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The NOVA SCOTIA MEDICAL BULLETIN

EDITORIAL

WHY WAIT FOR SPRING?

This is the time for new resolutions. Can we see through the fog of an hectic year and see a clear course into the future? Medicine, not as a healing art or science, but as a vital segment of society has somehow come through a trial by fire in Canada. No longer can we stand aloof, on majestic heights, dispensing our benefits and taking comfort from the gratitude of the individuals whom we serve. To paraphrase a slogan, "Health is everyone's business", and the people of this land quite obviously mean to concern themselves with what they conceive to be the means to make it available.

The fog then becomes clear - we cannot, if we would, sail against the current. Instead we must guide our course to avoid the dangers which would prevent our progress toward the goal of better and better health for more and more people.

Our submission to the Royal Commission on Health Services was predicated on a sequence of priorities. We believed then and we believe now that this deposition clearly indicates our proper course. It follows that we must use this document as the measure against which we shall judge proposals from any source. Politicians at the moment are jumping onto the "medicare" bandwagon. We believe medicine has a duty to go to these politicians who propose nebulous schemes. They should be put in the position of having to amplify and itemize their proposals. They must publicly state how they will bring them about. Their programs can then be measured against our proclaimed standards.

We have in Nova Scotia a basic 6 point plan to meet the urgent health needs of our citizens. Our resolve and effort for the New Year should be to make these points known to the politicians and the public. Only thus can we guide the planning - and we must

DO IT NOW!

S.C.R.

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EMERGENCY HEALTH SERVICE§

S. H. Kryszek, M.B., Ch.B.*
Windsor, N. S.

The mention of Emergency Health Services often brings raised eyebrows and questioning glances. What and where is this organization? Who are the personnel? What are the functions? Is it another platoon of civil servants engaged in some outlandish scheme? These questions to a certain extent are prompted by the fact that there are no offices with definite and well defined duties in our towns as in other branches of public services.

Emergency Health Services is not a group of "backroom boys," who, when a nuclear bomb falls or another calamity happens, suddenly appear from nowhere and "take over". In fact, the kind of calamity which could happen to us, makes that business of "taking over" quite outdated. It is the existing services and the existing government, which have to be preserved and so adapted in the face of an emergency, that our national life and institutions can be continued.

And so Emergency Health Services is not a separate service or a unit. It is only a definition of a state of readiness of the existing health services. All personnel and most of the equipment are and have been engaged in health work of various kinds: private practice, hospital practice, public health work, dentistry, nursing, pharmacy on all levels, even veterinary medicine. In this province, as in most of the others, only a small group of people are engaged in actual planning. Only two of them, a doctor and a nurse are full time.

Preparedness is a community service. Just as a practitioner has to be ready for an individual emergency a myocardial infarction, an intestinal obstruction, a fractured leg — so the health profession, the public health service and the hospitals have to be ready for a civic emergency — an air crash, an explosion, a blazing tanker, a flood, a train wreck, or for a national emergency — an attack on Canada from outside with the use of nuclear weapons.

These thoughts may be very unpleasant, but adopting the attitude that it cannot happen to us is no answer. Airplanes have crashed into buildings. Earthquakes, floods, hurricanes, train wrecks, explosions, are common place. Ships have blazed in harbour and at sea. It can happen to us.

As to the spectre of nuclear war, it is likely to stay with us for some time to come. It will not go away, because we refuse to think about it. We hope it will not happen — but it may happen in spite of our desire for peace. It need not even happen by accident — it may happen through calculation. Mutual balance of total terror need not be necessarily true under all circumstances. The saying: "We must live together, otherwise we shall both die", can be modified to "We must live together, otherwise one of us shall die."

Total **mutual** destruction is most unlikely, contrary to emotional statements and press articles, but mutual heavy damage is certain and annihilation of one side is possible. Preparedness of health and welfare services may mean the difference between national survival and national annihilation.

No government mindful of its duties could neglect emergency planning. Just assume that something did happen — and thousands of lives were lost because of lack of preparation. The medical profession would no doubt be

*Director of Emergency Health Services Province of Nova Scotia.

§For a fuller treatment of this subject readers are referred to C.M.A. Journal. Dec. 1 1962 outraged, if no preparations were made, and their criticism would be well merited and justified. All political parties accepted the principle of emergency planning. There are no objections against that principle in Ottawa, and all ten provincial governments are actively engaged in it.

Against this background of recurring civil disasters and ever present threat of a national emergency the need for Emergency Health Services should be considered.

THE PROBLEM

The problems of emergency health care are manifold. Many of them can be illustrated by actual events. And so: the problem is a train wreck producing a hundred casualties near a town with a hundred bed hospital. The problem is fire on the "Noronic" in Toronto harbour; the problem is the Alberta School bus disaster; the problem is a plane crashing into a school; the problem is the Windsor department store explosion; the problem is the Springhill Disaster; the problem is a nuclear attack on Canada with two to three million people killed, one and a quarter million injured, fourteen million a radiation risk — all survivors exposed to epidemic disease.

Strangely enough, for the health services of a small community, there is a basic similarity in all these problems as far as clinical services are concerned. A fifty bed hospital faced with a hundred casualties from a civil disaster will be in very much the same situation as if a convoy brought a hundred casualties from a damaged target area.

If hospital preparedness brings planning for civil disaster and national emergency together, the latter produces two major additional problems:

First, the need to provide prompt care to mass casualties on a scale hitherto unknown, with approximately half of our doctors, nurses and hospital beds possibly lost in the target areas.

Second, the care of intact survivors — the majority of Canadians — of whom many will be displaced people, evacuees living in overcrowded quarters, on likely less than wholesome diet, some of them having absorbed appreciable amount of gamma radiation.

These factors produce the rationale for the planning, which follows.

PLANNING

It seems clear from the above that on the federal and provincial level, planning for a national emergency will automatically include other contingencies, while on the municipal and community level preparedness for a local disaster will largely fill their part within the national framework of emergency planning.

Emergency Health Planning is divided into three parts:

1. Casualty care.
2. Care of intact survivors.
3. Public health measures and control of epidemic disease.

1. Casualty Care

Casualty care starts with self-aid, and rescue and first aid by the members of the Armed Forces. The patients will then be evacuated to Advanced Treatment Centres, established on main re-entry and evacuation routes just outside the significant radiation zone. Those Advanced Treatment Centres

(A.T.C.) will have capacity for sorting, supportive treatment, minor treatment, holding and further evacuation of five hundred patients per twenty-four hours. They have a military counterpart in R.C.A.M.C. Ambulance Stations.

Further evacuation will take patients to the existing hospitals, expanded in accordance with emergency planning (hospital disaster plans), and to emergency hospitals, which will be opened in suitable areas. Of course it is anticipated that urgent cases will be cared for in the hospitals closest to the damaged area. As time progresses, some of the hospitals will be gradually released for normal work, while others will become definitive care hospitals for the injured.

Here in Nova Scotia, Halifax – Dartmouth being considered a target area, Advanced Treatment Centres will be located in Hubbards on Route 3, Brooklyn, Hants and Windsor on Route 1, Milford Station on Route 2 and Oyster Pond on Route 7. A sixth is planned for Shubenacadie on Route 2. All health personnel from the target area, that is doctors, nurses, dentists, veterinarians and pharmacists, who manage to evacuate following an alert, should proceed to any one of the above points for assignments.

Five A.T.C.'s is an insufficient number – eight to ten are required and further units will be planned, as suitable locations become available. Consideration is also given to mobile A.T.C.'s moving towards damaged areas after the event.

Hospital accommodation is a major problem for the planner. We have fewer than three thousand general hospital beds outside the target area. Careful disaster planning can double that number. In addition, we may expect up to two thousand emergency beds, which would bring the total to approximately 8,000. With the possible patient load of 9,000 to 15,000, the situation could be very difficult, but not hopeless. Major casualty care would be provided by the following hospitals:

N. S. Sanatorium in Kentville;
Soldiers Memorial Hospital, Middleton;
Yarmouth Hospital;
Colchester County Hospital, Truro;
Aberdeen Hospital, New Glasgow;
St. Martha's Hospital, Antigonish;
Sydney City Hospital and St. Rita's Hospital, Sydney;
St. Elizabeth Hospital, North Sydney.

Additions will be made to this list as new hospitals and hospital wings are being built (like Blanchard – Fraser Memorial Hospital, Kentville; New Waterford Hospital, St. Joseph's Hospital, Glace Bay).

Other hospitals will, of course, implement their disaster plans and also switch to casualty care, but their expansion capabilities and surgical facilities are limited, so they cannot be classified as major centres.

Emergency Hospitals consist of pre-packaged, completely self-contained 200-bed units, which will be made available from the federal stockpile. The allocation of these units to the Province has not yet been made, but it should be from seven to ten.

These emergency hospitals will be located as follows: two in Truro, one each in Liverpool, Yarmouth, Kentville, Horton District, Canning. This leaves three possible units unallocated at the present time.

