher can help with: we need to reflect on the purpose of the distinction, in order to know where best to draw it. Maturity can be measured on physiological, political, legal, social, or moral grounds, and different criteria will be relevant for different purposes.

Whichever category we choose, we should not hope to find any magic moment at which there is a sudden and observable change from the characteristics of childhood to those of adulthood. The change here is one of a gradual process where the boundary may be fuzzy for a fairly significant period of time. Adolescents will pose confusion because they will count as adult in some respects, but not in others; for most persons, we will have no trouble knowing that at ten years of age the individual is a child, and at twenty-five he or she is an adult.

BIOLOGICAL CRITERIA

If we were interested in the distinction for biological purposes, as we are for the other species and for medical care, we would select appropriate biological criteria, such as the end of the growth period, or the development of reproductive capacity. I'll defer to your expert judgment about the most useful physiological marker.

POLITICAL CRITERIA

For political purposes, it is politically necessary to fix an arbitrary date, generally the eighteenth or nineteenth birthday, rather than to attempt to measure any specific ability. It is important to know whether someone is a child or an adult within a state, because adulthood carries with it many civil rights and responsibilities. Freedom to drink, attend dirty movies, vote, and engage in other risky ventures is restricted to adults. As you surely know, women have had some difficulty in establishing their credentials as adults in the political sphere, no matter what their actual age. Along with children, idiots, and criminals, women were denied the right of self-government. The first Province to grant women the right to vote (and recognize their political status as adult citizens) was Manitoba in 1916. Quebec did not get around to allowing women to vote until 1940! It is fifty years since women were legally declared to be persons by the Supreme Court of Canada (reversing an earlier decision that we were *not* persons). I believe it's only been about ten years since women have been allowed to enter taverns in some provinces. But now, for most purposes, both male and female children are thought to become adult citizens when they reach the age of majority. Most legal rights are tied to the political age of maturity, but the age of majority for particular rights and liabilities does vary somewhat in statute (such as the right to marry).

*Based on an address given at the National Meeting of the Canadian Committee of Fertility Control in Val David, Quebec, September 1979.

**Associate Professor, Department of Philosophy, Dalhousie University, Halifax, N.S.

SOCIAL CRITERIA

The social judgment of adulthood is the hardest one to determine because it is a matter of convention and the conventions are very vague and variable. To a large extent, it is a matter of evaluation and judgment of behavior. Unfortunately, such evaluation is generally determined by one's expectations and values. Feminists complain regularly that women's roles in our society tend to be childlike. "Immature", dependent, irresponsible behavior is regularly reported to be the norm for women. If we are socialized to expect childlike behavior from women, and in turn women are socialized to behave in a childlike fashion, it will be very difficult to make the social distinction between a girl and a woman; further, the blurring of the roles and social status of girls and women makes the distinction less relevant. ("Girl" once was used to refer to a young person of either sex; it no longer can be used for males but it still retains the sense of immaturity).

Feminists object to the blurring of the distinction because they see the danger in not making any differentiation. If women are socially equivalent to children, then they are not receiving the respect adults are entitled to. They tend to be patronized and not taken seriously — fine for fun and entertainment, but not really to be trusted with responsible decision-making.

Black men deeply resent being called "boy" because they know such a locution is a mark of disrespect and even contempt. Having one's manhood recognized is very important socially and culturally. Many women recognize that there is a comparable insult underlying the use of the term "girl" for adults. It is often used to establish low status (secretaries are "girls", or worse yet, "my girl", but female bosses are always "women" or "ladies"). Many of us reject the old saw that it is a compliment to be thought so youthful, for implicit to that notion is the idea that maturity is unwelcome and something to be embarrassed about. The idea that women are more desirable if they can pass as girls denies the value of maturity in women. To take pleasure in others' misperceptions of oneself, one must accept the premise that it is better to be what they think you are than to be yourself. Such attitudes are not consistent with self-respect.

While I'm at it, let me point out that forms of address which are frequently used with women may convey the same denial of respect owed an adult. Endearments like "dear" are fine for expressing genuine intimacy and love, but they are patronizing when applied to virtual strangers or someone with whom there is only a professional relationship. A good test of appropriateness is whether the form of address can legitimately be reciprocated. Some doctors call patients "dear", but would be shocked to hear themselves addressed that way since it would not be showing proper respect. And, of course, the use of first names carries the same kind of social status symbolism. It is common to call women by their first names, as one does with children, when it would be thought disrespectful for the women to respond in kind or when a male in similar circumstances would be addressed more formally. (On a personal note, the kind of thing I'm

talking about is the innumerable committees on which I sit where I am always referred to as "Sue", but my male colleagues are "Dr. X" or "Professor Y". I don't mind the use of "Sue", but I don't like the assumption of social hierarchy which the different usages convey.) You won't be surprised to hear that I have some reservations about the convention of doctors calling adult patients by their first names while expecting a more formal form of address in return. Such a practice reinforces the questionable assumption that the doctor-patient relationship is one of authority rather than equality.

MORAL CRITERIA

I've talked about the biological, political, and social significance and criteria of adulthood, but the really crucial perspective, the one that underlies the political and social distinctions, is the moral significance of adulthood. From the moral point of view, adults are full-fledged moral agents; that is, they are responsible for their actions. Children are not held to be fully responsible in a moral sense. We have different expectations of their behavior and make different sorts of judgments about it. Correspondingly, we grant them less freedom. Moral theorists often refer to an abstraction which they call the moral community. By this they mean a group of moral agents who are capable of moral decision-making, and hence who are *responsible* for making moral decisions. It is called a community because being a moral agent, i.e. a responsible being, entails having certain rights and freedoms and also duties, and primary among those duties is treating *other* moral agents with respect for their freedom. So being a moral agent is really being part of a community of moral agents and carries with it certain fundamental rights and responsibilities with respect to other moral agents.

Freedom, responsibility, rights, and personhood are interdependent concepts in moral theory. It is becoming a popular moral view that the ultimate moral principle is that we ought to treat persons with respect — to recognize their status as autonomous beings with preferences and a right to exercise those preferences. So to be a fully-developed person is to be fully a member of the moral community, assuming one's responsibility as a moral agent, and in turn being entitled to have oneself and one's preferences respected.

CHILDREN'S VALUES

Children have preferences, too, but they are often ill-formed and inadequately thought out. They are frequently inept at balancing long-term and short-term interests. Their moral views are immature and they generally seem incapable of a wide-range of socially responsible behavior. (An interesting empirical base for this assumption is provided by the work of Lawrence Kohlberg, a developmental psychologist: Kohlberg argues that children undergo a developmental sequence in moral reasoning and seldom reach the advanced stages of moral reasoning until their early twenties.)

Because children are not thought to be fully responsible in their thoughts and actions, they are not granted full freedom in most societies. They are not full-fledged members of the moral community since they are not fully responsible moral agents, and hence they have less stringent moral duties, but also less freedom. Paternalism is thought acceptable in dealing with children — requiring them to comply with a

course of action which someone *else* considers to be in their best interests. Paternalism is a restriction of the individual's freedom and it is justifiable only when the individual is unable to exercise that freedom properly.

ADULT STANDARDS

Adults, in ordinary circumstances, are thought to have a right to autonomy, to make their own choices in matters that primarily affect themselves. Paternalism is inappropriate for adults unless their rational decision-making powers are seriously impaired for some reason (such as when they are drugged, or unconscious, or mentally retarded).

It is true that some adults are not very good at making decisions and probably everyone makes mistakes sometimes; nonetheless most theorists argue against interference even in such cases. The reason for their stubbornness is that we're likely to make even more serious mistakes if we attempt to head off other individuals' folly and try to save them from themselves. Individuals differ in judgments of value. What one person considers a desirable value, another may consider completely unacceptable. So what appears to be a mistake in reasoning may really be a disagreement in values. In such disputes, the sensible course is to allow the individual most directly concerned to decide. This is consistent with the only universalizable principle available: in matters primarily affecting an individual, let that individual make the choice. (Please note that this liberty principle does not apply to cases where another person may be seriously harmed — that is a different point, and interference is justified here on the grounds that another person's freedom and well-being is being threatened.)

INDIVIDUAL RESPONSIBILITY

Since respect for autonomy and protection against paternalism is a right of adults and not of children, it is important to know whether an individual is an adult or a child. A measure of paternalism is owed to a child, but it is morally wrong when applied to an adult. Adults are not entitled to be taken care of in the same way that children are; responsibility is the other side of freedom. Adults are held responsible for their behavior and subject to blame and serious punishment when it is judged wrong. Children are "trained" to avoid wrongful behavior but are not usually judged; however, adults are condemned when they engage in wrongful acts. To be an adult, then, is to be subject to full moral judgment, blame, praise, duties, rights, and particularly respect as a responsible moral agent.

This, of course, is the main reason feminists have been trying to teach us to distinguish "girls" from "women". To be a girl is to be a child, not fully responsible for oneself, not to be trusted to make all decisions affecting oneself. It is to be in need of supervision and control. By contrast, to be a woman is to be responsible, to be entitled to respect, to have the right to make decisions primarily affecting oneself rather than to be directed or controlled. It is to be free.

Now there are undoubtedly some temptations about maintaining one's status as a girl, adopting the Peter Pan, I won't-grow-up, view. It's nice to be cared for, to avoid responsibility, to be coddled and cuddled. However, women have noticed there are some disadvantages to the role. When your "caretaker" has a somewhat different view of your interests, the "care" can feel more like oppression. Without respect, it is difficult to have any control over one's

life — political, economic, social and interpersonal decisions will be made that affect one and yet there is not way to have any input.

From a moral point of view, then it is important to distinguish adults from children. Morally, it is wrong to treat adults with paternalism unless their decision-making powers are clearly reduced at the time. As autonomous, responsible decision makers, adults have the right and responsibility to act according to their own judgment in matters primarily affecting themselves.

PATERNALISM

The claim that paternalism is morally wrong in relationships with adults is often difficult for professionals, especially physicians, to accept. Professionals, for example — doctors, lawyers, genetic counsellors, business consultants, etc. — have a special, thorough expertise that their clients lack. Persons come to them to be told what to do. I don't want anyone to conclude that I object to such relationships as paternalistic. There is nothing paternalistic in offering advice, especially expert advice and particularly when such advice is solicited. It is completely acceptable (in fact, generally commendable) from a moral point of view to provide a person with information and expertise which that person needs for rational decision-making. The morally dangerous ground for such professionals comes in the temptation to make decisions for the client — to select her/his ends or values as well. For example, it would not be paternalistic to tell a client inquiring about abortion what procedures are available and the advantages and disadvantages of each, and even saying "I'd recommend X because. . ." or "You run a very high risk of having a genetically defective child; let me explain your options". However, it certainly is paternalistic to say "Don't be silly; you don't want/need an abortion". It is the difference between how we behave to children who are not fully trusted and hence not allowed the liberty to make major decisions for themselves, and how we treat autonomous adults.

The reason I'm so concerned that we consciously recognize that we are dealing with adults when relating to women is that it is very hard not to be paternalistic in some situations. It takes a certain conscious effort to resist paternalism when we have opinions about another person's well-being. Physicians, in particular, have an exceptionally hard time of it. They are frequently trained to be paternalistic — to anticipate a patient's ends and provide guidance that will minimize any dissonance the patient may face in acting in accordance with those ends. Also, patients are often ill, and serious illness can reduce an adult's autonomy and decision-making capacity, creating a childlike dependency which requires a paternalistic response. Moreover, patients frequently demand paternalism from their physicians. Trained to expect the doctor or counsellor to make the decisions, many patients seek to evade taking responsibility for themselves and they demand that the physician continue to make all the decisions, including the value judgments.

I sympathize with the health professional who is caught in this trap, but I think it is a dangerous practice to continue. The patient or client is the one who will live with the outcome of the decision and must recognize and assume the responsibility of living with the consequences, and hence it is preferable that she be the one to pick the values used in making the decision. Whether it is a question of using contraception, or a particular form of contraception, or having an abortion, or

taking action to produce fertility, or even to remove cancerous tissue, the patient will be most profoundly affected by that decision. It is up to her to determine her preferences about the outcome; the health professional's job is to inform her of what preferences are realistic and of how best to achieve the most desirable, feasible goal.

IMPLICATIONS

I have made a big deal of what one is entitled to in the way of respect and freedom if one is an adult, and the converse seems to be that one is not entitled to any such thing if not an adult. Logically, that's incorrect. All that we can properly infer is that if someone is not an adult she is not entitled to as much freedom and respect as she would be otherwise.

I think it is surely the case that the physician or counsellor can affect the patient's involvement in the decision-making process by his or her behavior towards the patient. A patient who is treated as a responsible autonomous moral agent is more likely to take responsibility for her own life than one who thinks she is not being involved in a cooperative enterprise. The patient who is treated as a child, called "girl" or "dear" or "Sue" by a physician who clearly expects to be called "Doctor" and be treated as a superior, authority figure will have a hard time breaking the paternalism cycle herself. Unless very strong in spirit, she will be made to feel self-doubts and lose confidence in her ability to act responsibly. She may rebel against being treated as a child, but that rebellion may result in withdrawal from the whole situation and refusal of involvement with health professionals at all. There is a very large self-help women's health movement which has recently developed that consists largely of women who reject the dismissive treatment that they feel medical professionals have offered them. Personally, I'm all for self-help, i.e. doing what one can for oneself, but I do think there are some decisions that require technical expertise, and I think it is most unfortunate to allow so many patients to become so thoroughly offended and alienated that they will not come near "the system" at all. This, too, could be a moral failing, and is surely a medical failure.

I think I've made clear the reasons for my view that we must be very definite to acknowledge the adulthood of those who are undoubtedly women. It is necessary for moral, social, and even medical reasons. But there are two more crucial questions to deal with here: the "when" and "what" implication we can draw for those who are not yet women.

THE GRADUAL DEVELOPMENT OF ONE'S CAPACITIES

Maturity is a process. We pick some point in development where sufficient maturity is achieved to count as clearly adult and use that for our division, but the months and years preceding that point reflect continuing development of maturity and a correspondingly increasing right to greater freedom and responsibility.

Infants and small children have very limited decision-making capacities, and so they have little scope for free action. They can choose flavours of ice cream and friends, and favourite stories. But parents are obliged to be paternalistic and ensure that they have a balanced diet, a limit to television viewing, sufficient time to sleep, exposure to learning opportunities, etc., even if coercion is required. Seven-year olds are capable of further choices but strong controls are still called for. As children enter adolescence they ought to have quite a wide range of freedom and

responsibility, but still a significant measure of paternalism is not only justified but obligatory. By the end of adolescence, those controls should be lifted and the new stage of adulthood (free of coercive paternalism) is reached.

It seems, then, that fifteen-year olds should be granted a very significant degree of freedom and responsibility. They should be very much involved in decisions affecting their own futures. From a moral point of view, though, I think some paternalism is still appropriate. That is, it is not normally wrong to disagree about their evaluations of their own well-being and to try to require them to comply (provided the person making the judgment has the fifteen-year old's best interests at heart). However, here we run into practical difficulties, for it is a mystery to most parents and youth workers *how* we go about getting teenagers to comply. There may be no way to get them to do what we rightly believe is in their best interest without causing them even more serious hardship, and so we may resign ourselves to not exercising our paternalistic judgments. Or, we may discover that the best way to get them to do as we think best is to refrain from paternalism and treat them as if they were adults (a kind of second-order paternalism). But this is a psychological question and I am out of my field here; my point is the simple moral one that if an individual is not yet an adult, some measure of paternalism is morally permitted (if one can manage to exercise it). The degree of paternalism permissi-

ble decreases as the child's age increases. So the non-adult is entitled to increasing freedom corresponding to her developing maturity.

