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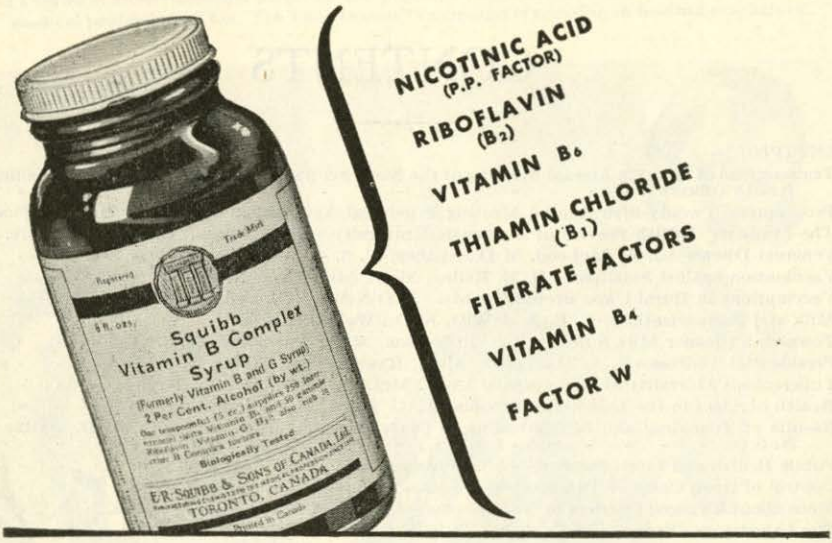

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Transactions of the 25th Annual Meeting of the Nova Scotia Provincial Association of Medical Health Officers

THE twenty-fifth annual meeting of the Nova Scotia Provincial Association of Medical Health Officers was held at the "Pines Hotel", Digby, N. S., on Tuesday, July 4th, 1939.

The meeting came to order at 9.50 a.m., the President, Dr. R. A. MacLellan of Rawdon Gold Mines, presiding. After the minutes of the last regular meeting were read and adopted, Dr. MacLellan called upon the Hon. Dr. F. R. Davis, Minister of Health, to give the opening address.

Dr. Davis began by congratulating the members upon their attendance and their increasing interest in public health affairs. He then went on to outline the place of the local health officer and the general practitioner in building up a real, alert and efficient Department of Health, showing that their goodwill and cooperation were essential to that end. Dr. Davis clearly outlined the aims of the Department and the manner in which the health organization was being built up with the objective of developing a system which would give to all, but particularly to the children, that measure of health which is their birthright. He pointed out that the services inaugurated in the year 1904 and those added through the years since that time, have all been maintained and intensified and in addition others have been established, in order to keep pace with the marked and rapid development in public health. The Honourable Minister concluded by stating that the health of the people has been maintained at a satisfactory level and as a consequence the province of Nova Scotia is a healthful place in which to live. To all who have contributed in bringing about this result he was extremely grateful.

A vote of thanks to Hon. Dr. Davis was moved by Dr. J. K. McLeod, seconded by Dr. F. O'Neil and unanimously carried.

In the pages that follow, most of the papers and addresses given on the occasion of this meeting are reproduced. Dr. W. D. Forrest who spoke from notes had intended to prepare a summary for the minutes, but his untimely death made this impossible. Dr. Forrest took a prominent part, along with the late Dr. W. H. Hattie, in the organization of this association and was one of its early presidents. He was a regular attendant at annual meetings, especially in the earlier years, and his contributions to their proceedings, both in the form of original papers and in participation in discussions were greatly valued. A fluent speaker and trenchant critic, scarcely anything the association undertook, escaped his comment. While ever ready to "draw swords" with those from whom he differed, he was withal a kindly, upright and straightforward gentleman; qualities which earned for him an unusual number of close and life-long friends. The death of great, big, generous Bill Forrest leaves a vacancy difficult to fill and a memory which will, for long, endure.

Twenty-Fifth Annual Meeting of Provincial Association of Medical Health Officers

Pines Hotel, Digby, N. S., July 4, 1939.

PROGRAMME

Tuesday, 9.30 a.m., July 4, 1939.

Minutes of Previous Meeting.

Reports.

General Business.

10.00	Opening Address - - - -	Hon. F. R. Davis, Minister of Health.
10.15	"Student Health Services at Dalhousie University" -	Dr. H. G. Grant, Professor, Preventive Medicine, Dalhousie.
10.45	"Vaccination against Smallpox"	Dr. H. E. Kelley, M.H.O., Middleton.
11.00	"Vaccinations in Rural Cape Breton County" - - -	Dr. F. O'Neil, M.H.O., Cape Breton South.
11.30	"Venereal Diseases and Their Treatment" - - - -	Dr. J. K. McLeod, M.H.O., Sydney.
12.00	"Milk and Pasteurization" -	Dr. C. E. A. deWitt, M.H.O., Wolfville.
12.15	"Towards a Clean Milk Supply"	Dr. J. S. Robertson, D.P.H., Div. Med. Health Officer, Yarmouth.
12.30	"The Evolution of a Health Officer" - - - - -	Dr. W. D. Forrest, M.H.O., Halifax.