It is in the area of hospital disaster planning where the plans for civil and a war disaster come closest together and, indeed, overlap.

However, manpower is the real "planner's nightmare". In a civil disaster, aid will come from the next town or from "the city" – pre-planned or spontaneous. In a war situation everybody's resources will be strained to the utmost. Acute shortage of doctors and to a lesser extent nurses is certain to occur. Very careful planning of personnel disposal is absolutely necessary. Dentists and veterinarians have to be brought into the planning and prepared for their role. Numerous first aid and home nursing courses have to be conducted in order to train auxiliary personnel. On the administrative side, jobs have to be allocated and – in view of all the possibilities – chains of succession established, so that no essential function remains untended under any circumstances.

Supply planning also plays an important part and our pharmaceutical profession is of paramount importance there. The object is to make every municipality, including its hospitals, self-supporting for seven days, each of the three zones self-supporting for fourteen days and the province for thirty days. Apart from medical and surgical supplies, the feeding of patients and personnel has to be provided, for and emergency blood transfusion service planned.

One could go on describing various phases of planning in detail, but this is not the purpose of this article. It intends to show the difficulties facing both the health professions and the planners in achieving a state of preparedness for a grossly increased workload under unfavourably changed environmental conditions.

2. Care of intact population

Except for very major natural cataclysms comparable to the Agadir earthquake, this phase of planning is geared for preparedness in the face of external attack. In view of shortage of medical personnel, the normal doctor–patient relationship will have to be suspended in the post-attack period. Patient care will be concentrated in clinics established preferably in the vicinity of hospitals. The clinics will be operated by nurses, who will treat simple cases themselves and keep more serious ones for examination and treatment by visiting physicians.

Almost all medical cases will have to be treated at home. Surgical admissions will be limited to emergencies during the initial period. Prenatal care will also be given at the clinics, as will be protective inoculations.

All normal obstetrical cases will be delivered in maternity homes, established in the same general area as the clinics. Complicated cases will be admitted as surgical emergencies.

3. Public Health Planning

This is a very critical phase of planning. In a civil disaster, like major floods, with the rest of the country and indeed of the world intact, the health situation can be brought under control, malnutrition and epidemic disease prevented by merely diverting part of normally available resources to the stricken area. Not so after a nuclear strike. Large numbers of displaced population, overcrowding, possible damage to public utilities and shortages of some foodstuffs, difficulties in distribution of drugs, vaccines and equipment, with no outside assistance forthcoming for at least thirty days, make public health operations a critical necessity. If less spectacular than mass casualty care, success in this operation is perhaps even more essential for national survival.

Emergency Public Health personnel will be expected to control epidemic diseases by isolation and inoculation, to check water and food supply for bacteriological and radiological safety, to supervise existing sanitary facilities and ensure provision of emergency ones, to ensure proper garbage and sewage disposal, and finally to provide public information and instruction.

In this formidable task, as in other phases of planning, we shall rely on existing personnel, i.e., Health Units' Directors – as Zone Medical Officers and Deputies – public health nurses and sanitary inspectors. Their numbers will be augmented by approximately thirty municipal and town Medical Officers, recruited from among the private practitioners, and by any nurses with public health training or experience. Wherever possible, they will work as teams – doctor, nurse, sanitary inspector. Where there is no complete team, they will work in two's or individually. Where a doctor is not available, the public health nurse or sanitary inspector will assume powers of Medical Officer of Health.

Laboratory facilities will be provided by Emergency Mobile Laboratories. Equipment for those forms part of the federal Emergency Health Supplies program.

Bacteriological and chemical warfare is thought to be much less likely than use of nuclear devices, which can be employed much more efficiently. However, should this situation occur, the importance of public health services will obviously be even greater than following nuclear explosions.

Legislation

Under the British North America Act, health is a provincial responsibility. Civil Defence Order in Council, (Federal), 1959, assigns to the Provinces responsibility for:

1. Medical Services
2. Hospitals (including Emergency Hospitals)
3. Public health measures

Present State of Organization and Planning

Emergency Health Services planning is proceeding on three closely inrerrelated levels, federal, provincial and municipal.

Federal Emergency Health Services are a division of the Ministry of National Health and Welfare. The Chief of that division is Dr. A. C. Hardman, and the staff includes consultants in public health, hospital services, nursing and problems specially related to thermonuclear chemical and biological warfare. That division is responsible for planning on the national level, for training of key federal, provincial and municipal personnel at the Civil Defence College at Arnprior, Ontario, for Emergency Health Services publications, and for the medical stockpile through the Supply Branch. Other fields of Activity of the federal division are: Fostering liaison between the provinces, assisting with training on the provincial level, generally advising provincial organizations and maintaining contact with national associations of health professions and with Canadian Armed Forces on staff level.

Training courses for health professions at the Canadian Civil Defence College so far have included those for physicians and dentists and two types of courses for registered nurses, also hospital administrators conferences on hospital disaster planning. New and more specialized types of courses will be initiated this year – one in emergency public health measures and the other in operations and administration of health services under emergency conditions. Interprovincial conferences sponsored by federal headquarters are also held from time to time.

The Federal Emergency Health Services Division is also initiating research into clinical problems arising from a mass disaster under changed and unfavourable environmental conditions.

The Emergency Health Supply Program is well under way. This consists principally of stock piling and six hundred (600) Advanced Treatment Centres, one hundred (100) emergency hospitals – this number to be increased to two hundred (200) – and hospital disaster kits form most of the stockpile. The balance is in back-up supplies for these units.

Hospital Disaster Kits are available to hospitals with approved disaster plans under federal – provincial agreement, providing the province concerned employs a part-time pharmacist to administer the program. Advanced Treatment Centres and Emergency Hospitals are stored in regional depots. They can be leased to the provinces for prepositioning, providing the province employs a full-time pharmacist as Emergency Health Supplies Officer to look after this rather expensive equipment.

Emergency hospitals deserve a special mention. Each is a completely self-contained two hundred (200) bed unit, fully equipped, from its three operating tables, through the microscopes and anaesthetic machines down to the stationery and is transportable on four five ton trucks. They are undoubtedly a very strong point of the supplies program.

The federal office offers constant advice and consultation to the provincial Emergency Health Services. Health being both a prerogative and a responsibility of the provinces, the bulk of field planning is done on that level.

The problems and their proposed solutions have been described earlier. It can be added that as Emergency Measures Organization plans for continuity of government on all levels, so Emergency Health Services plan for continuity of health administration in addition to other health services. It is gradually becoming recognized in all provinces that Departments of Health will have to perform this task. Here in Nova Scotia the Department of Health is being rapidly organized and prepared for the emergency role, and it is now recognized departmental policy that all members of the Department take part in emergency planning and training. This is done under the authority of the Minister and the Deputy Minister of Public Health.

In the field, Health Unit Directors occupy positions in the Civil Defence organization. They supervise the training of their units' personnel in emergency functions and act as Civil Defence Zone Medical Officers and their deputies.

Professional training on the provincial level, which is sponsored by the Civil Defence, consists of courses for doctors and dentists, hospital disaster plans institutes and nurses instruction on the regional level. A course for Veterinarians is suggested in 1963. Instructional material is provided to nursing schools.

Committees already in existence or being organized are: Emergency Health Services Advisory Committee, Hospital Disaster Plans Committee, Nursing Advisory Committee.

On the municipal level, Civil Defence sponsors training of auxiliary personnel, which is conducted through the good offices of St. John Ambulance and the Red Cross. In Nova Scotia between July 1, 1961, and June 30, 1962, 1,452 persons were trained in Home Nursing and 1,765 in First Aid.

Hospital disaster planning is also part of the municipal program, although done in close co-operation with the provincial organization.

Each municipality or major town should have a Civil Defence Medical Officer to take administrative charge of health services within that municipality in the event of an emergency. Nova Scotia has so far 26 such Medical Officers.

In Nova Scotia, training of auxiliary personnel in first aid and home nursing is progressing well and hospital disaster planning is gathering momentum. It is anticipated that a number of hospitals (six or more) will have approved disaster plans next October and will be eligible for issue of hospital disaster kits. Services of the Hospital Insurance Commission's pharmacist, specifically concerned with the hospital disaster kits, have been made available to E.H.S. on part-time basis and this program can now be proceeded with.

The majority of other hospitals are now working on their disaster plans which are in various stages of completion.

Incidentally, the Commission for Hospital Accreditation has made the hospital disaster plan a mandatory requirement.

This description of organization and planning is based on what we are doing in Nova Scotia. Other provinces have roughly similar patterns.

As far as personnel is concerned, the provinces have various combinations of the following, full or part time: medical director, nursing consultant, pharmacist. Nova Scotia has a full-time medical director and nursing consultant and a part-time pharmacist.

The Future

As can be seen, certain things have been done, certain things are being done and still others are planned for the immediate future. But this part of the way, which lies ahead, is much longer, than that which is behind us.