WHEN DOES A GIRL BECOME A WOMAN?

The final question of when, is really the first one, and by now you've probably noticed I've been avoiding it. My excuse is that there is no precise answer. Somewhere between the ages of seventeen and twenty-one, children become adults in the moral sense. I have no difficulty with the case Dr. Love cited in proposing this address to me — as I recall, he spoke of a thirty-four year old mother of four and author of five books, and I can say unequivocally that she is a woman. Though the actual date of transformation is hard to pin down, the problem is perhaps not too serious because the degree of freedom and responsibility one is entitled to grow in the same kind of continuous process as the relevant mental and social capacities. On one end of the chronological continuum, we clearly have children. (I am reminded of a favourite Doonesbury cartoon where a precocious child in a feminist-run nursery arrives excitedly one morning proclaiming that her mother just had "a baby woman".) But I'm pretty secure that up to age sixteen or so, we can confidently use the term "girl". And I fear we'll just have to put up with a bit of fuzziness around the edges in the late teen years. □

MEDICAL SOCIETY INSURANCE PROGRAM

Level Term Life Coverage

(Maximum Available — \$300,000.00)

Age	Annual Premium Per \$25,000	Special Student Rate For one \$25,000 unit
Under 31	\$ 45.00	
31-35	\$ 55.20	
36-40	\$ 62.40	Under 31 — \$30.00
41-45	\$ 98.04	31 & Over — \$35.40
46-50	\$126.96	
51-55	\$199.68	
56-60	\$272.04	(Additional units available at regular rates)
61-75	\$421.92	

LONG TERM DISABILITY, PHYSICIANS OFFICE EXPENSE AND ACCIDENTAL DEATH AND DISMEMBERMENT COVERAGE AVAILABLE THROUGH THE ONTARIO MEDICAL ASSOCIATION.

SHOULD YOU WISH INSURANCE COUNSELLING PLEASE CALL MR. SCHELLINCK AT THE MEDICAL SOCIETY OF NOVA SCOTIA OFFICE 453-0205.

Adolescent Pregnancies

A REVIEW OF MODERN MEDICAL MANAGEMENT 1971 — 1980

T. P. Corkum,* M.D., M.Sc., F.R.C.S.(C),
Halifax, N.S.

SUMMARY

This review summarizes various maternal, fetal and neonatal criteria in 341 adolescent gravidae delivered from 1971-72 to 1980 in Halifax, Nova Scotia. Pre-eclamptic toxæmia appeared to be the only obstetrical complication, the incidence being increased over that of the general population. The importance of good prenatal care in reducing complications in this age group cannot be over-emphasized.

At the present time approximately half of all deliveries occur in patients less than 20 years of age. The sexual revolution, and the earlier somatic and sexual maturation of both males and females, has undoubtedly contributed to the precocious initiation of sexual activities among adolescents. Consequently, this has increased the numbers of pregnancies and marriages in the teenage group.

Teenage pregnancies can be subclassified according to age:

- (a) Juvenile Gravida — less than 13 years.
- (b) Adolescent Gravida — 13 years to 16 years.
- (c) Late Teenage Gravida — 16 years to 20 years.

The present review deals only with the performance of adolescent gravidae in the Halifax-Dartmouth area of Nova Scotia since 1971.

MATERIALS AND METHODS

Since this study began we have seen 808 adolescent pregnancies. A significant number of these had emotional problems which were significant enough to consider therapeutic termination (Tables I and II). Four hundred and sixty-seven (467) adolescent pregnancies were terminated therapeutically. Of the total 7,976 abortions undertaken in Halifax since 1971, 5.8% were performed in young women aged 13 to 16 years.

The latest statistics from Birth Registration for the Province of Nova Scotia show that the overall number of adolescent pregnancies is changing little from year to year (Table III). This is contrary to the popular belief that teenage pregnancy is increasing in epidemic proportions. It is possible, however, that the young adolescent behaves differently from her older sibs. Her young age may afford her the protection of relative infertility. She may also be more amenable to parental guidance and sex education.

Since 1971 we have delivered 44,301 patients in the Halifax area. The majority of these patients — 38,062 — have been delivered in the Grace Maternity Hospital. The

remainder were delivered in the Halifax Infirmary prior to the closure of its obstetrical unit in 1976. It may be seen, therefore, that 0.77% of our total deliveries were adolescent gravidas (Table IV and Figure 1)

TABLE I
VICTORIA GENERAL HOSPITAL — THERAPEUTIC ABORTIONS

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Total Number Performed	433	535	599	681	704	814	849	975	1108	1278
Number Performed on 15 Yr. Olds + Younger	18	28	32	40	46	60	60	59	56	68
% of Total	4.2	5.2	5.3	5.9	6.5	7.4	7.1	6.1	5.1	5.3

Percentage of therapeutic terminations occurring in adolescent gravidae, Victoria General Hospital, 1971-1980.

TABLE II
VICTORIA GENERAL HOSPITAL

Total Therapeutic Abortions	7976
Total Therapeutic Abortions in Adolescents	467
% Therapeutic Abortions in Adolescents	5.8%

Percentage of therapeutic terminations occurring in adolescent gravidae, 1971-1980.

TABLE III
STATISTICS FOR BIRTH REGISTRATIONS

Year	Deliveries by Age			Total
	13	14	15	
1971	3	24	103	130
1972	—	25	76	101
1973	3	20	91	114
1974	6	25	96	127
1975	2	9	94	105
1976	7	19	87	113
1977	3	16	83	102
1978	1	23	90	114
TOTAL	25	161	720	906

Total number of adolescents delivered in Nova Scotia, 1971-1980.

Asst. Prof. Obs.-Gyn, Lecturer Dept. of Paediatrics, Dalhousie University, Halifax, N.S.

TABLE IV
TOTALS BY AGE GROUP (GMH)

Year	Total Deliveries	13	14	15	% Per Year
1972	4818	0	6	35	0.85
1973	5110	2	5	24	0.61
1974	4934	1	7	35	0.87
1975	5044	2	4	30	0.71
1976	4905	1	5	36	0.86
1977	4742	1	10	27	0.80
1978	4997	1	11	36	0.96
1979	4893	0	6	19	0.51
1980	4858	0	12	25	0.76
TOTAL	44301	8	66	267	0.77

Total adolescents: 341

Total number of adolescents delivered in Halifax-Dartmouth, 1972-1980.

PERCENTAGE OF DELIVERED ADOLESCENT PATIENTS

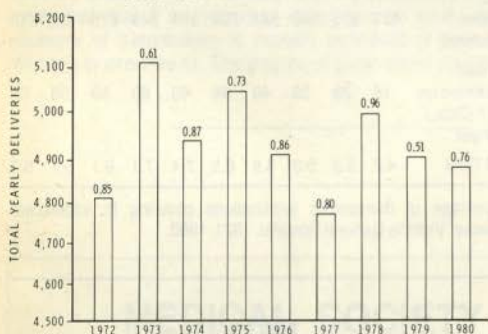


Fig. 1 — Percentage of adolescents in the total obstetric population, Halifax-Dartmouth, 1972-1980

RESULTS

(a) Mode of Delivery

Various factors must be considered when discussing the mode of delivery of the adolescent. In the very young gravida skeletal and pelvic growth may not be complete. The obstetrician may be timid when considering caesarian section and its future implications in a 13 or 14 year old. The adolescent tends to be anxious, immature, and poorly prepared for the discomforts of labor. This may give rise to incoordinate uterine activity and overzealous sedation.

Our study shows that 89% of our adolescent pregnancies were delivered vaginally. The caesarian section rate of 11% is similar to our overall section rate for the same time interval (Table V and Figure 2). The significance of this rate, however, lies in the observed time spent in labor. In other words, it is quite possible that the caesarian section rate was kept down at the expense of prolonged labor.

In those patients delivered vaginally, 71% were in labor less than 12 hours and 94% were in labor less than 18 hours. This suggests that either dystocia in this group was not a problem, or early recognition of dystocia led to prompt treatment (Table VI and Figure 3).

TABLE V
TYPES OF DELIVERY (Vaginal vs. Caesarian)

	13	14	15	Total
Vaginal (All Types)	6	58	238	302
Caesarian Section	2	8	29	39
% of Vaginal Deliveries	75%	88%	89%	89%
% of C/S Deliveries	25%	12%	11%	11%

Type of delivery in 341 adolescent gravidae, 1972-1980. (Difference from general population: $\chi^2 = 0.4$; $P < 0.25$; NS).

DELIVERY TYPES

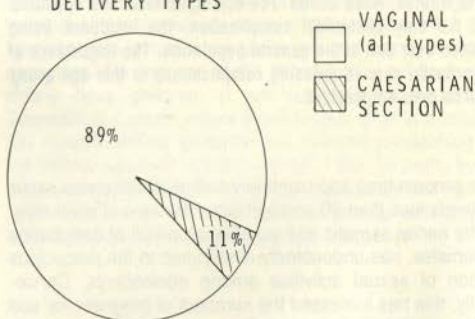


Fig. 2 — Percentage of adolescent gravidae delivering by the vaginal route versus caesarian section.

TABLE VI
TOTALS BY AGE GROUP

Hours of Labor (vaginal)	13	14	15
Less than 3 hours	2	1	13
3-12 Hours	4	34	147
12-18 hours	-	17	49
More than 18 hours	-	3	13
Not Charted	-	3	16
TOTAL	6	58	138

Numbers of hours spent in labor by adolescents undergoing vaginal delivery.

VAGINAL DELIVERIES

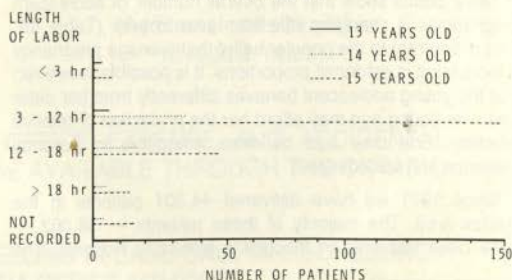


Fig. 3 — Time spent in labor, by age, for adolescents undergoing vaginal delivery.

In those patients delivered by the abdominal route, the majority were in labor less than 18 hours. In fact, 11 patients underwent caesarian section prior to the onset of labor. These findings reflect the obstetrician's concern for the indications for caesarian section rather than his concern for his patients age (Table VII and Figure 4)

TABLE VII
TOTALS BY AGE GROUP

Hours of Labor C/S	13	14	15
Less than 3 hours	—	—	4
3-12 hours	1	2	6
12-18 hours	—	3	6
7-8 hours	—	—	2
Not charted	1	—	3
No labor	—	3	8
TOTAL	2	8	29

Numbers of hours spent in labor by adolescents undergoing caesarian section.

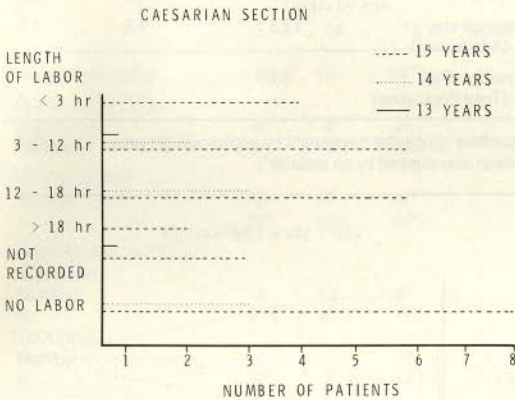


Fig. 4 — Time spent in labor, by age, for adolescents undergoing caesarian section.

(b) Fetal Outcome

The standard for fetal assessment at birth is the one-minute Apgar rating. For this study, a high Apgar suggests fetal well-being. In our total group of adolescents, 79% delivered with an Apgar score of 8 or better (Table VIII and Figure 5). The 15 year olds, however, seemed to fare better than the 14 year olds. Unfortunately, there were too few 13 year olds to really compare. Certainly, more figures are needed here to draw any valid conclusions for the youngest patients.

Periodically one will see prematurity and growth retardation mentioned in reference to the adolescent gravida. Certainly, with reference to low socio-economic background, dietary indiscretions, poor weight gain, and inadequate prenatal care, one might expect to see differences. In this study 8.3% of babies weighed less than 2500 gm. This compared favourably with the 6.5% rate in the general population (Table IX and Figure 6). If instead gestational age was reviewed, it was found that 7.9% of adolescent

TABLE VIII
TOTALS BY AGE GROUP

Apgar By age	13	14	15
1-4	—	4	12
5-7	1	16	35
8-10	7	44	215
Stillbirth	—	2	2
Not Charted	—	—	3
TOTAL	8	66	267
% Apgars less than 8	88%	67%	81%

Apgar scores, by age, for adolescents delivering 1972-1980.

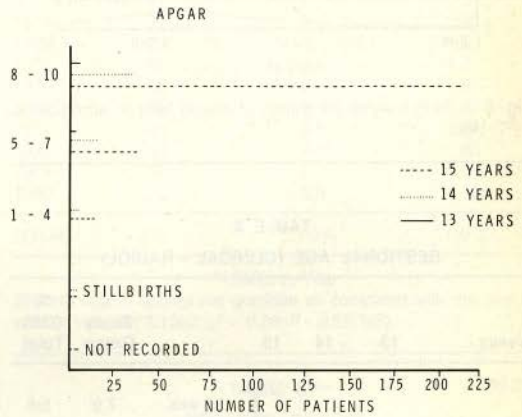


Fig. 5 — One-minute Apgar ratings for infants born to adolescents, 1972-1980.

TABLE IX
TOTALS BY AGE GROUP

Weights by age	13	14	15	% Study Group	% Total Pop.
<1000 gm	—	—	1	8.3	6.5
1000-2499 gm	1	5	21		
2500-3500 gm	6	33	164		
>3500 gm	1	28	79	91.7	93.5
Not Charted	—	—	2		
TOTAL	8	66	267		

Birth weights of infants of adolescent gravidae, 1972-1980 (Difference from general population: $\chi^2 = 0.8$; $P < 0.25$; NS)

pregnancies ended at less than 36 weeks gestation, which again compared favourably with the overall hospital rate of 5.6% (Table X and Figure 7).

(c) Maternal Outcome

If there were a significant increase in maternal complications in the adolescent gravida, then one might expect this to

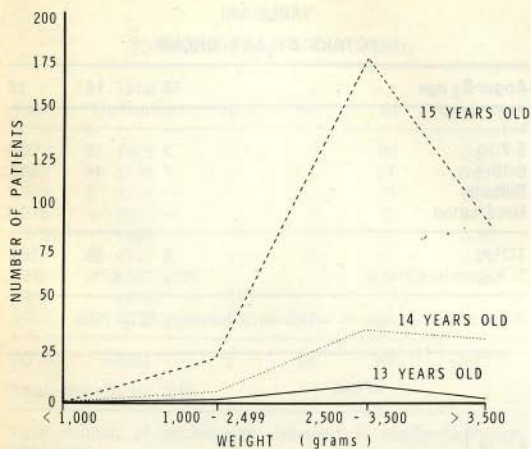


Fig. 6 — Birth weights (in grams) of infants born to adolescents, 1972-1980.

TABLE X
GESTATIONAL AGE (CLINICAL + RADIOL)

Weeks	13	14	15		% Study Group	% GMH Total
20-28	—	—	1	} 36 wks.	7.9	5.6
28-36	—	3	21			
36-42	7	50	214	} 36 wks.	92.1	94.4
>42	1	6	13			
TOTAL	8	59	249			
Unrecorded	25					

Gestational ages (in weeks) of infants born to adolescent gravidae, 1972-1980.