Appointment of Nominating Committee.

Afternoon Session, 2.00 o'clock.

2.00	Presidential Address - - -	Dr. R. A. MacLellan, Rawdon Gold Mines.
2.30	"The Open Case of Tuberculosis" - - - - -	Dr. G. C. W. Bliss, M.H.O., Amherst.
2.45	"Tuberculosis Mortality in Nova Scotia" - - -	Dr. A. L. McLean, D.P.H., Dalhousie University, Halifax.

3.10	"Health Services in the Lunenburg Schools" - - -	Dr. Russell Zinck, M.H.O., Lunenburg.
3.25	"Toxoiding from the Standpoint of the Rural M.H.O." -	Dr. C. L. MacMillan, M.H.O., Victoria County.
3.40	"Results of Toxoiding and Schick-testing in Glace Bay"	Dr. C. J. W. Beckwith, D.P.H., Div. Med. Health Officer, Sydney.
4.10	"Public Health and Louis Pasteur" - - - - - -	Dr. J. E. LeBlanc, West Pubnico, M.H.O., Argyle Municipality.
4.30	"Something More About Typhoid Carriers" - - -	Dr. J. J. MacRitchie, Div. Med. Health Officer, Halifax.
4.45	"Laboratory Diagnosis of Typhoid and Typhoid Carriers"	Dr. D. J. Mackenzie, Halifax, Director, Public Health Laboratory.
5.10	"The Certification of the Causes of Death" - - - - -	Dr. H. Robertson, C.P.H., Halifax, Statistician and Epidemiologist.
5.30	"Safe Water Supplies" - -	R. D. McKay, B.Sc. Sanitary Engineer.

Report of Nominating Committee.

Election of Officers.

Unfinished Business.

New Business.

Adjournment.

"The Students' Health Service of Dalhousie University"

H. G. GRANT, M.D.,
Professor of Preventive Medicine, Dalhousie University.

MR. President and members of the Medical Health Officers' Association of Nova Scotia—I wish to thank you for the honour of addressing your association. The topic on which I shall speak—The Students' Health Service—is not as close to your hearts as many other public health matters, but I feel that the observations we have made on the health of students attending Dalhousie University will interest you as medical health officers and also as private physicians.

Since 1931 all students attending Dalhousie University have been required to submit to an annual physical examination, which is carried out at the Dalhousie Public Health Clinic by the medical members of the staff. Whenever it is considered advisable, the students are referred to other members of the staff for consultation.

The examination is thorough, including urine analysis, blood pressure, the testing of vision and fluoroscopic examination of the chest, followed in all doubtful cases by X-ray examination. The examining physicians are limited to three (3) examinations per hour.

The charge to the student is five dollars which is included in the registration fee. In addition to the examination and the advice given about physical defects or disease, there is a consultation service maintained at the Dalhousie Public Health Clinic for minor illnesses. The medical service is not complete—students becoming ill during term are treated by their own private physician. Careful records are kept so that statistical studies may be made at different intervals. The records have been studied from 1933-1938 inclusive, and tables prepared showing the results. I shall now show these tables, commenting on them where necessary.

Table No. 1

DALHOUSIE UNIVERSITY

Students' Health Service

Environment	NUMBER			PERCENT		
	Males	Females	Total	Males	Females	Total
Rural	382	98	480	22.6	19.9	21.9
Urban	1312	395	1707	77.4	80.1	78.1
Total	1694	493	2187	100.0	100.0	100.0

This table shows the make up of our student body and whether they have lived in rural or urban communities. The term urban here means towns of over 2,500 population. There were 2,187 students included in the study, of these 1,694 were males and 493 females. Over seventy-eight per cent of the group came from urban centres and approximately twenty-two per cent from essentially rural areas.