What is the objective? The objective is to solve each emergency problem with the highest possible efficiency and maximum saving of life and limb. This is a pretty pat answer, but it is quite possible to achieve this high state of efficiency by fulfilling the following conditions:

(1) Organizing an efficient emergency health services administration on all levels through the Department of Public Health, Zones and Municipalities.

(2) Preparing individual members of health professions for their emergency role.

(3) Pre-planning emergency public health measures.

(4) Ensuring that every hospital in the province shall have a workable disaster plan with which all personnel must be familiar.

(5) Pre-planning adequate out-patient and maternity services under emergency conditions.

(6) Training adequate numbers of auxiliary personnel.

(7) Engaging full-time personnel as conditions require and budget permits.

All this cannot be achieved without the wholehearted support of the medical profession. By this, I do not mean the support of the profession's leaders – they have already declared their interest and co-operation. What is needed is the interest and active support of all practising doctors, whether general practitioners or specialists. It is easy to make paper plans — only the medical profession can bring life to them. The old cry "We shall rally round when the call comes", which was so successful in the past, does not hold true any longer in this age of jets and giant industrial enterprises, atomic energy and space travel.

The long history of the medical profession is a history of community service, outlasting wars, political storms and industrial revolutions. In this A.D. 1962, forty-four years after the "War to end all wars", seventeen years after Hiroshima and Nagasaki and the V-2 rocket – two years after the Agadir earthquake, Peru landslides and Lamonte school bus disaster – emergency planning is part of our community service. Only we can perform this service.

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BOOK REVIEW

Health in Industry; A Guide for Engineers, Executives and Doctors. R. C. Browne, M.A., D.M., M.R.C.P. Edward Arnold (Publishers) Ltd., London. MacMillan of Canada, 1961, 157 pp. $3.25.

The title of this book is of the type that makes a reviewer apprehensive. He fears that another bold writer has tried to cram a lifetime of experience and accumulated knowledge into an unreadable and sketchy account of a multi-faceted and important subject. Not so with Dr. Browne. He proceeds directly to produce what his title promises. He distils drops of wisdom for the men who design the industrial plants and machines. He has good advice for the executive relative to his own health and to the health of his workers and their environment. Dr. Browne is careful to include evidence that all that he has to say makes good sense from the corporate economic point of view. Sickness absenteeism, industrial accidents and automation are discussed in this light. The doctor in industry will find much to interest and enlighten him. The interested reader is urged to consult the carefully chosen references, which are listed at the end of each chapter. "Health In Industry", a small practical book, is highly recommended reading, particularly for the corporation personnel indicated in the title.

F. D. K

THE EFFECTS OF NUCLEAR WEAPONS

J. E. STAPLETON, M.B., B.S., D.M.R.T.*
Halifax, N. S.

As early as 1934, it was realized that it might be practical to obtain energy by the fusion of light elements. The process was explored during World War II but abandoned in favour of fission, and fission bombs were dropped on Nagasaki and Hiroshima. By 1952, however, the technical difficulties were overcome and a fusion bomb exploded, while Russia caught up technologically the next year and exploded its first Hydrogen bomb in August, 1953.

Atomic Theory began with New Zealand born Lord Rutherford's hypothesis that atoms consist of electrons surrounding a heavy, charged nucleus. This was expanded by Niels Bohr who said that the nucleus was composed of positively charged heavy particles, called protons the number of protons being equal to the number of orbiting electrons. In 1932 it was discovered that also in the nucleus are neutrons, particles approximately the same weight as protons but without any electrical charge. The number of protons in the nucleus determines the Atomic Number of the element; Thus Hydrogen has an Atomic Number of one; Uranium 92. The total number of protons and neutrons determines the Mass number - 238 for Uranium, 1 for hydrogen. But atoms of the same element may have varying numbers of neutrons so that while its Atomic Number is constant, its mass number may vary. Hydrogen or example may exist in three forms - Hydrogen, Deuterium and Tritium.

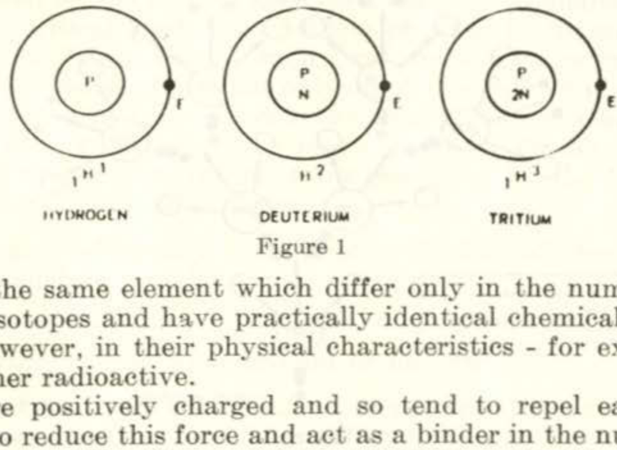


Figure 1

Atoms of the same element which differ only in the number of neutrons are known as Isotopes and have practically identical chemical characteristics. They differ, however, in their physical characteristics - for example one may be stable, another radioactive.

Protons are positively charged and so tend to repel each other. The neutrons tend to reduce this force and act as a binder in the nucleus. In light elements the force holding the particles together is greater than the force tending to cause repulsion and so the particle is stable. In the heavy elements, however, this may not be true and thus in uranium the nucleus is unstable, and some of the particles are ejected, thus giving rise to the phenomenon of radioactivity. Nuclear radiation may be in the form of nuclear particles or electro magnetic radiation.

Each radioactive element has a half-life which cannot be changed in any way, the half-life being the time required for the radioactivity of a given amount of a particular material to decrease to half its original value. Half-lives range from a millionth of a second to several billion years - radium for example is 1600 years. The total decay of a radioactive material is thus an infinitely long process.

There are three families of naturally occurring radioactive substances - Uranium, Thorium and Actinium. All these substances decay to form a

*Head of the Department of Radiation Therapy, Victoria General Hospital, Halifax, N. S.

different isotope of lead. From a study of such processes, it became obvious that one element could be converted to another element in either of two ways (1) by removing particles from the nucleus, thus decreasing the atomic number and mass number and (2) by adding particles to the nucleus, thus increasing the atomic number and mass number. In 1919 Rutherford made oxygen by bombarding nitrogen with alpha particles.

However, it was noticed that the total weight of the end products of a nuclear transformation was always less than the weight of the original reactants. Since matter could neither be created nor destroyed, this discrepancy remained a dilemma until Einstein stated that "The sum of matter and energy in a particular system is constant, but matter and energy are mutually interconvertible." Einstein also showed that a simple relationship existed between matter and energy: $E = mc^2$, where E is the energy liberated, m is the mass lost, and c the velocity of light. Thus it became obvious that nuclear reactions could produce energy several million times greater than that obtainable from chemical processes.

The first attempts to split the atom consumed far more energy than they produced, but in 1938 Hahn and Strassman split Uranium into two nearly equal halves by bombarding the nucleus with neutrons. What is more, each fission was accompanied by the simultaneous release of at least two neutrons so that a self-sustaining chain reactions was theoretically feasible.

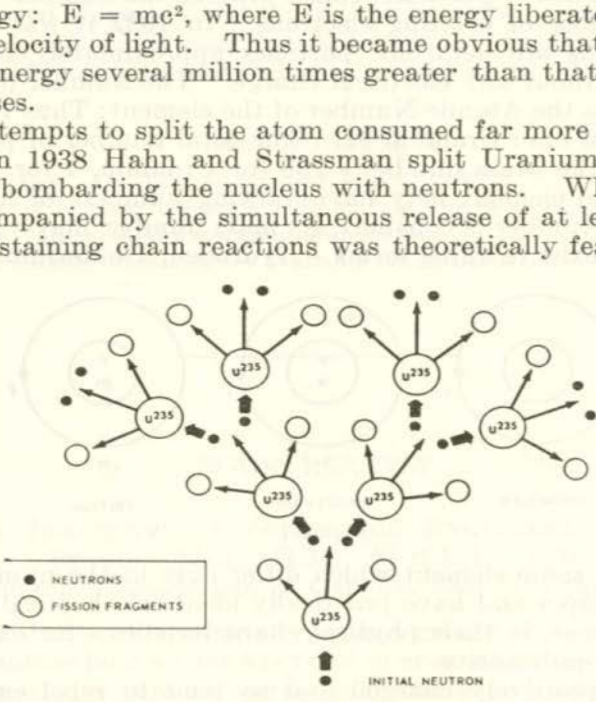


Figure 2

At the urging of Einstein, work began to initiate a nuclear explosion. The actual loss of mass in the fission of uranium is small - about 1/10th of one per cent and the fission of one pound of uranium would decrease its mass by 1/600th of an ounce. Nevertheless this tiny quantity of matter represents the energy released by the combustion of 1500 tons of coal, 250,000 gallons of gasoline, or 9000 tons of T.N.T.