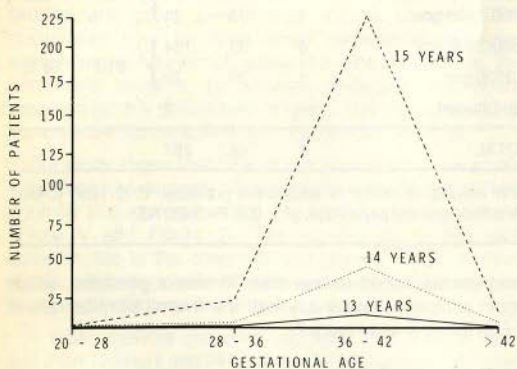


Fig. 7 — Gestational ages (in weeks) of infants born to adolescents, 1972-1980.

be reflected in an increased hospital stay. The total lengths of hospital stay were examined in both the study group and in the total hospital population. The average hospital stay in each adolescent group was higher than the 6.0 days spent by the average gravida. The mean hospital stay was between 5 and 7 days in all age groups (Table XI and Figure 8).

Another major problem which has previously been alluded to in discussion of diet is anemia. Fifteen percent (15%) of our patients had a hemoglobin value of less than 10.5 gm% (Table XII).

TABLE XI
HOSPITAL STAY (DAYS)

Length of stay (Days)	13	14	15
1-4	—	14	49
5-7	—	32*	139*
8-10	1	10	44
11-13	—	2	13
14-20	1	5	12
21+	2	3	10
TOTAL	8	66	267
Average stay (Adolescent)	13.3	7.5	7.7
Average Stay (Total Population)	6.0*		

Numbers of hospital days spent by adolescent gravidae, 1972-1980. (Mean stay marked by an asterisk*)

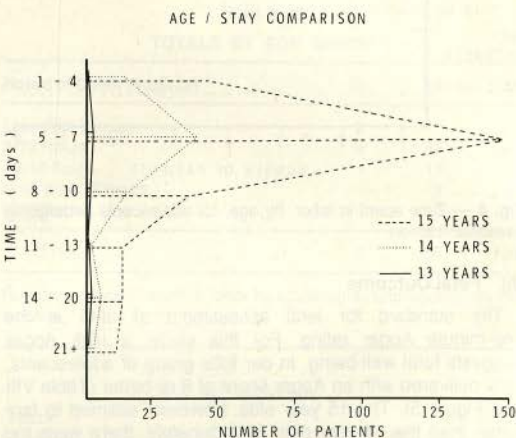


Fig. 8 — Average hospital stay (in days), by age, for adolescent gravidae, 1972-1980.

Most authorities have found an increased incidence of toxemia in the adolescent gravida. The present study shows a two to three fold increase with the average incidence of 5.4% (Table XIII). In reviewing the lengths of hospitalization, it became apparent that in most patients with prolonged stays, the complication was pre-eclamptic toxemia. Why this should be a particular problem in this age group is not known. Some have attributed it to a poor diet, low in protein and high in carbohydrate, excessive weight gain, suboptimal

TABLE XII
TOTALS BY AGE GROUP

Initial Hemoglobin Values (gm%)	13	14	15
<9	—	—	5
9.0-10.5	2	7	34
10.6-11.5	2	12	62
11.6-12.5	3	19	65
12.6-13.5	1	18	52
13.6-14.5	—	6	25
>14.6	—	1	5
Not Charted	—	3	19
TOTAL	8	66	267
% <.10.5 gm %	25%	11%	15%

Initial hemoglobin values (in gm %) of adolescent gravidae at time of delivery, 1972-1980.

TABLE XIII
MISCELLANEOUS CRITERIA

	Totals by age			%GMH
	13	14	15	
Total per age group	8	66	267	
MARITAL STATUS:				
No. Married	0	6	23	
%Married	0	9.1%	8.6%	
KEEPING BABY:				
Number	2	37	161	
%	25%	56%	60%	
MEDICAL and/or PSYCH. PROBLEM:				
Number	4	13	47	
%	50%	20%	18%	
TOXAEMIA:				
Number	1	5	36	
%	9%	7.6%	13.5%	5.4%
HAEMORRHAGE (all Types)				
Number	0	2	16	3.7%
%	0%	3.0%	6.0%	
RETAINED PLACENTA:				
Number	0	1	1	1%
%	0%	1.5%	0.4%	

Miscellaneous criteria surveyed in adolescent gravidae, 1972-1980 (Incidence of toxemia differs from the general population: $\chi^2=30.0$; $P<0.005$).

prenatal care, immaturity of the neuro-endocrine system, and poor physiologic compliance to the increased stresses of pregnancy.

As part of this review a number of other criteria were examined. Despite the fact that only 8.5% of the girls were married, 59% are keeping their babies. Many of these children were incorporated into the extended family and raised as maternal sibs by the grandparents. There was no increase in the incidence of haemorrhage or retained placenta in the study group. Of note, however, is the relatively high incidence of medical and particularly

psychological problems in the adolescent gravida. As the age of pregnancy increases these particular problems appear to lessen.

The success of treatment of the adolescent gravida is ultimately reflected in the perinatal mortality rate. Since 1972, we have had 3 stillbirths, and 2 neonatal deaths (under 7 days). The stillbirth and neonatal mortality (perinatal mortality) rates are similar for adolescent gravidae and the general obstetrical population (Tables XIV and XV).

TABLE XIV
STILLBIRTHS

Year	Total Stillbirths (All Deliveries)	Stillbirth Rate (%)	
		13-15 Age Group	For All Deliveries
1972	31	0	.96
1973	36	0	1.0
1974	42	0	1.2
1975	36	0	.94
1976*	46	2.4	.95
1977*	45	2.6	.95
1978	44	0	.88
1979	29	0	0.59
1980*	27	2.6	0.55
TOTAL	336	1.0%	0.9%

*1 Stillbirth/Year

Stillbirth rate in adolescent gravidae as compared with the overall stillbirth rate, 1972-1980 ($\chi^2 = 0.08$; $P < 0.25$; NS).

TABLE XV
NEONATAL DEATHS

Year	Total Neonatal Deaths (All Deliveries)	Neonatal Death Rate (%)	
		13-15 Age Group	For All Deliveries
1972	32	0	1.0
1973	29	0	0.84
1974*	69	3.0	2.0
1975	42	0	1.1
1976	49	0	1.0
1977	35	0	0.74
1978*	53	2.1	1.1
1979	33	0	0.94
1980	36	0	0.74
TOTAL	378	0.67%	1.1%

*1 Neonatal Death/Year

Neonatal mortality rates in adolescent gravidae as compared with the overall neonatal mortality rate, 1972-1980 ($\chi^2 = 0.14$; $P < 0.25$; NS)

DISCUSSION

Huffman has defined the adolescent gravida as a select group of teenagers between 13 and 15 years of age. Most authors have chosen to include all pregnancies when reviewing the obstetrical performance of teenagers. The present study, however, only deals with adolescents.

Several authors have reported increases in toxemia^{1,2,3} prematurity^{1,4} and perinatal mortality⁵ in the youngest gravida. This review examines various maternal and fetal

criteria in the 341 adolescent gravidas delivered from 1971-72 to 1980. Such parameters as mode of delivery, time spent in labor, one minute Apgar, prematurity, birth weight, medical complications, haemoglobin, antepartum haemorrhage, stillbirth rate, neonatal mortality rates, and toxemia were studied. Preeclamptic toxemia appeared to be the only obstetrical complication, the incidence of which was statistically increased over the general obstetrical population. It was gratifying to see the perinatal mortality rate in the adolescent gravida the same as the more mature patient. This may be due to:

- (a) the high quality and ready accessibility of prenatal care in the Halifax-Dartmouth area;
- (b) the more than adequate diets, reinforced with vitamins and protein which teenagers enjoy today;
- (c) the adolescent's cardiovascular system, uncompromised by atherosclerosis and vasospasm secondary to essential hypertension;
- (d) the strong family support given to the very young gravida but withheld from the older unmarried teenagers;
- (e) the ability of most youngsters, who are either attending school or unemployed, to get adequate amounts of rest and exercise.

The adolescent gravida must still be considered as a high risk patient; however, with adequate, conscientious prenatal care she should fare as well as her older sister.

CONCLUSION

This review has examined various material, fetal and neonatal criteria in 341 adolescent gravidae delivered from 1971-72 to 1980 in Halifax, Nova Scotia. Pre-eclamptic toxemia appeared to be the only obstetrical complication, the incidence of which was increased over the general population. The importance of good prenatal care in reducing complications in this age group cannot be overemphasized. □

ACKNOWLEDGEMENT

I would like to thank members of the Medical Records Department, Halifax Infirmary and Grace Maternity Hospital for their assistance in preparing data for this manuscript. In particular I wish to thank Mrs. R. Ryan of the Halifax Infirmary who has spent a considerable amount of time over the past several years preparing the charts and graphs included in this study.

Bibliography

1. Battaglia F C, Frazer T M *et al.* Obstetrical and paediatric complications of juvenile pregnancy. *Paediatrics* 1963; **32**: 902-910.
2. Claman A D, Bell H M. Pregnancy in the very young teenager. *Am J Obstet Gynecol* 1964; **90**:350-354.
3. Duenhoelter J H, Jimenez J M, Baumaun G. Pregnancy performance of patients under fifteen years of age. *Obstet Gynecol* 1975; **46**:49-52.
4. Israel S L, Deutschberger J. Relation of the mother's age to obstetric performance. *Obstet Gynecol* 1964; **24**:411-417.
5. Hulka J F, Schaaf J T. Obstetrics in adolescents: a controlled study of deliveries by mothers 15 years of age and under. *Obstet Gynecol* 1964; **23**:678-685.

Nitrol®

(nitroglycerin ointment, 2%)

Description: Nitrol® Ointment contains 2% nitroglycerin (glyceryl trinitrate) in a special lanolin-petrolatum base.

Action: When the ointment is spread on the skin, the active ingredient (nitroglycerin) is continuously absorbed through the skin into the circulation, thus exerting prolonged vasodilator effect. Nitroglycerin ointment is effective in the control of angina pectoris, regardless of the site of application.

Indications: Nitrol® Ointment is indicated for prophylactic management or symptomatic treatment of angina attacks, associated with or resulting from coronary insufficiency, coronary artery disease, coronary occlusion.

Contraindications: Nitrol® Ointment is contraindicated in patients with marked anemia, increased intraocular pressure or increased intracranial pressure. Nitrol® Ointment should not be employed in patients with known idiosyncrasies to nitrites.

Warning: In terminating treatment of anginal patients, both the dosage and frequency of application must be gradually reduced over a period of 4 to 6 weeks to prevent sudden withdrawal reactions, which are characteristic of all vasodilators in the nitroglycerin class. Information regarding the use of nitrates in acute myocardial infarction are insufficient to establish safety.

Precautions: A hypotensive headache is a sign of overdosage. Occasionally elderly patients may have no untoward symptoms while recumbent, but may develop postural hypotension with faintness upon suddenly arising.

Dosage and Administration: For angina pectoris the ointment may be applied every 3 to 4 hours as required. The usual dose is 1 to 2 inches, as squeezed from the tube, although some patients may require as much as 4 or 5 inches. The ointment should be spread in a thin uniform layer on the skin. The optimum dosage is determined by starting with an application of ½ inch of ointment and increasing the dose in ½ inch increments each successive application until headache occurs, then decreasing to the largest dose which does not cause headache. Nitrol® Ointment can be applied to any convenient skin area but psychologically, many patients prefer the chest.

Measurement and application of the ointment is easily accomplished with the aid of the specially designed Appli-Ruler® supplied with the ointment. The ointment can be squeezed onto the graduated area of the Appli-Ruler and conveniently spread over the desired skin area. Keep the tube tightly closed and store at controlled room temperatures.

Supplied: 30 gram tube
60 gram tube

References:

1. Reichel, N. Goldstein, R.E., *et al.*, *Circulation*, **50**: 1974.
2. Armstrong, P.W., *et al.*, *Am. J. Cardiol.*, **46**: Oct. 1980.
3. Taylor, W.R., Forrester, J.S., *et al.*, *Am. J. Cardiol.*, **38**: Oct. 1976.
4. Parker, J.O., *et al.*, *Am. J. Cardiol.*, **38**: Aug. 1976.



Kremers-Urban (Canada)

6541 Mississauga Rd.,
Mississauga, Ont. L5N 1A6

Adolescent Menstrual Dysfunction — A Gynecologist's Viewpoint

T. P. Corkum,* M.D., M.Sc., F.R.C.S.(C),
Halifax, N.S.

Two menstrual problems I am commonly asked to see in the adolescent female are dysmenorrhoea and irregular cycles (dysfunctional bleeding). These young women are often under the care of, or have been seen by, several different physicians. This fact alone leads me to believe that menstrual problems are very difficult to handle and a complete cure is often impossible. After all, the menstrual cycle is physiological but all too often the patient, parent, and physician try to make it pathological. The nature of the menstrual cycle with its accompanying discomfort, flow, irregularity, etc. has to be appreciated. As well, one must assess whether in fact any interference is necessary. We must always remember the old Latin adage, "Primum non Nocere" (first do no harm).

I would, therefore, like to share a few thoughts, impressions and observations with the reader. Certainly there may be some dispute with that which I have to say. Different people may have different approaches to the same problem and find their methods highly satisfactory. For the less well informed perhaps the following may give some direction.

DYSMENORRHOEA

Classically, dysmenorrhoea has been classified as either primary (functional) dysmenorrhoea or secondary (organic) dysmenorrhoea.

Primary dysmenorrhoea usually begins early in life when ovulation consistently occurs. This is probably six months to two years post-menarchal, and accompanies regular cycles. The crampy lower abdominal discomfort occurs during the first 12 to 24 hours of the menstrual cycle and may be accompanied by nausea, vomiting and minor changes in bowel habits. It is postulated that the etiology of this problem is prostaglandin produced by the early menstrual endometrium. Studies have directly correlated prostaglandin levels in menstrual blood with severity of dysmenorrhoea. Other factors such as congenital cervical stenosis, the infantile uterus, and uterine retroversion probably only contribute minimally to this problem. In some cases there is a strong psychological over reactivity which may exaggerate a minor problem thus creating a problem of major proportion.

Secondary dysmenorrhoea is pathological or organic in nature. In the adolescent the major causes are congenital anomalies of the internal genitalia and/or external genitalia, endometriosis and pelvic inflammatory disease. Usually, we have thought of secondary dysmenorrhoea starting later in life; however, the menstrual period that is terribly uncomfortable from menarche is highly suspect of being pathological (secondary) in nature. Investigators now recognize that certain diseases, notably endometriosis, can occur in the very young. The young woman with menarchal dysmenor-

rhoea is highly suspect of having a congenital anomaly usually associated with outlet obstruction or mullerian (uterine) fusion-canalization failure.

Management

I have long felt that physicians have been too anxious to prescribe oral progestins for the symptomatic relief of dysmenorrhoea. I am not referring to the young woman who pleads dysmenorrhoea, but really needs contraception. It is necessary, despite the patient's age, to take a careful history as well as perform a complete physical examination including speculum and rectal and/or vagino-abdominal examination. If after this, one's impression is that the case represents functional dysmenorrhoea, then I recommend the following protocol.

Each step lasts approximately three months, and it is essential to stress that the treatment will not be magical. I try to emphasize rest, exercise, nourishment, psychological support, hygiene, etc. I also suggest that the discomfort may not completely disappear; however, treatment should allow the patient to attend school and participate in most activities during a menstrual period. It always worries me when I hear of girls being put to bed for four or five days during menstruation, as I know there must be a deficiency in the home environment.

Step I consists of mild analgesics such as Midol or ASA, or a combination of ASA or acetomethaphin with codeine. I feel the codeine level should be kept fairly low as the narcotized youngster performs little better than the youngster with severe pain.

Step II consists of antispasmodics such as Stelabid, Probanthine, and Bellergal. These agents have been available for sometime, and there are some patients who find them very effective, especially in combination with a mild analgesic. Their use is short-term, during early menstruation, and they need not be taken prior to menstruation which is often difficult in the young woman with irregular menses.

Step III consists of the antiprostaglandins. We have all been bombarded with literature on these "wonder drugs". Certainly they are very useful in a wide number of patients. Such products as Anaprox, Ponstan, and Motrin are part of our everyday vocabulary. I find these products particularly useful if there are significant gastrointestinal symptoms. Some of the antiprostaglandins are best given two to three days prior to the onset of menses whereas others are used at the onset of the menstrual period and during the first day or two of the menstrual period.

Other medications may also be of some value for the treatment of dysmenorrhoea. Megavitamin therapy, diuretics with or without tranquilizers, tranquilizers alone, and Vasodilan have been successful in the treatment of some patients.

There are some cases of apparent functional dysmenorrhoea which do not seem to respond to conservative

*Asst. Prof., Obs.-Gyn. Dalhousie University, Paediatric Lecturer, Dalhousie University, Director, Paediatric Gynecology, IWK Hospital for Children, Halifax, N.S.

treatment. I refer to these as resistant cases, and I feel they deserve more intense investigation. If I have a resistant case, or I see a patient previously seen by two other physicians for dysmenorrhoea without relief, or previously seen by the same physician on at least two occasions without relief, then I progress to examination under anaesthesia (EUA), laparoscopy, and possibly dilation of the cervix. Here some may differ in their approach. It has been my impression that at this point many would put youngsters on oral progestins. It has also been my impression that a two or three month course on 'the pill' does little for the problem if the pill is withdrawn after this period. The adolescent started on the pill at this time is being subjected to a very long course of medication. Also I do feel, as many have previously felt, that progestins at a very young age will soften a naive youngsters inhibitions and promote premature sexual experimentation.

It is my feeling that in many cases previously treated successfully with oral progestins a misdiagnosis was made. Actually rather than giving symptomatic relief from functional dysmenorrhoea many cases of endometriosis and tubal reflux were being medically managed. I say this as over 70% of adolescents laparoscoped with a diagnosis of dysmenorrhoea, having fulfilled the above criteria, show evidence of pelvic pathology which could explain their symptoms. This same finding has been verified by Dr. John Leventhal in Boston. He had examined well over 100 cases at last communication and, strangely enough, the most common pathologic finding was endometriosis, a disease we know is well handled with the use of oral progestins.

The management of organic or pathologic dysmenorrhoea depends upon the nature of the disorder. One must always remember that any treatment must be compatible with future fertility. Endometriosis may be treated medically and/or surgically. However, I do feel that it should be treated and not left to run its natural course, as this may result in advanced disease at an age when fertility is of paramount importance. The medical treatment may include the use of oral progestins, depoprovera or cyclomen (Danazol). Here it must be emphasized to the patient and her guardian that the medications are being used for therapeutic reasons and will be closely monitored. In many cases "the pill" is the best and least expensive method of pseudopregnancy treatment.

Surgical treatment has little part to play in this age group apart from dilatation of the cervix and excision of endometriomas. In some instances I still do cervical dilatations even though its use has been abandoned by some. In many cases laparoscopy reveals intense hemosiderin staining of the pelvic peritoneum, serious pelvic inflammation and increased peritoneal fluid. I feel that dilatation of the cervix will facilitate catamenia, whereas the use of low dose oral progestins will lighten the period thus decreasing tubal reflux.

Pelvic inflammatory disease in the adolescent may be primarily related to Neisserial infection; however, some of the worst cases occur as the result of other infective pelvic processes such as appendicitis and Crohn's disease. Again, medical treatment is the cornerstone of therapy. Increased rest, fluids, antibiotics, high protein diet, etc. are all useful. It has been my impression that adolescents with a fixed, retroverted uterus, and perioophoritis resulting in periovarian adhesions, extraperitonealization, and cystic changes, have considerable menstrual discomfort. Certainly these adolescents may be almost totally incapacitated by constant pain which is exaggerated at the time of menses. For this group

surgery with lysis of adhesions, uterine suspension with or without presacral neurectomy, antibiotic and corticosteroids will often give much wanted relief.

Congenital genitourinary anomalies are usually due to failures of fusion or canalization. The menstrual discomfort is severe. A mass may be present from cryptomenorrhoea, there may be urinary tract anomalies, and secondary endometriosis if there is any outlet failure, (e.g. blind horn, imperforate hymen, blind hemivagina.) The treatment for outflow failure is to secure drainage to the outside, or to remove the offending structure such as a blind uterine horn. A trial of pseudopregnancy may be thought wise by some prior to actual surgery. In the case of bicornuate uterus or fusion anomalies, metroplasty at this time for this reason (dysmenorrhoea) has little role to play. This surgical procedure is used mainly in an effort to control early or mid-trimester pregnancy wastage. If medical treatment does not control dysmenorrhoea and/or menstrual dysfunction which appears to be persistent, then one should consider presacral neurectomy with long-term pseudopregnancy.

DYSFUNCTIONAL BLEEDING

In the adolescent the initial menstrual periods are usually anovulatory. However, they may be ovulatory as cases of pregnancy prior to menarche have been described. It seems, therefore, that adolescents are prone to menstrual dysfunction or dysfunctional uterine bleeding.

Huffman has divided adolescent dysfunctional bleeding into three groups:

- | | |
|-----------------|--|
| Mild | — normal haemoglobin slight irregularity of flow timing |
| Moderate | — haemoglobin over 9 gm % frequent, heavy menses |
| Severe | — haemoglobin less than 9 gm % prolonged, unrelenting haemorrhage. |

Management

In this particular problem again "Primum non Nocere" should prevail. It is too easy to start oral progestins before taking a thorough history and performing a complete physical examination. The history must include age of menarche, timing of menses, estimation of flow, history of bleeding disorder, etc. The physical examination must include a speculum as well as bimanual examination. One must always consider pregnancy and its complications such as abortion.

One can obtain some idea of the quantity of flow by the haemoglobin estimation. Certainly a low haemoglobin is more ominous than a normal haemoglobin. A white blood cell count and smear will help exclude a blood dyscrasia. I always include in my initial workup a clotting profile, platelet count and "thyroid screen". Based upon history, physical examination, and ancillary lab data one can then sub group the patient into one of the aforementioned categories.

Treatment

I. Mild

In this group usually no treatment is required. The haemoglobin is normal. Depletion of iron stores can be

treated with supplementary oral iron. A menstrual calendar and pad count with description is also useful. I find many mothers disturbed by the number of napkins used by their daughters during a menstrual period. When they describe the pads, however, most will remark that they are only slightly stained. A more thrifty attitude will solve this problem.

Dysfunctional bleeding is usually self-limiting. Over two or three months most adolescents will find they are back into a more acceptable pattern. I find a calendar helps here as most normal youngsters feel they are menstruating more often than their calendars will reveal. In the normal adolescent a well documented cycle is most reassuring that all is going well. In an abnormal situation a well kept calendar should give direction to intelligent treatment.

II. Moderate

This group of young women can usually be managed quite well on an outpatient basis. Again replacement iron is important and one must keep an eye open for a reticulocyte response.

The less severe moderate bleeders may be managed with cyclic progesterone (provera). This medication will mimic the absent luteal or secretory phase of the menstrual cycle. I usually give 10 to 15 mgm daily for 5 to 10 days beginning on day 14 to 18 of the cycle. Over a period of three months this usually controls the menses. After medication is stopped many adolescents will cycle relatively normally.

One may choose instead to block hypothalamic control, and regulate the menstrual function medically. This can be done with a combination of estrogen and progestin, e.g. combined oral progestins or with sequential medication such as premarin with provera or norquen.

When starting oral progestins some prefer a low dose pill; however, I find breakthrough bleeding tends to be a problem. Therefore, I tend to use a high dose pill initially and then after a few months drop back to a low dose pill. I keep up this medication for at least six months before stopping. Most of these young women will begin to recycle normally; a few, however, will again develop menstrual problems, and if detected early, often a low dose medication here will suffice.

I remember a youngster I was treating for menstrual problems with different combinations of oral progestins. She seemed to repeatedly run into bleeding problems which would be remedied by a change of medication. She had her medication changed so often I was dizzy thinking up new combinations. Finally, it was decided to stop all her medications and begin again, which was the best decision made for her. Once the medications stopped, so did her menstrual dysfunction. Her menses have been quite regular since this time. This is a prime example of iatrogenic irregular uterine bleeding. In her case the treatment was as bad, if not worse, than the disease itself. I point this out so that others will not fall into similar traps while treating menstrual dysfunction.

III. Severe

To treat the adolescent with severe dysfunctional bleeding is a frightening experience. The haemoglobin may be as low as 5 or 6 gm percent. Blood is literally pouring from the vagina. After stabilization and cross-matching, IV therapy, and transfusion are begun. One must take special note of coagulation factors before, during and after transfusion. This

is the place for intravenous Premarin therapy, 25 mgm q 3-4 hourly for 6 doses. Along with this a high dose oral progestin, one (1) tablet q8h is begun. Usually the bleeding will be under control within 24 to 48 hours. When bleeding has ceased the oral progestins can be reduced to one (1) tablet q12 h. This is kept up for about 10 days. I then reduce the dosage to one (1) tablet OD for a further week after which I allow a period to begin. This withdrawal bleed is often quite heavy. I again start a cycle of high dose oral progestins, one (1) daily, in cyclical fashion beginning the 4th or 5th day of flow. The length of time I will allow menstruation really depends on the quantity of flow. If the medications outlined above do not work, then one must consider an EUA, D&C and laparoscopy. A D&C is not an easy task on a virginal 13 year old. One must embark upon it with trepidation. The vagina is tiny, exposure difficult and the cervix may be tight and certainly is easily lacerated. I might consider a laparoscopy on a patient if EUA reveals abnormal pelvic findings or if I suspect a uterine anomaly or ectopic pregnancy.

For those patients unresponsive to estrogens, androgens have been used successfully to stop dysfunctional uterine bleeding. Testosterone Propionate 25 mgm every day for 10 doses will usually stop bleeding. These doses are usually not adequate to cause masculinization. More definitive surgery, e.g. hysterectomy or radiation castration are only mentioned for the sake of completeness. Their use has been almost entirely abandoned for this problem.

Dysmenorrhoea and menstrual dysfunction are two interesting gynecologic problems occurring in the adolescent patient. I have attempted to present a few personal thoughts on these problems, and hope that I have given some help with respect to treatment initiation when it is felt to be necessary. □

82/83 EDITION OF CONTRACEPTIVE TECHNOLOGY

Available soon at reduced rate of \$8.50

Due to authors' special invitation, **Planned Parenthood Nova Scotia** is able to offer you the 11th revised edition of this practical, yet comprehensive, manual at a reduced rate. This resource has been widely used by health professionals in the family planning field, and the 82/83 edition has added to its already extensive coverage two completely new chapters on "Infertility" and "Future Methods of Birth Control".

To order your copy or to make further inquiry, please contact:

Cumberland Co.	— 667-7500
Cape Breton	— 539-5158
Pictou Co.	— 755-4647
Halifax/Dartmouth/Halifax Co.	— 455-9659
Yarmouth/Clare/Digby	— 769-3005

or

Planned Parenthood Nova Scotia,
1815 Hollis St., Halifax, N.S.
B3J 1W3 Phone 423-2090

Failures Following Fimbrectomy

William H. Lenco,* M.D., F.R.C.S.(C),
Liverpool, N.S.

SUMMARY

Four pregnancies developed following 101 bilateral fimbrectomies performed from July 1977 to December 1979; a four percent failure rate. This unacceptably high failure rate was probably due to the fact that fimbrectomy is a less safe procedure than tubal interruptions performed for the purposes of sterilization.

Fimbrectomy as a method of sterilization was initially reported to have a low failure rate.¹ Subsequently, Metz² among others have reported a failure rate as high as 4%. Fimbrectomy as a method of sterilization has never gained widespread acceptance, despite its ease of performance and lack of interference with the blood supply to the fallopian tube and ovary. Because of an unacceptable failure rate and its very poor chances of reversal, the method is rapidly falling into disfavour.

The purpose of this report is to confirm the high failure rate associated with fimbrectomy.

METHOD

Between July 1977 and December 1979, 120 consecutive operations for sterilization were performed at the Queen's General Hospital by the author: 101 cases (or 84%) were bilateral fimbrectomies; 13 (or 11%) were bilateral tubal interruptions; and in 6 (or 5%) of the cases a fimbrectomy was performed on one side with a tubal interruption on the other side. (See Table I)

TABLE I

NUMBER OF DIFFERENT TYPES OF
STERILIZATION PROCEDURES

Procedure	No. of Cases	Percentage
Bilateral Fimbrectomy	101	84%
Bilateral Tubal Interruption	13	11%
Fimbrectomy on one side and Tubal Interruption on the other side	6	5%
TOTAL	120	100%

Tubal interruptions were carried out by a modified Pomeroy technique in which approximately a 1 cm. portion of the fallopian tube was removed from its mid portion, the proximal end being ligated and subsequently suture ligated with 3.0 Dexon, and the distal free end ligated with similar material. Fimbrectomies were carried out by using a double clamp technique in which two curved hemostats were applied over the distal end of the tube and the fimbrial end was excised. A ligature of 3.0 Dexon was used, proximal to the medial hemostat, and a suture ligature of the same material

was used proximal to the lateral hemostat. Both fimbrectomies and tubal interruptions were performed through a 5 cm. Pfannestiel incision which varied in width depending on the patient's weight.

Most patients were admitted the day prior to surgery and discharged the day after, while a minority (less than 10%) were done as out patients. Post partum sterilizations were usually carried out on the fourth day with the exception of those done at the time of cesarean section. In all cases, a general anaesthetic was used.

RESULTS

There were four subsequent interuterine pregnancies, all occurring in the 101 fimbrectomized patients, or a 4% failure rate among those patients. Since December 1979, all subsequent ligations have been modifications of the Pomeroy method.

Of the four failures: (i) one decided to continue on with the pregnancy; (ii) another had a therapeutic abortion with repeat tubal ligation; (iii) another had a therapeutic abortion and a repeat tubal ligation but continued to bleed p.v. following the abortion and required a second D & C; and (iv) the fourth was seen three years following her sterilization, presenting with menorrhagia. An enlarged uterus was found on physical examination and this was thought to be secondary to fibroids pre-operatively, with a negative pregnancy test — a hysterectomy was performed showing retained products of conception at pathology.

The average age of the 120 patients was 29 years, and the average gravidity was 2.6 births per patient. Eleven sterilization procedures (or 9.17% of the total number of tubals) were done at the time of Cesarean Section and a further 40 patients, or 30%, had tubal sterilization procedures done following delivery. There were no subsequent pregnancies in either of these two groups of patients. Excluding those patients who subsequently became pregnant and required further gynaecological surgery, only three patients went on to require additional procedures; two were hysterectomies and one had a cone biopsy of the cervix.

Other than for one case that developed phlebitis, post partum, there were no complications in this group of 120 patients. All tubals performed in this group of patients were confirmed pathologically.

DISCUSSION

Sterilization by minilaparotomy particularly in the early post partum period is an extremely easy procedure and is probably the procedure of choice as advocated by Green and Laros.³ The complications of minilaparotomy when compared to laproscopic tubals are not statically different, and Sandmire⁴ found no difference when comparing operative time or hospital stay. The slight increase in post-operative discomfort in the minilap group is more than compensated by the elimination of the rare bowel, vascular, and bladder injuries associated with the thermal procedure.