Since not every neutron set free is successful in fissioning another atom of uranium - some escape - there is a critical mass of uranium which is necessary to sustain the chain reaction once it has been initiated. Therefore, to cause a nuclear explosion, the quantity of uranium must exceed the critical mass. However, once a mass of uranium of greater than the critical size is assembled, it is liable to detonate spontaneously from the stray neutrons which are always in the atmosphere as a result of cosmic ray activity. Consequently, a reliable bomb must be composed of at least two sub-critical masses of fissionable material which are not brought together until the actual moment of detonation.

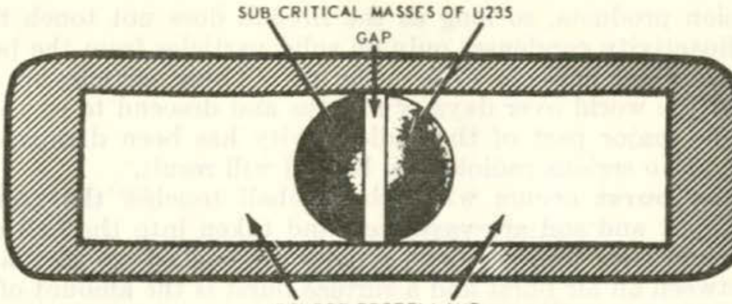


Figure 3

With the accomplishment of the fission explosion and the generation of tremendous heat, the fusion bomb became a practicable possibility. Every second the sun converts four to five million tons of matter into energy by fusion of the nuclei of hydrogen together to form the nucleus of helium. This provides the main source of Solar heat. In 1952 Operation Ivy demonstrated that indeed this method of energy production was practicable, and the way was set for the development of bombs without an upper limit on the size of the explosion; for with the ordinary atomic bomb the explosive capabilities of this weapon are limited by the need to keep each mass of fissionable material in the bomb below the critical level, thus putting physical limits on the size of the bomb. The fusion bomb has no such limitations because it has no critical size and the energy released depends only on the amount of material contained in the weapon. The hydrogen bomb has thus three successive stages in its detonation - Fission to generate the heat required - Fusion of the hydrogen nuclei - Further fission from the neutrons generated by the fusion process.

A nuclear bomb may be exploded

1. In the air, sufficiently high so that the fireball does not touch the earth's surface.
2. On the surface, where the fireball touches the surface of the earth.
3. Subsurface - either underground or underwater.

An air burst results in the formation of a fireball which rises to the edge of the stratosphere, sucks up dirt from the earth's surface, where it spreads to form the familiar mushroom cloud. A high pressure shock wave moves out from the ball of fire which causes most of the physical destruction; this shock wave is then reflected from the ground and later combines with the primary wave to form the Mach wave with pressures two to eight times the initial wave. Thus the destructive effect is multiplied. The fireball emits thermal radiation in the infra red, visible, and ultraviolet wavelengths during the first second of the explosion and nearly 30% of the energy of the bomb is released as heat. Skin burns of various degrees will be caused on exposed individuals up to twelve miles or more from a one megaton bomb. Fires will also be started by this heat radiation.

Nuclear radiation is emitted at the instant of explosion and consists of gamma rays and neutrons. This radiation is immaterial beside the damage caused by the heat and blast. Such an air burst causes negligible residual radioactivity on the ground consisting of gamma rays, beta and alpha particles from the fission products, so long as the fireball does not touch the ground, since the radioactivity condenses only on solid particles from the bomb casing and on the dust which happens to be in the air. These particles are very small, spread around the world over days or months and descend to earth slowly, by which time the major part of the radioactivity has been dissipated into the atmosphere and no serious radiological hazard will result.

A surface burst occurs when the fireball touches the ground. Vast quantities of rock and soil are vaporized and taken into the ball of fire, and when the fireball rises tons of dirt particles are sucked up so that the main difference between an air burst and a surface burst is the amount of dirt in the mushroom cloud. This dirt becomes intensely radioactive and is heavy enough to fall down again quickly, resulting in an area of extreme radioactive contamination and a much larger area of some hazard. The fireball of Operation Ivy touched the ground over an area of 28 sq. miles. The area of radiological hazard is much greater than the area of heat and blast, and the pattern of fallout is determined by the size of the particles, the direction and force of the winds and the nature of the ground. While the area of fallout can be described as cigar shaped extending downwind from the point of burst, prediction of fallout in any area is difficult and reliance can only be placed on direct measurement in any area.

A crater will be formed from a surface blast, and the energy used to create the crater will effectively lessen the blast. Thus from a tactical point of view, a surface blast is less effective militarily than an air blast. Targets will be overdestroyed close to ground zero and targets further away will receive a blast wave of much lower pressure. However, underground targets may be destroyed by ground shock from a surface blast.

Subsurface bursts may be either below ground or below water. An underground burst will cause little damage due to blast and there will be virtually no heat or immediate radiological hazard. However, there will be greater residual radioactivity. With a deep underwater burst (1000 feet or more deep) the fireball loses its identity in a mass of turbulent water before reaching the surface. Radioactive foam will be produced, but no column of water and no base surge. The only hazard that arises occurs if the radioactive foam is deposited on a beach.

With a shallow underwater burst, however, the fireball causes a huge column of water to be shot upwards. A shockwave is sent through the water travelling much faster than the shockwave in air which occurs as the fireball leaves the water. In Operation Baker, the water column reached a height of 6000 feet, was 2000 feet across and the thickness of the walls was 300 feet. More than a million tons of water was sent skyward.

The water falling back to the surface forms a cloud of mist called the Base Surge, which is a ring shaped cloud up to 1000 feet high and moving at better than a mile a minute. The base surge is highly radioactive, and in addition there is a large amount of fallout which commences shortly after the nuclear explosion. Essentially all the thermal radiation is absorbed by the water in a shallow underwater blast, as is the immediate gamma and neutron radiation emitted from the fireball at the instant of detonation.

The effects of a nuclear weapon are thus I. Blast, II. Heat, III. Initial nuclear radiation and IV. Residual radioactivity. In the case of an air burst, the blast effect causes more destruction than the heat or nuclear radiations.

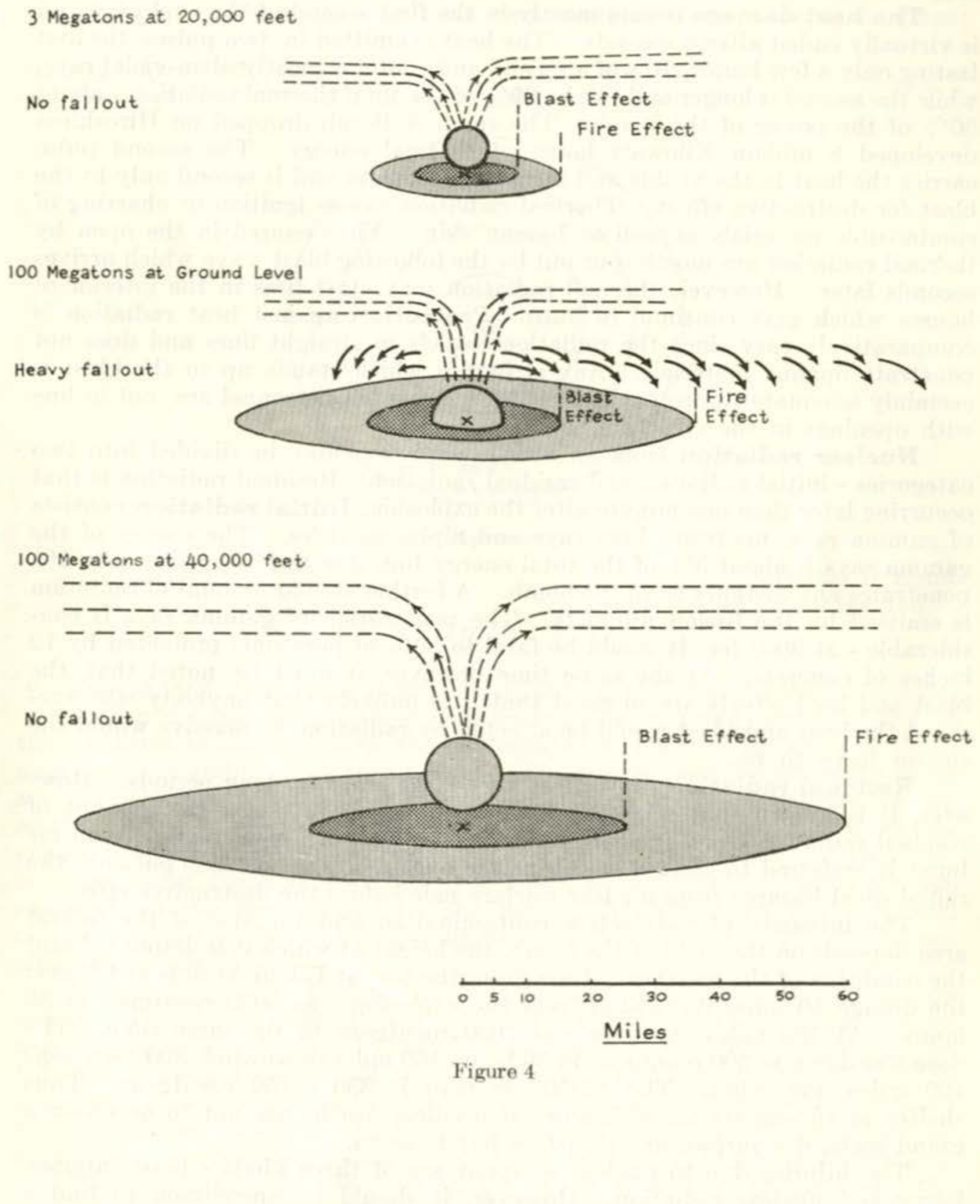

3 Megatons at 20,000 feet
No fallout
Blast Effect
Fire Effect
100 Megatons at Ground Level
Heavy fallout
Blast Effect
Fire Effect
100 Megatons at 40,000 feet
No fallout
Blast Effect
Fire Effect
0 5 10 20 30 40 50 60
Miles