*Surgeon, Queens General Hospital, Liverpool, N.S. B0T 1K0

The accepted failure rate of the Pomeroy method is about 0.3% or three cases per thousand⁵ and is about the same for laparoscopic tubal ligations, although figures above and below are found in each case. The initial reaction when four cases presented themselves was that the Dexon sutures used were not reactive enough (unlike surgical gut used by other authors) to cause an inflammatory reaction around the tube with resulting occlusion. Although Kroener reports no pregnancies in over 1,000 fimbrectomies, Metz had 10 pregnancies in 388 cases using chromic sutures and recently more reports of fimbrectomy failures have been appearing. It could be argued that rather than Dexon causing the failure rate, that crushing the tube with hemostats was the cause of recanalization. However, the Madlener technique⁵ which employs crushing a loop of the fallopian tube and subsequently the tying of the loop with non-absorbable sutures without resection, had a reported failure rate of only 0.6% in 4,952 cases. □

References

1. Kroener WF. Sterilization by Fimbrectomy. *Am J Obs Gyn* 1969;**104**:247.
2. Metz K. Failures Following Fimbrectomy. *Fert-Ster* 1977;**28**:66.
Metz K. Failures Following Fimbrectomy: A Further Report. *Fert-Ster* 1978;**30**:269.
3. Green LR, Laros RK. Postpartum Sterilization. *Clin Obs Gyn* 1980;**23**:647.
4. Sandmire HF. Minilaparotomy Tubal Sterilization. *Am J Obs Gyn* 1978;**131**:453.
5. Douglas RC, Stromme WB. *Operative Obstetrics 3rd Edition*. New York: Appleton Century-Crofts, 1976.

Female Sterilization

Charles A. Maley,* M.B., M.R.C.O.G., F.R.C.S.(C),
Halifax, N.S.

In 1919, Madlener described crushing a loop of Fallopian tube and ligating it with a non-absorbable suture. Five years later Irving transected the tube and buried the proximal end in the uterine muscle. Cook modified this to burying the proximal and distal ends in the broad ligament.

Pomeroy, in 1929, ligated the middle third of the Fallopian tube, without crushing, with catgut suture before excising it. Abdominal fimbriectomy was then described in 1935 by Kroener and the vaginal approach was published by him in 1969.

Uchida in 1975 published 20,000 cases of a complex procedure of serosal stripping, tubal resection and cornual encasing with serosa. He had no failures.

In 1962, Palmer described laparoscopic tubal coagulation which is now probably the most common method of interval sterilization. Modifications of this technique using clips or silastic rings are becoming more popular since intraperitoneal diathermy burns cannot occur. As laparoscopy requires specialized training and more expensive equipment than traditional abdominal or vaginal procedures, Minilaparotomy is becoming more popular, particularly in less developed countries.

With the dramatic increase in sterilizations, in the Halifax-Dartmouth area (1401 patients in 1980), has come the inevitable request for tubal reconstruction and reversal of sterilization. If short segments of Fallopian tube are excised, or if tubal occlusions using the Laparoscope are performed, then Winston claims that 75—85 percent may conceive after microsurgical repair. It seems that results are best when reversal is performed less than five (5) years after sterilization. □

*Lecturer, Department of Obstetrics and Gynaecology, Dalhousie University, Halifax, N.S.

PRIME OFFICE SPACE FOR RENT.

Halifax Professional Centre,
5991 Spring Garden Rd., Halifax, N.S.
800 — 3000 sq. ft. available immediately.

Contact: J. R. Wells, Phone 423-1141
or write P. O. Box 426,
Halifax, N.S. B3J 2P8



the Permanent

- Will Planning
- Executors and Trustees
- Custodian of Investments
- Investment Management

Please call or write:
A. M. Jamieson or C. J. Stringer
Canada Permanent Trust Company
1646 Barrington Street
Halifax, N.S. B3J 2P7 422-1531

HRDoane and Company

Chartered Accountants

Halifax	Amherst	Fredericton	Port Hawkesbury
St. John's	Antigonish	Grand Falls	St. Stephen
Saint John	Bathurst	Hamilton	Summerside
Charlottetown	Bridgewater	Kentville	Sydney
Montreal	Campbellton	Marystown	Truro
Toronto	Corner Brook	Moncton	Windsor
Vancouver	Dartmouth	Newcastle	Woodstock
	Digby	New Glasgow	Yarmouth

The Tovee-Cannell Syndrome — Revisited

T. P. Corkum,* M.D., M.Sc., F.R.C.S.(C),

Halifax, N.S.

In 1957, when the Caesarian Section rate was approximately 4%, Drs. E. B. Tovee and D. E. Cannell described a type of large bowel obstruction peculiar to the postpartum period.¹ Their paper made several interesting points about bowel obstruction during pregnancy:

- (a) Of all bowel obstruction occurring during pregnancy only 10% occurred postpartum.
- (b) Large bowel obstruction is relatively rare in pregnancy or postpartum.
- (c) Small bowel obstruction is usually due to bands or adhesions tightened by the emptying uterus.
- (d) After Caesarian Section small bowel obstruction may be caused by: (i) the omentum being attached to the uterine scar, thus trapping small bowel; or (ii) by a knuckle of small bowel adherent to the Caesarian Section scar.

Of particular interest to the authors was a type of large bowel obstruction which they attributed to compression of the sigmoid colon at the pelvic brim by the puerperal uterus. They described 10 cases in their practice of which eight were seen post Caesarian Section, and four were complicated by caecal volvulus.

The condition described, which has been referred to as the Tovee-Cannell Syndrome, presents in the following Manner. Immediately post Caesarian Section, the patient presents with the usual abdominal tenderness, mild ileus and distension. After 48 hours, there is a slow increase in crampy lower abdominal pain, followed by increasing abdominal distension. As the small bowel is involved, distension becomes more generalized and vomiting begins. Enemas and laxatives at this point seem to be of little help. There may be borborygmi and often one can see waves of peristalsis passing toward the right lower quadrant. X-ray demonstrates distension of the large bowel down to the pelvic brim. Usually the caecum is grossly dilated and, in progressive states, caecal volvulus and perforation are a real possibility.

The treatment of this condition is comprehensive and straight forward, provided the condition is recognized early. If volvulus or perforation have occurred surgery is immediately necessary. In early cases the patient is placed in the knee-chest position. A rectal examination is performed pushing the gravid uterus forward and out of the pelvis. A sigmoidoscopic examination will usually release a generous amount of gas with almost immediate relief of discomfort. A rectal tube may then be threaded down the scope and left in place. Symptoms usually are alleviated within 24 to 48 hours without further treatment. X-rays, in particular a barium enema, may be of some help not only in making a diagnosis but also in rectifying the situation. In severe cases complicated by nausea and vomiting, intravenous fluids and nasogastric suction will be necessary for a short period of time.


*Asst. Prof., Obs.-Gyn., Dalhousie University, Halifax, N.S.

At present the Caesarian Section rate is 17%. Last year (1980) in Nova Scotia approximately 2,000 Caesarian Sections were undertaken. With this number of surgical procedures the incidence of puerperal bowel obstruction is certain to increase. In 1978, when last communicating with Dr. Tovee, he told me about an obstetrician in Ontario who was involved then in a lawsuit because of a perforated caecum due to "the obstruction".

It would seem, therefore, we should take special precautions in recognizing and treating a complication which is inherent in our modern approach to the obstetrical patient. Any student of obstetrics would be well advised to read Drs. Tovee and Cannell's paper. It was, and still is, an excellent review of bowel obstruction by two authors with extensive clinical experience. □


Reference

Cannell D E and Tovee EB. Postpartum obstruction of the large bowel. *Postgrad Med* 1957; 21: 231-235.



C REALTY LTD.
MEMBER
N.S. Real Estate Assoc

BUS: 423-3002
RES: 477-5706



V. F. Clahane
PRESIDENT

HALIFAX, N.S.

ELEGANT LIVING

Large three story home recently refurbished. Contains a dozen rooms which include domestic quarters. The two and a half washrooms and the kitchen are new and modern. The lot is very large with about 300 ft. bordering the Avon river. This property is being offered fully furnished. Commuting time from Halifax is a bit more than half an hour. The vendor is a professional person with a practice in Halifax and has not experienced difficulties with travel. \$160,000.

SCHWARTZWALD

A super S/D with a super house. Kitchen features a work island complete with a Jenn-Air countertop range. Masterbedroom features an en-suite plus a fireplace plus an adjacent nursery or study. This classic Cape Cod has many other features I would like to show interested parties. \$139,900.

Management of Tension Headache

Lyn S. MacBeath,* B.Sc., M.D.,

Halifax, N.S.

INTRODUCTION

Tension headaches are commonly seen and diagnosed but they are not always effectively managed. Failure of therapy is frequently due to inadequate patient evaluation; the importance of a thorough history and physical examination cannot be too strongly emphasized. One problem in managing chronic or frequently recurrent headaches is that they are often resistant to standard medical treatment because they include behavioural changes characteristic of other chronic pain syndromes.

PATIENT EVALUATION

An accurate diagnosis is essential for effective patient therapy. The aims of assessing the headache patient are to identify the origin of head pain, and to isolate the major contributing factors to this pain. Comprehensive analysis is usually based on four major areas of assessment: history, physical examination, investigations and follow-up evaluation (Table I). Patient evaluation is not complete until the effect of pain on the patient and on the patient's lifestyle is properly assessed.

History

The headache history is the most important part of patient assessment. It must be complete and it should include a functional inquiry of all systems, allergies, family and social histories. The setting, pattern and course of the headache must also be noted. Because headaches are often variable in frequency, symptomatology and severity, a clear pattern cannot be discerned initially. It is useful to have patients record the subsequent time, place and duration of their headaches in a calendar or diary.

Physical Examination

The physical examination helps to determine additional factors contributing to the headache. General inspection should include gait, posture and screening tests for range of motion in the neck. Manipulation may be attempted to further elicit and relieve the pain.

Palpation should involve careful examination of the muscles, their insertions and bony prominences. All muscle groups of the head and neck should be examined for trigger points. A general physical and neurological examination should be performed in every case. Examination should note any bruit over the orbits or skull, and any evidence of papilledema or localized neurological abnormalities.

Additional Investigations

Additional investigations are not required in all patients. They may, however, be helpful for patients with chronic pain, patients whose history or physical examination suggest

underlying disease, or those over 35 years of age who present with headache for the first time. In many instances, initial simple investigations are required to reassure the patient. In the patient over age 55, a CBC and sedimentation rate should be taken to check for temporal arteritis. Plain films of the skull, cervical spine and chest may be indicated in some cases. When a cerebral mass is suspected, a brain or CAT scan should be performed.

TABLE I
THREE PHASES OF HEADACHE TREATMENT

PHASE I

Patient Evaluation

1. History
2. Physical Examination
 - a) General
 - b) Neurological
3. Investigations (if necessary)
 - a) brain or CAT scan
 - b) cervical or skull x-rays
 - c) blood count
 - d) sedimentation rate
 - e) differential rate

Treatment

1. Explain headache mechanism
2. Enlist patient co-operation
3. Have patient keep headache calendar for 2-3 months
4. Give recommendations to patient

Recommendations

1. Avoid precipitating factors
2. Do neck exercises
3. Do relaxation exercises
4. Apply local heat or cold
5. Massage trigger points of neck and shoulder muscles
6. Take hot baths
7. Take ASA 300 mg each morning
8. Take ASA 600 mg at onset of headache

PHASE II

Inject trigger points

Continue recommendations

PHASE III

Do acupuncture

Benign behavioural therapy

Benign physiotherapy

Benign transcutaneous nerve stimulation

Continue recommendations

*Fourth-year Medical Student, Faculty of Medicine, Dalhousie University, Halifax, N.S. (M.D. '81)

Mailing address: Dr. T. J. Murray, Department of Medicine, Clinical Research Center, 5849 University Avenue, Halifax, N.S., B3H 4H7.

Selection of Therapy

The physician should explain the various modes of therapy, clearly delineating the pros and cons. Follow-up visits are then critical, not only to monitor progress and to suggest changes in therapy, but also to encourage the patient to continue treatment.

Selection of therapy is based on three questions: Is the pain acute or chronic? Which precipitating factors contribute to the patient's pain? To what degree will the patient participate and comply with prescribed therapy?

Patients with occasional acute headaches rarely seek their physician's help. They can usually isolate the headache triggers and are relieved by over-the-counter analgesics.

Patients with chronic or frequently recurrent headache present the greatest challenge. Long-term pharmacotherapy can lead to various side effects; most non-pharmacologic methods, however, require active patient participation and are not universally effective.

Headaches with primary biological (physical) etiology are best managed by treating the underlying disorder. Often, however, the pathology is due to degenerative disease or some other chronic process (e.g. degenerative disc disease) that is as difficult to manage as the headache. In these patients, diagnostic nerve blocks with local anesthetics can be useful in determining origin of pain and how much central and psychological factors contribute to the perceived pain.

Table II summarizes treatment method used for tension headaches. These can be grouped as pharmacological and non-pharmacological therapy.

PHARMACOLOGICAL THERAPY

Analgesics are useful for acute pain but long-term therapy usually has side effects; the patient, for example, may become physiologically and pharmacologically addicted.¹

Non-narcotic Analgesics

Non-narcotic analgesics are most effective for low intensity pain and prevention of headache related to underlying inflammatory processes.² Action may be both peripheral and central. Side effects of long-term treatment vary with the agent used and can include nephropathy, gastro-enteritis and anemia. Common agents are: salicylates (ASA, aspirin), acetaminophen, phenacetin, ibuprofen (Motrin), naproxen (Naprosyn) and idomethacin (Indocid).

Narcotic Analgesics

Narcotic analgesics interfere centrally with pain perception and affective response. These agents vary in strength but all produce increasing tolerance in the patient and have side effects such as mental clouding, sedation and respiratory depression. Weak narcotics with relatively high analgesic potential, including codeine, are useful when combined with salicylates and caffeine. Chronic headache sufferers should avoid other narcotics that provide pain relief in severe headache; patients may become "hooked" on these drugs, feeling that they are the only effective treatment.

Migraine Medications

Migraine medications are sometimes used for tension headaches. These are usually effective only if there is a vascular component to the headache. In an acute headache,

TABLE II
SUMMARY OF TREATMENT METHODS

Pharmacological

- Non-narcotic analgesics
 - Narcotic analgesics
 - Anti-inflammatory analgesics
 - Migraine medications
 - Sedatives and muscle relaxants
 - Neuroleptics
 - Local injections of:
 - a) anesthetics
 - b) steroids
 - c) both the above
 - Surface anesthesia
-

Non-Pharmacological

- Physiotherapy
 - Immobilization techniques
 - Hyperstimulation
 - a) Surface — heating and cooling
 - Transcutaneous nerve stimulation
 - b) Deep — acupressure
 - acupuncture
 - massage
 - Spinal manipulation
 - a) Osteopathy
 - b) Chiropracty
 - c) Roling
 - Behavioural Manipulation
 - a) suggestion — hypnosis
 - b) relaxation — meditation
 - deep muscle relaxation
 - biofeedback
 - Psychotherapy
-

ergot medications may be used orally, sublingually or by suppository. Prophylactic medications include propranolol, pizotyline, methysergide and carbamazepine.

Sedatives and Muscle Relaxants

Sedatives and muscle relaxants, such as benzodiazepines, barbiturates and carbamates, are sometimes used for long-term management of tension headache, but they have variable results. Although diazepam seems to be an ideal drug because it is both a tranquilizer and a muscle relaxant, it is useful only in the short term.