Figure 4

The blast damage varies from total to light and extends from half a mile for total destruction to two miles for light damage for a minimal 20,000 ton A Bomb (Hiroshima type).

For a small 20 megaton H Bomb, the area of total destruction has a radius of 5 miles, while light damage extends to a radius of twenty miles, for a total area of over five hundred square miles.

The heat damage occurs mostly in the first second of the explosion and is virtually ended after 3 seconds The heat is emitted in two pulses, the first lasting only a few hundredths of a second and contains mostly ultra-violet rays, while the second is longer and carries 99% of the total thermal radiation - about 30% of the power of the bomb The small A Bomb dropped on Hiroshima developed 8 million Kilowatt hours of thermal energy The second pulse carries the heat in the visible and infra red spectrum and is second only to the blast for destructive effect Thermal radiation causes ignition or charring of combustible materials as well as human skin Fires caused in the open by thermal radiation are mostly put out by the following blast wave which arrives seconds later However, thermal radiation may start fires in the interior of houses which may continue to burn. **Protection** against heat radiation is comparatively easy since the radiation travels in straight lines and does not penetrate opaque materials. Any structure which stands up to the blast is certainly adequate to protect against heat, provided personnel are not in line with openings in the structure.

Nuclear radiation from an atomic explosion may be divided into two categories - initial radiation and residual radiation: Residual radiation is that occurring later than one minute after the explosion. **Initial radiation** consists of gamma rays, neutrons, beta rays and alpha particles. The energy of the gamma rays is about 3% of the total energy but, due to absorption, only 1% penetrates any distance from the bomb. A further similar amount of radiation is emitted by the fission products. The penetration of gamma rays is considerable - at 3000 feet it would be fatal to 50% of personnel protected by 12 inches of concrete. At the same time however, it must be noted that the blast and heat effects are so great that it is unlikely that anybody who survived the heat and blast would be affected by radiation, so massive would the shelter have to be.

Residual radiation may effect very large areas for long periods. However, it is known that scientists have been trying to lessen the amount of residual radiation from nuclear bombs and as we have seen, tactically an air burst is preferred to surface or subsurface bursts, so that as time goes on, the radiological hazards from nuclear warfare pale before the destructive effect.

The intensity of radioactive contamination and the size of the fallout area depends on the yield of the bomb, the height at which it is detonated and the condition of the weather. Data from the test at Bikini Atoll is as follows: the dosage 10 miles downwind from the explosion was 5000 roentgens in 36 hours. At 100 miles the dose was 2000 roentgens in the same time. The dose was down to 500 roentgens in 36 hours 160 miles downwind, 300 roentgens 190 miles downwind. The LD50 for man is 350 - 750 roentgens. Thus shelter arrangements are obligatory if needless deaths are not to occur on a grand scale, if a surface or subsurface burst occurs.

The injuries due to nuclear weapons are of three kinds - blast injuries, burns and nuclear radiation. However, it should be uncommon to find a victim showing only one type of injury. Blast injuries resulting from the shock wave usually kill immediately or within a few minutes, but the individual is also likely to be burnt and crushed as well.

The blast causes winds up to 170 mph., and consequently the air becomes filled with debris, each particle of which having the force to kill or maim. Secondary fires erupt and cause death or suffocation. Psychological trauma is real and a serious complication many miles away from areas of real damage. Anticipated casualties may be estimated roughly, if no warning is given:

Nominal A - Bomb
(20 kilo ton) "........... 1.3 miles........... "

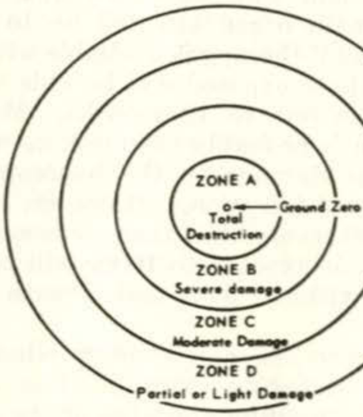


Figure 5

Nominal H Bomb
(1 Megaton)

"...........8.0 miles............."

Zone A 90% dead; Zone B 50% dead; Zone C 15% dead; Zone D 2% dead.

As for thermal burns, three degrees may be expected corresponding to the erythema of mild sunburn, the blistering of severe sunburn and full thickness burns extending to deeper tissues. The energy required for these burns are 2-3 calories/sq. metre, 3-4 calories/sq. metre and 8-10 calories per sq. metre. For a 10 megaton bomb, in fine weather 3 calories/sq. metre may be expected at 17 miles, 10 calories/sq. metre at 13 miles. In poor visibility, however, these distances may be cut as much as one fourth. Burns are also caused from the fires ignited by the bomb. At Hiroshima and Nagasaki it is estimated that 50% of all deaths were due to burns and 75% of all casualties were burns.

Effects due to the nuclear radiation are of two kinds - external and internal. However, the ingestion of radioactive nuclides is a trivial hazard compared to the blast, heat and external radiation. It is estimated that in the U.S. with an attack aimed half at military targets and half at cities 66% of the total population would be killed by blast and heat and 23% by fallout without adequate shelter facilities: with shelter facilities only 2% would be killed by fallout, the number being killed by blast and heat being of course unchanged.

If the radiation dose is received by only a small part of the body, the effect is a radiation injury. If the radiation is spread over a large portion of the body then the term radiation sickness is used. If the radiation is received in a few hours, then an acute exposure has occurred. If the individual is irradiated over several days or weeks, he has been chronically exposed.

The bodily systems affected by radiation are the G.I. tract, the haemopoietic system and the central nervous system. If 450r is received in a few hours or less, 100% of those exposed will become sick and 50% will die. However, if 450r is received over several weeks, only 10% will become sick and possibly none will die. The more chronic irradiation provides a chance for the damaged body tissues to recover. With an acute exposure in the range 100r or less, there will be no vomiting, no deaths and the only therapy required is reassurance. With an increase of dose to 300r, vomiting will occur in 100% of those receiving this dose and will begin two hours after exposure. The haemopoietic tissue is the main organ affected up to a dose of 600r. The prognosis is good, however, and if therapy is available with antibiotics and blood transfusion the majority of those exposed will be able to return to work after a convalescence varying from one to 12 months. With doses above 600r, bone marrow transplantation is probably required, as well as antibiotics and transfusion, to overcome the damage to the haemopoietic system and the majority die of hemorrhage and infection. However, it is not until the acute exposure has reached the 1000r range that therapy becomes only palliative and the prognosis hopeless. People exposed to 1000r will probably die within two weeks; with a dose of 5000r within 2 days mostly with respiratory failure and brain oedema.

It will be noted that there are many factors which determine the effect on the body of a specified radiation exposure dose. Beside the biological variation of individuals, age, nutrition and area of the body irradiated will all play a part. It is impossible to predict how a given individual will respond to a specified dose of radiation although the average effect on a large group may be known.

It should be remembered that in every case where a potentially lethal fallout has been produced, the fallout has been visible during delivery. It has the appearance of dust or ashes in the airl Thus it is probable that fallout will be perceived by those receiving it and the visible sign of its arrival may well be the first warning that exposed personnel will have. It has been found that the time of peak intensity of fallout is just double the time of arrival expressed in units of time since the burst itself. Thus an area that begins to receive fallout 3½ hours after the detonation will have peak intensity seven hours after the burst. It must be remembered that instruments used in the field are not normally calibrated for beta rays but merely give an indication of their presence. Trucks from a contaminated zone, or a street with high vertical buildings may have high beta contamination but little gamma radiation. Passive Defence is the best course of action during fallout. A shelter for 2-3 days, i.e. until the completion of initial rapid decay is the best location. Panic must be avoided at all costs. Every effort must be made to keep rescue teams working if fallout is not heavy. If all the able bodied men take to the shelters and stay there, many will die who would otherwise be saved.

Canadian Red Cross Society

Sickroom Loan Service

Dorothy Wyatt, R.N.

Born, as are all Red Cross services, of the recognition of a need, the Canadian Red Cross Sickroom Loan Service came into being in 1945. Designed to provide free equipment to patients convalescing at home, the service is unique in the world. It gives free assistance to 30,000 Canadians anualy; in Nova Scotia, between 4,000 and 5,000 people avail themselves of the service annually.

Pre-requisite for all loans is authorization by the attending physician. When this has been given, equipment may be borrowed from Red Cross for periods up to, but not exceeding, three months. Perhaps the greatest call is for crutches, some 500 pairs being on loan at all times in Nova Scotia. Frequently Red Cross receives requests from accident victims who have diagnosed their own conditions as sprains or strains. When this occurs, patients are urged to see their doctor, following which equipment is issued if the doctor advises it.

Equipment available through this Red Cross service includes hospital beds, wheel chairs, reclining chairs, crutches, bed pans, walkers, urinals, emesis basins, canes, back rests and bed clothes supports.

The beds can be elevated and are supplied with firm felt mattresses, mattress covers and rubber draw sheets. A special mattress carrying case is used for shipment to keep the mattress clean. Wheel chairs are available in standard, durable models, and are equipped with brakes. Many models are collapsible and can be used in or outdoors. The larger, more comfortable padded reclining chairs with detachable leg rests are also available. All crutches are adjustable and are available in junior, children's, small adult and tall adult sizes. They have under-arm pads and safety rubber tips as recommended by the director of the Rehabilitation Center in Halifax.

Hospital beds are not loaned to nursing homes or other institutions since operators naturally would be providing these as part of their service to their patients. Red Cross equipment is intended to assist the patient who is convalescing at home when active hospital accommodation is not required. Crutches are permitted to be used in hospital by patients who are being instructed in mobility by physio-therapists or nurses before going home. The Victorian Order of Nurses gives supervision under medical instruction to patients at home requiring this professional service.

The Sickroom Loan Service is strictly a short-term rotating loan service and prolonged illness poses a problem. When deciding long-term equipment requirements for patients, Red Cross needs the physician's advice. We realize the difficulties in assessing many of these cases, such as a diagnosis of arthritis or CVA which often have an indefinite prognosis.

For the patient with prolonged illness, there are several solutions. If the doctor recommends equipment indefinitely and the patient is financially able to provide it, he or she is encouraged to purchase the required item. Red Cross does not sell equipment to the patient but is pleased to provide purchasing information on all sickroom loan equipment. Needy cases can be referred to the Emergency Aid Committee of Red Cross, providing the assistance is not available from any other source.

In other words, Red Cross will provide equipment if the patient requires it indefinitely and has no other source from which to obtain it. This latter service has only a small budget, however, and assists individuals with artificial limbs, etc., in addition to sickroom equipment.

The Red Cross Sickroom Loan Service may be compared with hospital accommodation. It does not provide the complete answer to all cases of prolonged illness. Equipment is limited and available in ratio to the finances donated through either the United Appeal or Red Cross March Campaign. While there is no charge for the loan of equipment, in many cases users or their families make donations to the service in token of their gratitude, thus providing still another means of expanding it.

The Sickroom Loan Service was set up by the National Nursing Committee of the Canadian Red Cross Society, composed of volunteer nursing leaders from all avenues of the profession. The provincial nursing counterparts who serve Red Cross as volunteer advisers through the Divisional Nursing Services Committee, determine local policy. This is carried out through a staff director who also supervises other nursing programmes of the Society and is assisted by a secretary. The service is operated entirely by volunteers in 107 Branches of the Society in Nova Scotia. In addition to equipment loaned from headquarters, 84 Branches have equipment located throughout the Province. Branches have Red Cross Sickroom Loan Conveners who are volunteers with varied backgrounds. In a few areas, medical and nursing personnel direct the local service but in many communities, the Society depends upon the guidance of the clergy, the local merchant, the office worker, the teacher, the service station operator or the homemaker. All these people have tremendous enthusiasm for this service. A uniform policy on loans is attempted, educational literature provided and visits are made to Branch Conveners as often as possible to assist with the operation of an effective programme.

All Red Cross Sickroom Loan Conveners report being assisted by the advice of the local physicians. When establishing local loan services doctors have capably guided Red Cross volunteers with community Sickroom Equipment needs. When special features are required in wheel chairs or other loans, doctors have always been helpful with their recommendations.

Again it is emphasized loans are free; with positively no rental charge. Any donations of equipment or money are always used to assist in the expansion of the service. Many letters and donations from grateful patients are received by the service.

If a doctor practices in a community where the service has not been instituted, his recommendations would be particularly helpful to the local Red Cross. Many Branch volunteers are lay persons who need the guidance of the medical profession with local programmes.

Doctors are looked to as Red Cross volunteers whose advice to the community is needed. Doctors have always been prominent in guiding Red Cross programmes whether it be disaster services, blood services, outpost hospital services, home nursing or swimming and water safety programmes. Red Cross appreciates this medical participation which has made Nova Scotia Red Cross a strong link in the Canadian Red Cross Society with participation in the League of Red Cross Societies.

Details of the service provided in Canada by Red Cross were contained in the Society's National submission to the Royal Commission on Health and it is expected recommendation from this Commission will influence the future of this Red Cross Service which now provides essential assistance to many Canadians.

The Canadian Red Cross Society is a pioneering organization and as a member of the League of Red Cross Societies, represents one of the 87 nations which attempt to meet International needs without discrimination as to colour, race, religion, creed or status. Equally important is the acceptance and continuance of necessary programmes and services in the community. In essence, it pioneers needs not being met with the understanding that such programmes and services will be withdrawn when other community resources and organizations can provide the same standard of service.

BOOK REVIEW

"Classics of Medicine and Surgery", collected by C. N. B. Carmac. Dover Publications Inc., N. Y.

This Collection of the key original papers by Lister, Harvey, Auenbrugger' Laenec, Jenner, Morton, Simpson & Holmes covers their epochal discoveries in Medicine.

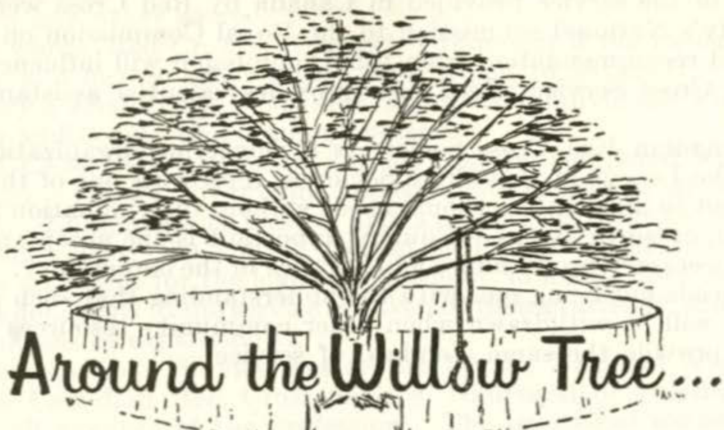
Of the two methods of learning the history of Medicine, either by reading a definitive account, or studying the original papers of the heroes of Medicine, the latter, if one has the time, is certainly the more rewarding. If the second course is followed, this paperback collection is an excellent starting point.

One is impressed by the completeness of the knowledge of the masters, even by present standards, and by how much that is immediately relevant the student can learn from the originals. The suggestion made in the introduction that medical students might well begin each new topic of study with the original paper struck this reviewer as being a commendable one.

I was particularly interested in the contentious papers of Morton and Simpson on the relative safety of ether and chloroform, and in Oliver Wendell Holmes' paper on puerperal fever. The death of mother after mother caused by the mere attendance of the family physician seems incredible, and the manner in which Holmes collected the evidence, found and convicted the "Criminals" was worthy of his mythical namesake Sherlock.

D. V. G.

THE DOCTOR'S COLUMN



The Story of Anaesthesia

Luther McKenzie, B.A., MD., LL.D. (Hon.)

Bedford, N. S.

The story of Anaesthesia (of a sort) reaches far back in antiquity. A Babylonian tablet, dated 2250 B.C. makes reference to the relief of toothache and when man first learned to ferment wine, he found a remedy for the discomfort of both body and mind. Homer (850 B.C.) in the Odyssey writes of a potion that induced insensibility. Numerous other early writers tell of various drugs that induced stupor. The early Egyptians used "Hashish", from which the word Assassin is derived. Under the influence of this drug, the sense of moral responsibility is lost, and evidently Murder Incorporated of that early date used the same methods and drugs as the modern gangsters. Paradoxically, these stupefying drugs were given to those about to be tortured, a somewhat contradictory attitude. It evidently did not occur to them to lighten the torture.