Neuroleptics

Neuroleptics, specifically the tricyclic antidepressants used for treating migraine, are useful for tension headaches, particularly if the patient has a background of depression. MAO inhibitors and phenothiazines, though less effective, may be useful in some patients.³

Local Injection

Injection of trigger points with local anesthetic, with or

without steroids, is becoming acceptable treatment for tension headache patients. Although insertion of the needle itself may be helpful,⁴ most physicians inject a local anesthetic such as xylocaine. Some use steroids, although the rationale for steroids is not clear.⁵

Neck strength and flexibility should be tested before and after the injection to determine how much each trigger point is involved in limiting movement.

Some skill is required to avoid producing small hematomas during injection. The patient should be positioned to allow maximal neck muscle relaxation. Needle size should be selected for the area to be treated; for example, very fine for the scaleni, medium for most of the upper back and neck. Once the needle is inserted, some probing may be required to identify a muscular trigger point; its hardness and a reaction of typical pain identify it. Ligamentous trigger points are easier to localize and their injection does not seem to cause spasm.

Several treatment sessions may be necessary, though some patients find permanent relief from only one session. Gradual strengthening of affected muscles by exercise produces the maximum benefit after injection. The break in the pain cycle experienced by some chronic pain patients may be enough to encourage them to try other preventive methods.

Surface Anesthesia

Surface anesthesia may also be used to treat tension headache patients. Ethyl chloride spray may be used over the muscles that are in spasm.⁶ These sprays may also be used to relieve trigger point pain although they do not completely stop it.⁴ This method is simple and effective for large areas without marked underlying pathology. The patient should not use it without supervision because there is a danger of skin damage from freezing.

NON-PHARMACOLOGICAL THERAPY

Physiotherapy requires the patient to be involved in therapeutic exercise programs. When subacute and chronic pain syndromes are involved, such programs are critical to return normal relaxation, range of motion endurance and strength to affected muscles. These exercises "should be prescribed like a potent drug; in proper dosage and of proper quantity."⁶

Immobilization techniques are most useful for acute, post-operative or chronic patients with marked weakness and stiffness of muscles. They produce relief by reducing afferent stimuli associated with activity. Collars allow some comfortable ambulation. Neck pain and stiffness due to underlying disease, such as osteoarthritis, may be decreased by cervical traction. Prolonged use of collars is not recommended because the patient may begin to depend on them; they may also increase muscle weakness and stiffness.

Hyperstimulation includes many techniques. Their analgesic effects can be explained by the gate theory of pain⁷ and may also be mediated by endogenous enkephalins.⁸ Since this type of treatment is usually symptomatic rather than preventive, other methods should be used to treat the underlying problem.

Hyperstimulation frequently produces muscle relaxation,

which makes it particularly useful before and after various manipulations. Surface methods often precede deep hyperstimulation for the same reason.

a) Surface hyperstimulation: The affected part should be cooled for acute pain and heated for subacute and chronic pain, although some patients react to one or the other regardless of the pain's duration. Surface anesthesia is often used to cool the affected part while moxa (an extract of Chinese wormwood) formed into a cone and burned, can be used to heat the skin.

Transcutaneous nerve stimulation is most effective for short-term treatment of subacute and chronic benign pain and has been reported as suited to headache with primarily back and shoulder components. A portable battery-powered stimulator delivers a biphasic spike wave through the skin via a pair of skin electrodes. Treatment duration is determined by the patient. However, the overall effectiveness in pain therapy is only 25% and the long-term therapy efficacy has not been established.

b) Deep hyperstimulation: These techniques appear to have more long-lasting effects than surface hyperstimulation, though their mechanism of action has not been determined. Two techniques take advantage of trigger points that are local and distant to the head pain.

Acupressure (Shaitsu) is thumb massage over trigger points; the pressure varies according to the discomfort of the patient. Treatment may be self-administered and is usually bilateral with a duration of at least 15-30 seconds. One study showed hand points alone to be extremely effective in managing tension headache sufferers.⁹

Acupuncture involves the precise insertion of needles into trigger points. The needles may be rotated or electrically stimulated to increase effect. Although acupuncture reduces the frequency and intensity of most types of headache, a well-trained specialist is required for therapy, so that its use is limited. Jensen¹⁰ found that one acupuncture treatment, using a point between the 4th and 5th metatarsal bones, relieved 60% of tension headaches studied. Comparison of placebo points has demonstrated that stimulation of the exact trigger points alone produces this effect.¹¹

Massage is another way to utilize trigger points. Muscles are first relaxed by light techniques such as gliding and kneading. Storms and Cyriax develop deep compression techniques for trigger points with strokes parallel to and across muscle fibers.¹² Massage should be stopped for the day when the spasm begins to soften.^{13,14}

Spinal manipulation is another type of treatment. How physical manipulation techniques relieve headache pain is not known, although their stimulation of peripheral nerves and muscle relaxation may play a role. Traditional theories of spinal manipulation effectiveness are based on the relief of chronic compression or stretching of nerve roots.

The use of spinal manipulation is controversial since unskilled practitioners may damage the spine. Methods include osteopathy, chiropractic and Roling.

a) Osteopathy: In osteopathy, normal mobility is restored by thoroughly relaxing and stretching the involved structures and then manipulating and adjustment.¹⁴

b) Chiropractic: This is much the same as osteopathy but does not include loosening of the preliminary soft tissue.

c) Rolwing: This is a recent method based on even more forceful adjustment of the spine and other joints to restore normal body posture.

Chiropractic and Rolwing may ultimately be as helpful to the patient as osteopathy but are more painful.

Behavioral Manipulation

Behavioural psychomanipulation is particularly useful for teaching patients how to relax and to cope with stressful situations. Suggestion may be enough for some patients. Helping them work out a new routine to deal with headache may have a placebo effect in itself.

Hypnosis, another form of suggestion therapy, can be very useful in headache management of patients who can be hypnotized, particularly to medium and deep levels.¹⁵ Self-hypnosis techniques may allow the patient to become self-sufficient in headache management.

Relaxation requires discipline and a regular time commitment from the patient. There are three techniques which differ in degree of the instructor's involvement and the amount of equipment required:

a) Meditation: This is a form of attention control which can be self-taught but takes a long time to master. Yoga is one aspect of meditation that may be particularly useful to restore relaxation flexibility to muscles.

b) Deep muscle relaxation: This method is learned quickly by most people. With the help of a relaxation script, usually recorded by the physician, the patient learns how to relax gradually. Once the patient masters rapid relaxation the script can be shortened. It can be eliminated when the patient learns to relax solely from environmental cues.¹⁶

c) Biofeedback: Biofeedback is the most sophisticated of the relaxation techniques and is one of the most thoroughly studied methods of headache therapy. Short periods of electromyography, EEG alpha waves and skin temperature biofeedback treatments are all used in tension headache patients, although electromyography is used most frequently. Sargent *et al*¹⁷ found that about 60% of chronic sufferers who were resistant to other forms of therapy had less severe, shorter headaches and decreased their medications following a 5-day biofeedback course. This technique can be maximally effective if it is combined with a behaviour modification technique.¹⁸ Unfortunately, it is most helpful only during the initial treatment. Most patients do not carry out the technique they learn during the initial treatment; in weeks and months following therapy they often return to the pre-treatment state.¹⁹

Psychotherapy

Psychotherapy is an important component of the treatment of all patients. It should be used extensively in patients with significant neurosis.

CONCLUSION

For the physician, the enigma of tension headache may become clearer if each headache is approached individually. This includes both a thorough patient evaluation and an awareness of the changing spectrum of headache symptomatology from muscle contraction headache to migraine.

An optimistic approach to treatment is not difficult when emphasis is placed on patient education and active patient

involvement in treatment and follow-up. If the first phase of treatment is not completely effective, move to phase 2 and eventually to phase 3 (if necessary) as shown in Table I. Long-term benefits are best achieved by non-pharmacological therapy.

Achievement of a completely pain-free state may not always be realistic, especially with chronic, recurrent headaches. The ultimate goal should be to achieve better control of the headache so that the patient has less severe pain and less interference with daily living. □

References

1. Medina J F, Diamond S. Drug Dependency in Patients with chronic Headaches. *Headache* 1977;17:12.
2. Bennett A, Berry H, Osen H E, et al Prevention of Headache with Analgesics. *Lancet* 1978; 1:104.
3. Sherwin D, A New Method for Treating Headaches. *Am J Psychiatry* 1979; 136:9.
4. Travell J, Rinzler S H, The Myofascial Genesis of Pain. *Postgrad. Med.* 1952;1:425.
5. Travell J, Mechanical Headache, *Headache* 1967; 7:23.
6. Kraus H, *Clinical Treatment of Back and Neck Pain*. New York: McGraw-Hill, 1970.
7. Melzack R, Wall P D. Pain Mechanisms: A New Therapy. *Science* 1965; 150:971.
8. Sjolund B, Terenius L, Eriksson M. Increased Cerebrospinal Fluid Levels of Endorphins after electro-acupuncture. *Acta Physio Scand* 1977; 100:382.
9. Kurland H D. Treatment of Headache with Auto-acupressure. *Curr Psychiatr Ther* 1977;17:271.
10. Jensen L B, Tallgren A, Troest T, et al. Effect of acupuncture on Myogenic Headache. *Scand J Dent Res* 1977; 85:456.
11. Johansson V, Kodic S, Lindahl O, Lindwall L, Tibbling L. *Effect of Acupuncture in Tension Headache and Brain Stem Reflexes. Advances in Pain Research and Therapy*, Vol. 1 Ed Bonica J J & Albeffessard, Raven Press, New York 1976, p 839.
12. Tappan F M. *Message Techniques: A Case Method Approach*. New York: MacMillan Co., 1981.
13. Chaitow L, *Osteopathy: Head-to-Toe Health Through Manipulation*. Wellingborough: Thorsons Publishers Ltd., 1974.
14. Hoyt W H, Shaffer F, et al. Osteopathic Manipulation in the Treatment of Muscle Contraction Headache. *J Am Osteopathic Assoc* 1979; 78:322.
15. Cedercreutz C, Lahteemaki R, Tulikoura J. *Hypnotic Treatment of Post-Traumatic Headache. Advances in Pain Research and Therapy*, Vol. 1 Edited by J. J. Bonica and D. G. Albe-Fessard New York: Raven Press, 1976, pp. 887-888.
16. Ferguson J M, Marquis J N, Taylor C B. A Script for Deep Muscle Relaxation. *Disease of the Nervous System*, 1977; 38:703.
17. Sargent J D, Solbach, Coyne L. Evaluation of a 5-day Non-Drug Training Program for Headache at the Menniger Foundation. *Headache* 1980; 20:32.
18. Budzynski T H, Stoyva J, Alder C, et al. EMG Biofeedback and Tension Headache: A Controlled Outcome Study. *Psychosom Med* 1973; 35:484.
19. Montgomery P S, Ehrisman W J. Biofeedback-alleviated Headaches: A Follow-Up. *Headache* 1976; 16:64.

The Potential Health Effects of Acid Rain In Nova Scotia

David B. Shires,* M.D.,
Halifax, N.S.

Acid rain as a pollution problem is both topical and controversial. Recently, *Newsweek* magazine reported,

"A nation's health can be read in its water and not even four trillion gallons of rain a day can dilute the results of decades of folly and greed. Rain falling through the sulfurous air of the North East occasionally reaches the acidity of lemon juice."¹

MacLean's magazine, referring to the International Nickel Company in Sudbury, Ontario, reported early in 1981 under the title "The Acid Rain from Hell":

"Faced with INCO's intransigence... the Ontario government has backed down, making its demands more and more lenient. And the pollution reduction that has occurred — from an estimated 6000 tons per day in 1970 to about 2500 tons today — is as much the result of cutbacks in INCO's Sudbury operation, as to any serious attempt to reduce the pollution."²

On March 3, 1981, the *New York Times* reported that if Ohio were to utilize effective pollution controls, 54,000 deaths from air pollution could be averted by the year 2000.³ Reporting on the visit of U.S. President Reagan to Canada during the week of March 9, 1981, the *Toronto Globe and Mail*, in a front-page article entitled, "U.S. Ignoring Pollution Agreement, Ottawa Says", referred to the high priority Canada would place on pollution control issues. These issues featured prominently on the agenda for the meetings between President Reagan and Prime Minister Trudeau. On Wednesday, March 11, a leading article on the front page of the *Boston Globe* reported how President Reagan had been met in Canada with pickets chanting, "Acid Rain Go Home". Most recently, the *Halifax Mail-Star* carried a front-page article on October 9, 1981, saying that the Canadian Department of External Affairs had issued a strong statement to the United States Senate on the matter of acid rain.

These quotations from the popular press place in perspective the enormous societal, environmental and politico-legal issues inherent in the acid rain problem.

NATURE AND SCOPE OF PROBLEM

Acid rain is defined as rain/snow precipitation with a pH less than 5.6. It is an air pollution problem which was first recognized in the 1950s as a concomitant of the increased energy requirements of industrial growth and the increase in fossil (anthropogenic) fuel burning. Because there is strong evidence that acid rain problems in Nova Scotia are related to U.S. East Coast industry, much consideration will be given to U.S. air pollution data.

*Professor, Department of Family Medicine, Dalhousie University, 5599 Fenwick Street, Halifax, N.S. B3H 1R2.

The U.S. President's Council on Environmental Quality in 1975 reported that:

"Between 1940 — 1970, total nationwide emissions of all the major regulated air pollutants grew substantially; controllable particulate emissions increased by about 15%, SO₂ increased by about 50%, CO and hydrocarbon emissions rose by more than 100% and nitrous oxides quadrupled."⁴

Between 1970 and 1975, air pollution control programs under the U.S. Clean Air Act appeared to be stemming the tide. However, since 1975, with alternatives to imported oil being more frequently used for energy production, the SO₂ emissions may once again be on the rise.⁵

The acid rain components are mainly sulphurous and nitrous acids which fall as precipitates in rain, and to a lesser extent, in snow. In Nova Scotia, which receives more precipitation in the form of rain than snow, this is an important characteristic.

Acid rain is a product of a complicated chain of physico-chemical events which originates many hundreds of thousands of miles away from industrial and domestic sources. In the acid rain which affects the Canadian maritime provinces, the prime generating sources are Ontario (Sudbury, Toronto-Windsor) — Sudbury having the dubious distinction of being the largest single point source of SO₂ in the world (more than three million tons of SO₂/year); Quebec (Rouyn, Noranda and Murdochville) and the U.S.A. heartland States of Ohio, Pennsylvania and the North East. Air trajectory studies have shown that the prevailing N.W. winds and the Gulf Stream air mass carry large quantities of these pollutants which are precipitated as acid rain in the North Eastern U.S.A. and the Canadian Maritime provinces.

Clear evidence exists as to the environmental effects of acid rain on forests, lakes and fish.^{6,7,8,9,10} The reasons for concern about acid rain in Nova Scotia can be summarized as follows:

- Problem will increase in proportion to energy demands (which are increasing annually);
- Nova Scotia is a receptor area for two air masses (northwest winds and the Gulf Stream);
- Humidity factor dominant in Nova Scotia climate;
- Bedrock in Nova Scotia offers little buffer action to acid rain;
- Time-lag period (up to thirty years) in manifestation of health effects may induce complacency in health agencies;
- Environmental epidemiology extremely difficult to prove cause → effect; and
- Economic-political realities make correction difficult.