Modern or Surgical Anaesthesia began with the discovery and use of Ether, Chloroform and Nitrous Oxide. Many of the facts of its beginnings are confused and conflicting, occasionally contradictory and controversial Even the origin of the name – anaesthesia and anaesthetic – is in dispute. By some it has been attributed to a Greek physician of the first century A. D. Dioscorides, but American writers, at least, credit the coining of these words to Oliver Wendell Holmes, and his letter of November 21st, 1846 suggesting these terms is still in existence. Dr. Holmes was of such intellectual integrity, that one may be assured that he was unaware that anyone had previously suggested the terms, and it would seem that their coinage can properly be attributed to Dr. Holmes.

Ether

In a very complete text on anaesthetics by Dr. Buxton he states that the discovery of Ether is attributed to an Arabian chemist, Djaber Yeber, but reading further in the same text it says that Ether was discovered in 1540 by Valerius Cordus, somewhat confusing – but the majority of writers on the subject, agree on Cordus, as the discoverer of Ether.

However, it was not until 300 years later that the first intimation of its possible use as an anaesthetic was made. Faraday in 1818, suggested that the inhalation of Ether mixed with air would produce a state of unconsciousness. However, his idea lay dormant until in 1842 Dr. Crawford W. Long of Georgia, under ether anaesthesia, painlessly, removed a tumour from his patients' neck. He failed to report this use of ether and seven or eight other successful operations in the Medical Journals, and knowledge of his use of ether was confined to the immediate locality. Working entirely independently of Long, Dr. Wm. T. G. Morton, in Boston, in October of 1846 operated successfully under ether anaesthesia. When Morton sought to patent his discovery, there ensued a long and bitter controversy which finally landed in the courts. Morton did not secure his patent. News of this discovery quickly spread to the British Isles and by Christmas, 1846, Liston, a surgeon in England and Simpson an obstetrician in Scotland were using ether in their respective practices. Dr. Jas. Y. Simpson was probably the first to employ anaesthesia in child birth.

During my internship in Bellevue Hospital (N.Y.) all the anesthetics given in the hospital were administered by the interne staff, and we were instructed in this by a famous N.Y. anesthetist, Dr. Thomas Bennett, one of the first in N.Y., at least, to make a specialty of anaesthesia. He was also the deviser of the first re-breathing inhaler, in America, known as the Bennett, inhaler. It was an excellent machine, making a very easy transition from the preliminary nitrous oxide to Ether. At this time ether had largely supplanted chloroform owing to its greater safety.

I recall Dr. Bennett saying that he liked chloroform as an anaesthetic, often used it, and never had a fatality from it, but to remember that in giving chloroform it should be 5% chloroform and 95% air. This is probably more epigrammatic than strictly accurate. Some who have studied this aspect of chloroform state that 2% chloroform and 98% air, is the safest mixture.

There are many stories about Dr. Bennett, one of which is that he was summoned to Newport to give the anesthetic to a beautiful but dumb socialite who was in need of an appendectomy. As Dr. Bennett was about to put the cone over her face, the young lady looked up at him and asked "when will I know anything?" Smiling down sweetly at her, Dr. Bennett replied – "Isn't that asking a lot of an anaesthetic?"

Dr. Bennett and his brother were the owners of a very popular dog biscuit, which they reportedly sold for five million dollars. He made much more money feeding puppies than administering to the sick.

It was commonly held, at this time, that prolonged anaesthesia might have an adverse effect on a smooth, or in fact, any recovery. The prolonged vomiting prevented the patient from taking any fluids by mouth, and intravenous fluid or blood transfusions were still unknown. It became, therefore, the ambition of the surgeon, to achieve speed in his operating. One famous N.Y. surgeon removed an appendix in 6 minutes, and I may add that his name rested as much on his speed as on his technical skill. A N.Y. gynaecologist, somewhat proud of his speed (he was also skilled) was operating on a large fibroid of the uterus (it reached the ensiform cartilage) and on its completion turned to me (I was giving the anaesthetic as well as holding the watch) and asked "How long?" When I told him sixteen minutes, he beamed.

On another occasion, I gave the anaesthetic for the wiring of an aortic aneurysm. These aneurysms were not, at this time, uncommon in the Bellevue wards. In fact, the hospital pathologist had recently (1904) reported that the commonest cause of **sudden** death in the Bellevue morgue, was ruptured aneurysm. This was the first wiring of an aortic aneurysm in N.Y. and the surgeon was noted for anything but his speed. Everything that could go wrong, did. The wire wouldn't coil properly in the sac, and the electric current could not be properly controlled. As hour succeeded hour, I became as nervous as the surgeon, and thought if the surgery didn't kill the patient the anaesthetic would. He lived three months when the aneurysm burst. The operation fell into disuse, but was revived 15 or 20 years ago with considerably more success than on this first attempt.

Leaving this digression and returning to Scotland and Dr. Simpson, we find Dr. Simpson during 1847, using ether in his obstetrical practice, but with waning enthusiasm, and along with his assistants Drs. Keith and Duncan conducted numerous experiments, inhaling substance after substance, in search for something superior to ether. But, meeting with no success, in November 1847, appeal was made to a Mr. Waldie, a chemist of Liverpool (both Dr. Simpson and Mr. Waldie were born in Linlithgowshire) for suggestions and he advised that they try Chloroform.

Chloroform was first produced, almost simultaneously and independently, in 1831, by three men – Liebig in Germany, Soubeirau in France, and Guthrie a chemist in N.Y. State, and its chemical composition was accurately determined in 1835 by the French chemist – Dumas. Chloroform was made by treating ethyl alcohol (or acetone) with calcium hypochlorite (bleaching powder) and the resulting product was shown by Dumas to be trichlormethane with a chemical formula $CHCl_3$.

Simpson and his assistants began their experiments, chiefly conducted in the Simpson dining-room, by repeatedly inhaling quantities of chloroform, and having assured themselves that it fulfilled their exacting requirements, advised the medical world that Chloroform was the ideal anaesthetic. Dr. Simpson through his lectures and writings was a warm advocate of the new anaesthetic, and it was not long until Chloroform had supplanted ether.

However, trouble lay ahead. Early in 1848, a young woman of 20 years was being operated upon for an ingrowing toenail. After inhaling chloroform for a very brief period, she suddenly died. Other reports of similar sudden deaths began accumulating and while Dr. Simpson vigorously defended chloroform, the handwriting was on the wall, and chloroform which had supplanted ether, was in turn supplanted by ether.

Many explanations were put forward as to the cause of these deaths, which we now know were due to ventricular fibrillation. In a great number, the fibrillation is preceded by numerous ventricular extra-systoles and if the chloroform is withdrawn at this point, the heart usually reverts to sinus rhythm.

The great majority of chloroform deaths occur at the inception of the anaesthetic, and too high a concentration of chloroform (5% or over) held responsible for causing the ventricular fibrillation. There are those who hold that chloroform induces anoxia of the heart muscle, which in turn induces fibrillation. Against this theory, death occurs early, before anoxia can be excessive. Furthermore ventricular fibrillation does occur without anoxia, as after injections of adrenalin, or over-doses of digitalis, or in electrocution. From the evidence available, it seems more likely that chloroform directly, without intervening anoxia, is responsible for ventricular fibrillation. Acute liver destruction with death may be a sequel of chloroform anesthesia.

In the early eighteen hundreds in the town of Pictou, N. S., there were three Fraser brothers who became druggists, one of whom was to achieve enduring fame. J. D. B. Fraser the eldest brother, was born in 1807 aned became a druggist in 1828. "Fraser the Druggist" as he was popularly called, must have been a man of parts. Gifted with imagination and endowed with initiative and an investigating type of mind, he was a subscriber to english medical journals, and in late 1847, there arrived from England the sailing packet with the medical journals. One of these contained Dr. Jas. Y. Simpson's article on the preparation and administration of chloroform. In his small shop, Fraser at once set to work, and after several failures finally produced what seemed to him a satisfactory product. This was the first chloroform, for surgical anaesthesia, produced in the Western hemisphere. There is no record of animal expreimentation, but we learn that Dr. W. J. Almon of Halifax, on February 5th, 1848, under chloroform anaesthesia, removed a thumb from his patient. This was the first operation under this anesthetic performed in the Western hemisphere. Dr. Almon operated a second time on March 11th, 1848, the chloroform in both instances being supplied by druggist Fraser, and on March 22nd, 1848 Fraser administered to his wife, the first chloroform to be given a woman in childbirth in America. The name of the accoucheur is not known.

One does not know which to admire the more – the bold initiative of the father or the implicit trust of the mother in consenting to the first childbirth in America under chloroform.

From the small community of Pictou, N. S. there had come fresh and growing impetus to the search for further knowledge of anaesthesia, one of the great boons of mankind.

FROM THE BULLETIN OF 40 YEARS AGO

The Medical Society of Nova Scotia Bulletin, Dec. 1922

The Present Status of Medicine in Nova Scotia

Dr. A. G. Nichols, Halifax, N. S.

In the last days of September of this year there was staged in the City of Halifax an event of more than passing importance in the medical annals of this province. For the first time in its history, the Faculty of Medicine of Dalhousie University inaugurated a course of post-graduate instruction. The idea was the outcome of a meeting of the Maritime Branch of the American College of Surgeons, held at Halifax earlier in the year, and, while it commended itself to the imagination of those interested in teaching, it was with not a little trepidation that the idea was translated into action. The Medical School was hardly out of its swaddling-clothes, and, moreover, isolated from the other and greater centres of scientific activity. In spite of the latter fact, and perhaps because of it, the experiment proved a complete success, to the gratification of all. The Course was short, lasting but one week, and was free. About thirty physicians from various points in the Maritime Provinces, and one from the United States, were in attendance.

So much appreciation of the post-graduate course was expressed by the visitors, that it is practically certain that a similar venture will be made next year.

TO THE EDITOR, NOVA SCOTIA MEDICAL BULLETIN

Sir:—

Many thanks for Dr. Schwartz' "Medical Reminiscences". I did not know that X-rays of acute infection of the ear and nasal sinuses were particularly liable to be misleading.

I agree - X-rays are only valuable as an aid to diagnosis. Today the young graduate sends his patient to the laboratory, X-ray Department, etc., etc., and makes little use of his eyes, ears and fingers - case histories are neglected.

A famous physician once said "if your doctor does not have your clothing removed before examination - change your physician". The trouble is that we do not know the normal abnormalities of the body, and E.C.G. can be as misleading as X-rays of the denser structures. We only X-ray the sick - not the healthy individual. Dr. Schwartz' work on the development of the mastoid bone was masterly and in the distant future will probably be quoted by other investigators. His description of the first intramuscular injection of Penicillin by Dr. Stoddard was most interesting - here goes for a similar experience.

In 1909 I haunted the "Lab" in the V.G.H. and helped Dr. Cox examine urine slides, etc. One morning Dr. Hogan came into the laboratory and wanted to know if we could make up a solution of a powder that would be safe for injection.

Apparently the Germans, with Ehrlich's permission had sent over to the hospitals in the U.S.A. and Canada small quantities of "606". We made the solution up to 100 cc's which Hogan injected more or less subcutaneously at three sites between the shoulder blades. Talk about the pawn-brokers sign - I think the result was very satisfactory but the poor patient could not sleep on his back for some ten days. This was the first injection of "606" in the Maritimes.

Yours sincerely,

JOHN COLLIE,

Weybridge, England,

October, 1962

The above letter is adapted with permission from a letter to Dr. Schwartz. We are grateful to him for the opportunity of reproducing it.—Ed.

PERSONAL INTEREST NOTES

Antigonish–Guysborough Medical Society

Dr. Alex J. George, Radiologist, at St. Martha's Hospital in Antigonish, owner of the Mount Cameron Farm – situated near the hospital – won several prizes for his "Aberdeen-Angus steers at the annual Fall – Eastern Counties Exhibition in Antigonish in September.

Dr. John Robert Greening, B.Sc., M.D.C.M. joined the Antigonish Clinic on July 15, 1962, in the practice of the specialty of Gynaecology and Obstetrics.

Dr. Ian Michael Leckie took up practice in Carnduff Sask., after he left Goldboro, Guys. Co., on February 22, 1962, where he had practised from Sept. 23, 1961.

Dr. William Richmond has taken over his practice in Goldboro. Dr. Leckie took a new Nova Scotian with him to Saskatchewan – a son born last February.

Dr. and Mrs. E. A. Dunphy visited Atlantic City recently, where Dr. Dunphy attended the Clinical Congress of the American College of Surgeons.

Dr. J. C. Wickwire recently attended a course in Cardiology at the Royal Victoria Hospital, Montreal.

Congratulations

To Dr. and Mrs. T. B. Murphy on the marriage of their daughter, Judith, to Mr. Patrick Grannon of New Brunswick.

To Dr. and Mrs. E. A. Dunphy on the birth of their daughter (Joan Louise) on April 21, 1962.

Cumberland County Medical Society

The regular meeting of the Society was held at the Fort Cumberland Hotel Amherst on Nov. 14, 1962.

Dr. N. Glen, Amherst, has been visiting in England during the past month.

Halifax, Medical Society

Congratulations

To Dr. C. J. Beckwith for his MEMBERSHIP EMERITUS award from the Canadian Public Health Association. This award was made at the Annual Banquet of the Nova Scotia Branch of the Association held recently in Kentville.

To Dr. Douglas Roy whose schooner, "Jeto" placed front on corrected time in the gaff rigged class at the Annual Schooner Championship Race.

To Dr. Ralph Ballem (30), Dr. E. I. Glenister, (20), Dr. C. J. MacDonald, (30), and Dr. A. J. Campbell, (40) for the pins they received at the recent ceremony at Government House, honouring them, among 258 Blood Donors in this area. The number of donations of blood given by these worthy gentlemen is shown in brackets after their names.

Dr. M. Erdogan, M.D., F.R.C.S. (C.), announces the opening of his office for the practice of Fractures, Children and Adult Orthopaedics, at the newly expanded Medical Arts Building, Spring Garden Rd.

Dr. J. Murray Snow has been appointed as Executive Director of the N. S. Alcoholism Research Foundation.

Western Nova Scotia Medical Society

The Annual Meeting of the Society was held on Nov. 14, 1962 at the Yarmouth Regional Hospital. Newly elected officers were President – Dr. F. C. Scott; Vice-President – Dr. R. Campbell, Shelburne; Sect'y – Dr. G. D. Belliveau, Yarmouth; Treasurer – Dr. R. M. Caldwell, Yarmouth.

Dr. C. L. Gosse, president elect of the N. S. Medical Society was the guest speaker. Plans were got under way to arrange for the Annual Meeting of the Nova Scotia Medical Society which is to be held at Braemar Lodge, July 2 – 5, 1963. Dr. D. F. MacDonald of Yarmouth is the Provincial President this year.

Births

To Dr. and Mrs. C. Lake, (Elnora Jackson, PHN), November 14, 1962, a son, at the Grace Maternity Hospital.

To Dr. and Mrs. Ewart Blanchard, Oct. 21, 1962, a son, Jonathan Sandilands at the Halifax Infirmary.

To Dr. and Mrs. Joseph Cairns, October 23, 1962, a son at the Halifax Infirmary.

To Dr. and Mrs. J. D. Darrock (Peggy Morrison) October 19, 1962, a son at San Francisco, U.S.A.

To Dr. and Mrs. Robert Fraser (neé Margaret Nason), November 6, 1962, a daughter (Stephanie Lynn) at the Grace Maternity Hospital.

To Dr. and Mrs. Alan Frecker (neé Louise Kearley), October 30, 1962, a daughter, at the Halifax Infirmary.

To Dr. and Mrs. J. D. Macpherson, October 26, 1962, a daughter, Shirley Joy at the Grace Maternity Hospital.

To Dr. and Mrs. Harris Miller, November 8, 1962, a daughter at the Halifax Infirmary.

To Mr. and Mrs. Robert O'Neill (Dr. Anna Beichl), November 12, 1962, a daughter, Carmen Angela, at the Grace Maternity Hospital.

To Dr. and Mrs. John B. Steele (Patricia Nicholson), a daughter (Wendy Ellen) at the Grace Maternity Hospital.

Marriages

To Dr. and Mrs. John W. Merritt, Halifax, on the marriage of their daughter, Marilla Louise to Lt. John Patrick Speller, R.N. of H.M. Sub. "Otter" at St. James Church, Spanish Place, London on Nov. 17, 1962. We regret that Dr. and Mrs. Merritt were unable to be present at the ceremony.

Obituary

We regret to record the death of Dr. Gerald D. Bliss, a native of Amherst, who died at the age of 79, in Altoona, Pa., on Oct. 17. He was the eldest son of the late Dr. and Mrs. C. W. Bliss of Amherst. After graduating from Jefferson Medical College, Philadelphia, in 1907 he interned in Altoona and later became the head of the new X-ray Department there. He and his colleagues organized in 1916 the Roentgen Ray Society of Central Pennsylvania which, in 1929 became the Pennsylvania Radiological Society. In addition to being its first president, Dr. Bliss served as Editor of the Bulletin and was also Secretary for a year. In 1958, Dr. Bliss was honoured by the Society with a presentation and life membership.

The

Medical Society of Nova Scotia

extends

sincere wishes for a

Merry Christmas

and a

Happy and Prosperous New Year

GENERAL INDEX

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ABBREVIATIONS USED:—Ab. - Abstracts, AWT - Around the Willow Tree, Corr. - Correspondence; Ed. - Editorials; Rev. - Review; 1000 - Thousand Word Series.