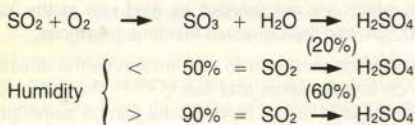
PHYSICAL CHEMISTRY OF ACID RAIN

A brief and rather simplistic outline of the physico-chemistry of acid rain production will help to explain how the problem evolves. Rain is normally acidic, produced by the interaction of CO₂ with water vapour in the atmosphere and the production of carbonic acid — a weak acid of maximum pH in rain of 5.6. The prime components of acid rain are the strong acids, sulphuric and nitrous. In New York and other major population areas, it is the nitrous acids generated largely from automobile use, that are important. However, the acid rain that falls in Nova Scotia is primarily sulphuric and the remainder of this discussion will be largely concerned with this latter aspect of acid rain production.

In the electric power generators and the smelters, coal is heavily used. Coal contains sulphur in varying proportions from 1% to 5%. When coal burns, so does the sulphur which is oxidized and released into the atmosphere as SO₂. The prime sources of SO₂ are power plants, natural gas processing, metal smelters, pulp mills, urban space heating, automobiles and natural sources such as sea spray and volcanoes.

The effluent from a coal-burning facility is usually discharged from a stack, the towers of which are being built progressively higher to meet with Environmental Protection Agency ambient air standards. It should be noted that there are no standards for sulphates. In this way, the effluent is carried away from the source by air movements while the air quality within the vicinity of the plant conforms to the Agency standards. Because there is a certain time period required for the formation of sulphuric and nitrous acids in the atmosphere, this high-stack discharge and suspension in atmospheric air movements is of vital importance. The coal-burning discharge stack in Sudbury, for example, is 300 metres high.

The discharge from such a coal-burning stack contains coal smoke (carbon particles) which becomes coated with atmospheric water vapour. The released SO₂ dissolves in this water-vapour coating, with the surface of the carbon particle acting as a catalyst. A portion of the SO₂ oxidizes to SO₃, which becomes sulphuric acid mist — an aerosol with potentially harmful public health significance. The simplified chemistry is as follows:



This reaction of SO₂ → H₂SO₄ is dependent on several factors, promoted by heat, photochemical effect and humidity. Below 50% humidity, only 20% of SO₂ → H₂SO₄, while above 90% humidity, 60% of the SO₂ → H₂SO₄. This has significance for Nova Scotia where fog and rain are fairly common. As an added factor to this, sulphuric acid generation, it has already been mentioned that NO₂ undergoes a similar process to form nitrous acid, but this is only half as strong an acid as sulphuric acid.

In addition, smelter processes in Quebec and Ontario produce some metallic ions such as aluminum, cadmium, manganese, selenium, arsenic, copper and zinc and these may be discharged into the atmosphere. However, these are usually deposited as "dry fallout" within a reasonable distance from the smelter stack. Some of the acid rain also

comes to earth within a few hundred miles from the source, but a significant portion is transported over long distances (more than 1000 miles) to be deposited in receptor regions as acid rain. This acid rain may be neutralized by the alkaline soil on which it falls, but may, over time, exceed the buffering capacity of the receiving watershed with the result that the pH of the lakes and streams decreases, progressively reaching pH levels as low as 3.0 (very acid).

This is a particular problem of Nova Scotia, with a basically acid rock and soil structure. Consequently, the effects of acid rain in this region are manifestly accumulative and rapidly progressive.

An additional chemical effect of acid rain and its collection in lakes and streams is the leaching effect this acidic water has on heavy metals in the substrate soil. When these anions, e.g., calcium and lead, are dissolved in the acidic waters, they may constitute an additional ecological and human health threat.

EFFECTS OF ACID RAIN

General Ecology

The effects of acid rain deposition in the Maritime provinces of Canada have been well described and documented by the Canadian (Federal and Provincial) Environmental, Water Quality and Fishery and Forestry Services.^{11,12,13}

Human Health

There is no clear evidence documented connecting acid rain to human disease. Recent publications¹⁵ however, have begun to make reference to the potential health hazards of an acid rain environment. From these references, it is possible to postulate several potential health hazards and these are as follows:

Direct Effects:

Increase of heavy metal precipitation in acid water supply intended for human consumption, with potential for chronic renal and heart disease.

Exposure of the human skin, eyes and respiratory epithelium to direct toxic effects of an acid mist aerosol, possibly manifesting as recurrent conjunctivitis, dermatitis, bronchitis, asthma and chronic obstructive lung disease.

Indirect Effects:

Acidification of water supply promotes algae growth, resulting in problems with ensuring adequate clean water supply for human consumption.

Effects of the corrosive nature of acid rain on buildings and mechanical devices, possibly resulting in increased motor vehicle accidents due to structural failure.

Adaptation of some species of edible fish to low pH levels may result in unexpected food hazards such as heavy metal contamination.

Potential exposure to carcinogenic chemical substances carried in the acid rain.

Economic Effects

Depletion of food stocks for populations relying on fresh water fish as staple diet. Threat to economy of communities relying on the attractiveness of recreational fishing in their community.

All of the above are potential health effects, and a great deal of experimental and epidemiological research is necessary before the threat can be documented. One of the sinister and insidious effects is the carcinogenic effect. Ever since Sir Percival Pott demonstrated the relationship of scrotal carcinoma to sweeping chimneys in London, the combustion products of coal have been logical candidates for carcinogens. If we add the increasing production of carcinogenic substances,¹⁴ some of which may escape into the atmosphere and be transported long distances, a potentially risky situation may evolve and be undetected for decades in Nova Scotia.

FUTURE

It should be pointed out that this is by no means a problem of the North Eastern United States and Canadian seaboard regions alone. It is a problem of international significance affecting the Scandinavian countries, Western Europe and Japan, all of whom are reporting increasing environmental consequences of acid rain. It may also be construed as a problem of state, provincial and national morality, no different from the problem of the exportation of toxic wastes. Pollution knows no political boundaries.

Whatever the viewpoints and criticisms, there can be little doubt that the problem, as far as Nova Scotia is concerned, will get worse before it starts to improve. If the projected U.S. Eastern seaboard's needs for electrical power generation are correct, the SO₂ emissions will increase into the 21st century.

Although some studies on health effects of acid rain have been published,¹⁵ there remains a number of unanswered questions. The major problem is that the research required in environmental epidemiology is extraordinarily difficult. Attempts must be made, however, to categorize the effects of acid rain on human health and to separate the deleterious health effects of one pollutant from another. In addition, the crude epidemiological survey indicators available (mortality, morbidity, absenteeism) must be refined, or they may further confuse the issues rather than clarify the relationship between acid rain and ill health. Clearly, if we are to have an effective monitoring program in Nova Scotia, innovative and ingenious methods will be required.

CONCLUSION

Although the problem of acid rain becomes controversial when postulating potential deleterious health effects, there are well-described disease- and death-provoking effects documented from SO₂ emissions, which in themselves warrant taking steps to correct the prime causes of acid rain production. Such a program or combination of programs will not be likely to eliminate the problem for at least another fifty years. However, the following points are worth noting:

1. The use of scrubbers should reduce/eliminate SO₂ emissions, but such regulations must be vigorously enforced to have effect. In this regard, it must be recorded that Nova Scotia's newly-opened coal-fired power station at Lingan has no scrubber.

2. Liming reservoirs to neutralize acidity has been tried but is, however, an expensive alternative. To lime Halifax reservoirs would cost initially half a million dollars and the process would have to be repeated at regular intervals.
3. Nova Scotia doctors should be aware of the effects of industrial sulphur emissions and of acid rain as an increasingly prevalent health risk factor in the Maritime environment.

The acid rain problem will be with us for a long time to come, and is clearly worthy of further study and research. □

References

1. Are We Running Out of Water? *Newsweek* 1981; February 23.
2. The Acid Rain from Hell *Maclean's Magazine* 1981; February 23.
3. Smith F, Hunt R, Meteorological Aspects of the Transport of Pollution Over Long Distances. *Atmospheric Environment* 1978; 12:461-477.
4. *Sixth Annual Report of the President's Council on Environmental Quality*. Washington: U.S. Government Printing Office #040-000-00337-1.
5. Likens G, Wright R, Galloway J, Butler T. Acid Rain. *Scientific American* 1979; 241:43-51.
6. Acid Precipitation and the Forest Ecosystem. U.S. Department of Commerce N.T.I.S. #P.B.-261, 813, 1976.
7. Summers P, Whelpdale D. Acid Precipitation in Canada. *Proceedings of the International Symposium on Acid Precipitation and Forest Ecosystems*. Columbus, Ohio, 1975.
8. Beamish R. Acidification of Lakes in Canada by Acid Precipitation and the Resulting Effects on Fishes. *Proceedings of the International Symposium on Acid Precipitation and Forest Ecosystems*. Columbus, Ohio, 1975.
9. Thompson M, Elder F, et al. Evidence of Acidification of Rivers of Eastern Canada. *Proceedings of the Symposium on "Lake Protection and Restoration"*. Portland, Maine, 1980.
10. Thompson M, Bennett E. Variations in the Degree of Acidification of River Waters Observed in Atlantic Canada. *Proceedings of the Symposium on "Lake Protection and Restoration"*. Portland, Maine, 1980.
11. Watt WD. Acidification and Other Chemical Changes in Halifax County Lakes after 21 Years. *Limnol. Oceanogr.* 1979; 24: 1154-1161.
12. Underwood J, Josselyn D. A Search for Lake Acidification in Nova Scotia. N.S.D.O.E. Document #1740-B1-80-01, April, 1980.
13. Farmer GJ, Goff TR, et al. Some Effects of the Acidification of Atlantic Salmon Rivers in Nova Scotia. Canadian Technical Report of Fisheries and Aquatic Sciences, #972, November, 1980.
14. David D, Magee B. Cancer and Industrial Chemical Production. *Science* 1979; 206:1356-1357.
15. Wilson R, Colome S, Spengler J, Wilson D. *Health Effects of Fossil Fuel Burning*. Cambridge, Mass: Ballinger Publishing Company, 1981.

Report on Radiation Oncology In The People's Republic of China

R. M. Cunningham,* M.D., F.R.C.P.(C).

Halifax, N.S.

My wife and I had the great good fortune to be invited to join the delegation of the Canadian Institute for the Administration of Justice on their three week study tour of the Chinese judicial system. We had the opportunity to attend their meetings and talks, a civil and a criminal trial, as well as the state banquets and many other cultural and social events. I had made special arrangements to visit cancer hospitals and it is the report on these cancer hospitals that I am making here.

The Beijing (Peking) Centre is naturally the show place, and the Cancer Institute associated with the Chinese Academy of Medical Sciences there is quite impressive and still expanding. My visit to it was arranged through the Canadian Embassy, and I went with an interpreter although my impression was that most of the doctors spoke English quite well. This institute has 234 beds now including 64 radiation therapy beds, and they plan to expand to between 600 and 1,000 beds total.

There are bridges between the laboratory and the ward so that they plan on considerable scientific feedback. They are quite proud of their arrangement for head and neck services. As both surgery and radiation sections are parallel, the two wards are adjacent and the outpatient services run parallel, so that there is a forced form of cooperation between surgeons and radiation oncologists. I saw the head and neck ward and it is certainly clean and spacious, but the beds are not up to our standards at the present time. Certainly the nursing station and the records and pharmacy are right on hand and seem to be well run.

I was told that there were 24 radiation therapists. I am sure that not all of these are qualified and many are in training. There are five physicists and four radiobiologists. Their equipment was quite impressive: a Brown Boveri Betatron at 45 MeV, but I gather this only works for a short period every day; an 8 MeV linear accelerator manufactured by Philips and this is working on two 10-hour shifts a day and is the main work unit for the whole department; two cobalt-60 units, one of them a T-80 somewhat more modern than the one we have at the Victoria General Hospital and the other is a Chinese copy of this, a neat little cobalt unit that I have illustrated here. They have two simulators: one I think is a Japanese unit and the other again is a Chinese manufactured simulator and they are very pleased with its accuracy. They have two whole body CAT scanners, one of which is an EMI-7000 model and this was working steadily while I was there. I did not see the other one. They also have a 250 KV unit which is manufactured in China and there must be hundreds of them throughout China. It seems to be the basic deep x-ray unit and it seems to be copied on the European designs and was quite a convenient unit.



Fig. 1 Chinese Manufactured Co 60 Unit



Fig. 2 Chinese Manufactured Simulator

With regard to equipment in China, their cobalt sources are supplied from Canada as I gather their nuclear reactors do not have the flux sufficient to activate cobalt-60. They have built a linear accelerator in Peking. I think it is a 8 MeV and it is a travelling wave type, but as with any such attempts it is a very low output and inefficient so I doubt if China will go ahead with further manufacture of linear accelerators. They still import linear accelerators from abroad.

*Radiation Oncologist, Victoria General Hospital, Halifax, N.S.

I went over the treatment schedule in a number of interesting cases and I was surprised to note that they do not use wedges. In fact in the whole of China I saw no instance of wedge therapy, and with all their physicists one would have thought this modification of the treatment field would be very convenient.

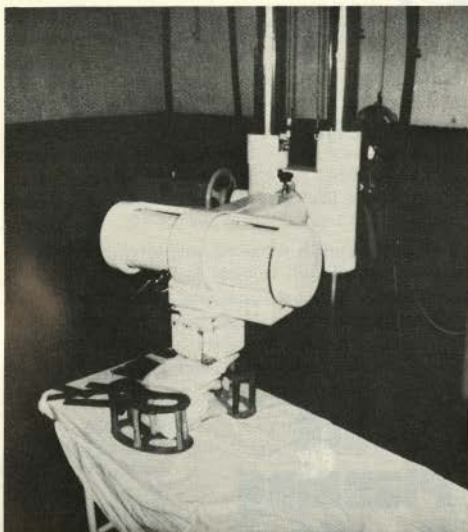


Fig. 3 Chinese Manufactured 250 KV X-ray Therapy Unit

They presented two papers to me after my little talk on the radiotherapy in Nova Scotia. The first was a comparison of pre and post-operative radiation therapy for carcinoma of the maxillary sinus, which seemed to be quite a well controlled study. They found that radiation followed by surgery gave a far better five-year survival rate than surgery followed by radiation. Their radiation dose was mostly given to around 6,000 rads — 4,000 rads to the whole region with a boost of 2,000 rads to the posterior wall. I would conjecture that this posterior wall boost was necessary because of the lack of wedges. The second paper dealt with nasoethmoidal carcinoma. There were 92 cases of this condition for which they have devised a T.N.M system, and they are attempting to obtain international approval. They found that the anaplastic, poorly differentiated tumors treated by radiation alone gave a far better survival than the squamous cell and adenocystic wherein radiation had to be followed by surgery.

There are three cancer treatment centers in Peking and I conclude this is approximately the situation across China. Of all the 30 or more provinces in China, only six do not have radiation therapy and the bigger cities seem to have several radiation therapy departments. There is an excellent journal system so that there is exchange and they use the same treatment sheets throughout China.

I was surprised to learn that the cost to the patient for a full radical course of radiotherapy is about \$150.00. This is somewhat more than the cost of a bicycle. I understand that if the patient would have great difficulty paying this then the charges can be dropped.

We visited a small hospital in Shanghai which was more of a traditional hospital with acupuncture and traditional

pharmaceuticals. When I asked especially about how they treated cancer there, they said most of the cancer treated in that hospital was carcinoma of the stomach and other cancers were referred to other hospitals. My impression generally in China is that acupuncture is less universal than it used to be.

Finally, through the good auspices of Dr. O.S. Wong here in Halifax, we visited the cancer center in Guangzhou (Canton). There is only one cancer hospital in the city and they treat 400 patients per day as compared with 300 per day in the tumor institute in Peking. They have 19 doctors in radiotherapy — five or six of them are fully qualified, one physicist, and one physics technician. They are certainly enthusiastic and they even came to the airport to welcome us to the city when we arrived. They only have two cobalt units, one of which is approximately an E-8 like the unit at the Halifax Infirmary, and the other is an ancient mercury-filled Atomic Energy of Canada Limited unit. They have two Chinese 250 KV units and one Dermopan for superficial therapy. They work on shifts from 6:00 a.m. to midnight, each group working six hours. They plan to get a 10 MeV linear accelerator next year and they could certainly use it.

After I gave my talk they reciprocated with a talk from their dermatologist who spoke about his treatment of numerous dermatological conditions with superficial x-ray and cryotherapy. His techniques seem to be very sound and he certainly has a wide experience. They were interested in our beam direction techniques and I will keep in touch with them to give them assistance in this regard.

Certainly China has a long way to go in many respects in radiation oncology, but they have gone far further than I had expected and they are certainly hard-working and enthusiastic. I saw no evidence of the technical training aspect or even the training of the junior doctors. It may well be that it is an on-the-job form of training. They would certainly appreciate further visits from oncologists should any happen to be visiting. □

CHINA!

May 15 to June 6, 1982 emphasizes
HEALTH CARE SYSTEM.

(Repeat of great trips in 1980 & 1981) Only US \$3402 from San Francisco (or \$3602 with optional two-day cruise thru Yangtze River gorges); includes Beijing, Xian, Shanghai, Guilin, other cities, and Japan and Hong Kong? (Another trip, June 19-July 10, on Education and Schools). Limited Space, Deadline near;

Write or call today:


Prof. Robert Hefner,
580 Union Dr., Rm 431,
Ann Arbor, MI,
48109 (313)763-4355
University of Michigan

— Credit available.

The Night Watch

The restaurant in town.
With a nautical air and a chef
who's inspired. A birds-eye
view of the city and harbour.

At Night, it all turns on
for you and twinkles while you dance.

CP Hotels 

Chateau Halifax

1990 Barrington St.,
Scotia Square, Halifax B3J 1P2
Telephone (902) 425-6700



CP and  are registered trade marks of Canadian Pacific Limited.



ALFRED J.

BELL & GRANT Limited
INSURANCE SPECIALISTS

bank of montreal tower, george street, (p.o. box 8)
halifax, nova scotia (902) 429-4150, telex 019-21713

"INSURANCE — THAT'S ALL!"

Medical Estate Planning Services

Donald R. Cox

Suite 3006
Mumford Tower II
Halifax Shopping Centre

Phone: 422-6314

Estate Planning Directed to the Medical Profession



Peter R. Arnold, CLU, CFC
(902) 429-6727

*"... It is tragic to witness the
successful doctor who works
tirelessly for thirty years — only
to end up with nothing finan-
cially, to show for it."*

*Introducing ... complete financial planning and
money management for health care professionals.
Your financial future — professionally planned.*

P. R. ARNOLD & ASSOCIATES
FINANCIAL PLANNING CONSULTANTS LTD.

Suite 421/Trade Mart/Scotia Square/Halifax/Nova Scotia/B3K 2Y5



Professional Economic Consultants-Maritimes

When you're ready to set up practice,
we're ready to help.

Bank of Montreal. We've been helping
doctors and dentists longer than any other
Canadian bank. We've got plans designed to
meet your particular needs.

Operating funds, term loans and mort-
gages (business or personal). We can also
arrange your car or equipment leasing.

Just look for the shingle.



The First Canadian Bank

Bank of Montreal

An Appreciation

DR. WILLARD C. O'BRIEN

Dr. Willard C. O'Brien of Yarmouth, Nova Scotia, died on November 6, 1981, at 88. He graduated from Dalhousie Medical School in 1919. He practised for a short while in Bridgetown, before moving permanently to Wedgeport, where he practised until 1979 — a period of approximately 60 years. His medical practice spanned over several decades, being involved in treating patients in homes and in the Yarmouth Regional Hospital where he was on the Active Staff. His career as a family physician included many years of anesthesia and chief obstetrician at the Yarmouth Regional Hospital. He was one of Yarmouth County's most esteemed citizens and he received an Honorary Doctorate in Humanities at Ste. Anne University in April 1980.

He was an Senior member of The Medical Society of Nova Scotia and a member of The Canadian Medical Association. Besides medicine, he took an active part in community affairs and was Mayor of Wedgeport from 1936 to 1942. He served two terms in the Provincial Legislature from 1956 to 1963, representing the dual Constituency of Yarmouth. He was a fourth degree member of Yarmouth Assembly of the Knights of Columbus since 1945 and he was invested as a Knight of the Order of St. Gregory in 1974.

He is survived by a daughter, Alice, (Mrs. William MacDonald), Ottawa, and a son, Dr. Milton O'Brien, Yarmouth, two sisters, eleven grandchildren and three great-grandchildren. He was predeceased by his wife.

*R. Parkash
Yarmouth, N.S.*

CHIEF OF MEDICAL STAFF ASSISTANT EXECUTIVE DIRECTOR MEDICAL STAFF AFFAIRS

Required by

HALIFAX INFIRMARY

Senior Specialist Clinician-Medical Administrator appointment in a 400 bed Tertiary Care University Affiliated Teaching Hospital.

A fulltime appointment with protected time for Medical Administration and Specialty practice within a university appointment reference.

Responsible for effective management of Medical Staff Affairs in association with Elected Officers and the Executive Director; Standards of Patient Care and Medical Education Programmes and related Clinical Departmental Organization and Joint University Appointments relating to these functions.

Job requirements include quality communications skills within the Hospital, University and allied agencies.

Salary and terms negotiable.

**Address Applications
and
inquiries to Search Committee
C/O Mr. J. N. Roberts, Executive Director
HALIFAX INFIRMARY
1335 QUEEN STREET
HALIFAX, NOVA SCOTIA B3J 2H6**

Barbara Blauvelt

DIRECTOR DALHOUSIE MEDICAL ALUMNI ASSOCIATION

Barbara Hinds*,
Halifax, N.S.

For the past 34 years, the last lamp burning in the School of Medicine has usually lit the office of Miss Barbara Blauvelt.

This month, Miss Blauvelt will turn off the top floor lamp and gracefully side-step from her role as administrative officer, or "general factotum," in the Dean's office and assume her new post in a ground floor suite in the Tupper Building as executive secretary of The Dalhousie Medical Alumni Association.

Latter day writers of job descriptions with a keen eye for more pay, less work, security, fringe benefits and longer holidays would shudder to list all the duties Miss Blauvelt has performed, generally without demur and always with dedication, since the day she joined the Medical School four deans ago in 1948.

She was a girl with a fresh secretarial diploma when she came to Halifax from her home in Yarmouth to help for only two weeks in the office of the dean, Dr. H. G. Grant. The Medical School was having difficulty finding someone to put the house in order.

"I stayed at the YWCA. I couldn't find the School of Medicine. The day was bitterly cold. I'll never forget it. Two weeks went by. I stayed. That makes it the longest two weeks in history, I think," she said, recently in an interview.

Dr. Grant's office was in the Public Health Clinic, now the Clinical Research Centre. Labs and lecture rooms were scattered about in several buildings. The business files numbered about 50 and they were stacked on boards on top of a bath tub in a bathroom adjacent to the secretary's office.

Today, the files fill rooms. The medical student enrolment has almost doubled and almost all the medical graduates of Dalhousie for the past 34 years are known to Barbara Blauvelt by their first name. After all, she registered most of them in medical school; gave them a shoulder to lean on when the going was rough; until recently typed up all their examination papers; mailed their results to them, often with a personal note; told them when and where to apply for scholarships and grants; kept them posted on opportunities; helped to arrange residences for them and was surrogate aunt or mother to many from overseas.

She has arranged special occasions, the order of convocations, banquet menus, protocol; the purchase of and engraving of silver trays for eminent visiting speakers; has scheduled reservations of lecture and committee rooms and kept a wide open door at all hours for every medical student with or without a problem. She is also a Commissioner for Oaths and has acted as faculty hostess during the years.

"The students have kept me going. I enjoy them tremendously," she said, and recalled with pleasure that she



is an honorary member of three graduating classes. In her 25th year in the dean's office, the Dalhousie Medical Students' Society presented her with a silver tray. She treasures the tokens of esteem or gratitude the students have given her over the years, and she prominently displays on her office wall a certificate of life membership in Phi Rho Sigma, Alpha Eta Chapter. She was the first woman to be admitted to what was once an all male preserve.

Miss Blauvelt's policy has always been to make time for students, no matter how busy she is. "I always have. I insist. They come first. There would be no Medical School without the students. I want them to feel they have a friend, even if it means just sitting and listening to their problems and telling them who to go to see. Sometimes that's all they need. I've helped them over the hump many a time. Some of them would not have got through Medical School unless someone helped them out."

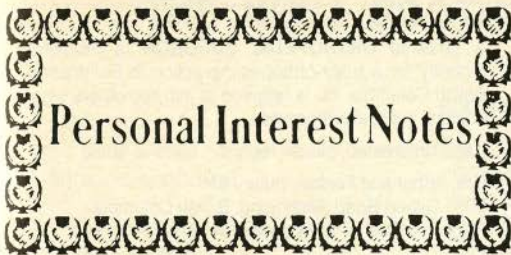
"Helping out" has also included finding ways and means of raising money for students who perhaps lost their father or mother and faced near destitution.

In her new post, she will be Assistant to the Dean of Medicine for Alumni Affairs 20 per cent of the time and will work 80 per cent of the time for the Medical Alumni Association, making contact with its members all over North America.

The job will entail travelling to new places to meet old alumni again, and she will still be helping to raise money — this time for the Alumni Association, which has a current interest in funding medical research. And when in town, she intends always to have her door open to students. The coffee pot will always be ready, she said.

Miss Blauvelt can be reached by calling 424-8800. □

*Consultant in Public Relations for the Faculty of Medicine, Dalhousie University, Halifax, N.S.



Personal Interest Notes

DALHOUSIE MEDICAL ALUMNI ASSOCIATION ANNUAL MEETING



Dr. Harold J. Devereux, Sydney, 1981/1982 Alumnus of the Year pictured being introduced by **Dr. Murdock A. Smith**, Sydney, President of The Medical Society of Nova Scotia.



Dr. Kenneth M. Grant, Halifax, being presented with his Certificate as Honorary President of the Year by **Dr. Douglas C. S. Brown**, Halifax, President of Dalhousie Medical Alumni Association.

Dr. B. K. Doane for the past six years Head of the Department of Psychiatry, Dalhousie University has resigned. A new appointment will be made very shortly. Dr. Doane will go on sabbatical before returning to teaching duties in the department.

Dr. Solomon Hirsch was part of a panel at the International Association for Suicide Prevention, and was as well, Vice-Chairman of another session of that meeting.

Dr. Jose Aquino, Halifax, was recently elected President of the Canadian Cancer Society, Nova Scotia Division. He chaired his first meeting when the newly elected board of directors met in Halifax in February.

Four senior appointments in departments in the Faculty of Medicine, Dalhousie University, have been announced.

Dr. David B. Fraser, 49, has been appointed Professor and Head of the Department of Diagnostic Radiology, located at the Victoria General Hospital, with which he has been associated since 1966.

Dr. Malcolm Alexander MacAulay, 47, who was medical director and executive director of the Victoria General Hospital from June 1978 to June 1981 (when he resigned) and a professor of pathology, is appointed Professor and Head of the Department of Pathology. Both Dr. MacAulay and Dr. Fraser obtained their MDs at Dalhousie.

Dr. Alistair Munro, 48, has been named Professor and Head of the Department of Psychiatry. He is currently psychiatrist-in-chief, Toronto General Hospital and professor of psychiatry, University of Toronto, and is a consultant in his speciality.

Dr. Franklin M. M. White, 35, currently director of the division of epidemiology, Ministry of Health, Victoria, British Columbia, will take up the position of Professor and Head of the department of Preventive Medicine and Epidemiology by July, 1982. □

ADVERTISERS' INDEX

Arnold, P. R., and Associates Ltd	28
Bank of Montreal	28
Bell and Grant Limited	28
C Realty Limited	18
Chateau Halifax	28
Doan, H. R., and Company	17
Halifax Infirmary	29
Insurance Program, The Medical Society	6
Kremers — Urban	12 OBC
Manuge Galleries	32
Maritime Tel & Tel	IFC
Medical Estate Planning Services	28
North West Territories	32
Permanent, The	19
Classified	15,17,27,32

REQUIRED IMMEDIATELY — One general practitioner and one general practitioner/anaesthetist to become associated with our Medical Group Practice. We are located in small town of approximately 3,000 population but serving an area of 20,000-25,000 population. Our resort area is well known, excellent sailing, championship golf course and many other attributing factors. Local service clubs and affiliated membership available to recreational facilities. Our largest city is Halifax 150 miles distance with a population of approximately 250,000. Our Medical Centre is a group of nine, located 150 yards from our 90 bed hospital. Office space and secretarial services provided. Salary negotiable.

Please Contact:

H. V. Davis, Clinic Manager
 McCLEAVE MEDICAL CENTRE
 DIGBY, NOVA SCOTIA BOV 1A0
 Telephone 902-245-4701

A qualified **ORTHOPEDIC SURGEON** is required urgently for a busy orthopedic practice in Richmond, British Columbia. He is required to join two others who practice general orthopedics.

If at all interested, please reply to:

Drs. Arthur and Fenton, Suite 107
 6051 Gilbert Road, Richmond, British Columbia.
 Phone number — area code (604) 273-6148.

NOVA SCOTIA RIDING FOR THE DISABLED ASSOCIATION

will be holding a clinic given by
 Mrs. Linda McGowan
 Cheff Centre for the Handicapped, Michigan
 Sunday, April 18, 1982
 Duntulum Stables, R.R. #2, Mt. Uniacke
 For information call 423-1594

Physicians

\$60,000 — \$70,000

Basic Salary

The Government of the Northwest Territories is currently recruiting for a number of physicians in several centres in the Northwest Territories.

Unique medical opportunities exist to provide a wide range of general practice services and may involve travel to various northern communities. Positions currently exist in general practice and a number of the specialty fields. Specialty support services, some of which include Surgery, Psychiatry, E.N.T., Pediatrics and Obstetric/Gynecology are available through the major health centres.

The highly competitive and negotiable basic salary ranges from \$60,000 — \$70,000, supplemented by an additional percentage of billing fees when basic salary is exceeded by billings. Numerous benefits are highlighted by removal expenses, settlement allowance, vacation and vacation travel assistance, continuing medical education opportunities and accommodation assistance.

Direct inquiries to:

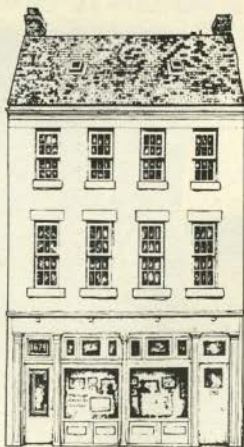
Catherine Borrie; M.P.H.
 Manpower Planning,
 Department of Health,
 Government of the N.W.T.
 Yellowknife, N.W.T., X1A 2L9
 Telephone (403) 873-7711



Northwest
 Territories

Manuge Galleries Limited

We specialize in
 Canadian paintings of
 the 19th & 20th
 centuries.



Our collection
 includes work by the
 Group of Seven,
 Robert Pilot,
 Goodridge Roberts,
 Alan Collier,
 Tom Roberts,
 John Little,
 Jean Edmonds
 Hancock,
 Gary Morton,
 Tom Forrestal and
 many others.

1674 Hollis Street
 Halifax, Nova Scotia
 B3J 1V7

Telephone (902) 423-6315
 Cable Address - Esman