Table No. 2
PERSONAL HISTORY

	NUMBER			PERCENT		
	Males	Females	Total	Males	Females	Total
Influenza	338	123	461	20.0	24.9	21.1
Scarlet fever	316	86	402	18.6	17.4	18.4
Appendicitis	213	66	279	12.6	13.4	12.8
Pneumonia	195	57	252	8.9	11.6	11.5
Jaundice	109	35	144	6.4	7.1	6.6
Diphtheria	103	18	121	6.1	3.6	5.5
Tonsillitis	92	28	120	5.4	5.7	5.5
Pleurisy	77	17	94	4.5	3.4	4.3
Otitis Media	49	12	61	2.9	2.4	2.8
Rheumatism	43	11	54	2.5	2.2	2.5
Heart disease	37	11	48	2.2	2.2	2.2
Hay fever and asthma	37	9	46	2.2	1.8	2.1
Fractures	32	6	38	1.9	1.2	1.7
Typhoid fever	28	5	33	1.6	1.0	1.5
Tuberculosis	25	5	30	1.5	1.0	1.4
Poliomyelitis	17	7	24	1.0	1.4	1.1
Smallpox	14	5	19	.8	1.0	.9
Diabetes	2	1	3	.1	.2	.1

This table was made up from the histories of past illness given by the students. You will notice relatively high incidence of appendicitis, also of scarlet fever and diphtheria.

Table No. 3
OPERATIONS

	NUMBER			PERCENT		
	Males	Females	Total	Males	Females	Total
Tonsillectomy	946	267	1213	55.8	54.2	55.5
Appendectomy	198	64	262	11.7	13.0	12.0
Nose operations	66	11	77	3.9	2.2	3.5
Mastoid operations	36	7	43	2.1	1.4	2.0
Herniotomy	41	1	42	2.4	.2	1.9
Leg operations	20	6	26	1.2	1.2	1.2
Abscess operations	19	5	24	1.1	1.0	1.1
Tumor and cyst	21	3	24	1.2	.6	1.1
Gland operations	14	2	16	.8	.4	.7
Ear operations	13	2	15	.8	.4	.7
Eye operations	7	3	10	.4	.6	.4
Arm operations	8	2	10	.5	.4	.4
Other operations	40	9	49	2.4	1.8	2.2
Total operations	1429	382	1811	....	....	....

This table shows the number of operations in the group studied. The two striking facts brought out here are the number having undergone tonsillectomy and appendectomy.

Table No. 4

VACCINATION AGAINST SMALLPOX

	NUMBER	PERCENT		
		Males	Females	Total
Previous Vaccination	1879	86.2	85.0	85.9
None	308	13.8	15.0	14.1
Total	2187	100.0	100.0	100.0

This table shows the vaccination status of students entering Dalhousie.

Table No. 5

MENSTRUATION

	FEMALES	
	Number	Percent
Normal	373	75.6
Irregular	45	9.1
Dysmenorrhoea	84	17.0
Loss of time	36	7.3
Total	493	....

Seventeen per cent of the women attending Dalhousie suffered from dysmenorrhoea, 7% to such an extent as to render it necessary to remain out of class.

Table No. 6

SPINAL CURVATURE

Scoliosis, Lordosis, Kyphosis.	NUMBER			PERCENT		
	Males	Females	Total	Males	Females	Total
Present	172	30	202	10.2	6.1	9.2
Absent	1522	463	1985	89.8	93.9	90.8
Total	1694	493	2187	100.0	100.0	100.0

Nine per cent of the group had some abnormal curvature of the spine, either scoliosis, lordosis or kyphosis.

Table No. 7

VISION

	NUMBER			PERCENT		
	Males	Females	Total	Males	Females	Total
With glasses	717	255	972	42.3	51.7	44.4
Without glasses	977	238	1215	57.7	48.3	55.6
Total	1694	493	2187	100.0	100.0	100.0

Forty-four per cent of the group were using glasses at the time of entering college.

Table No. 8

VISION

	NUMBER			PERCENT		
	Males	Females	Total	Males	Females	Total
Normal	767	207	974	45.3	42.0	44.5
Abnormal	927	286	1213	54.7	58.0	55.5
Total	1694	493	2187	100.0	100.0	100.0

Fifty-five per cent of the group had defective vision. The tests here were conducted by general physicians; if specialists had been employed, the percentage would have been slightly higher. This high percentage of abnormal vision in a group of students is indeed a challenge to the medical profession. It shows the need of more research on the etiology of defective vision.

Table No. 9

CONDITION OF TONSILS

	NUMBER			PERCENT		
	Rural	Urban	Total	Rural	Urban	Total
Healthy	172	491	663	35.8	28.8	30.3
Diseased	72	169	241	15.0	9.9	11.0
Enlarged	19	51	70	4.0	3.0	3.2
Removed	217	996	1213	45.2	58.3	55.5
Total	480	1707	2187	100.0	100.0	100.0

Showing the condition of the tonsils at time of entrance.

Table No. 10
TEETH

	NUMBER			PERCENT		
	Rural	Urban	Total	Rural	Urban	Total
Treatment required	46	131	177	9.6	7.7	8.1
No treatment required	434	1576	2010	90.4	92.3	91.9
Total	480	1707	2187	100.0	100.0	100.0

This table shows the condition of the teeth. The examinations were done by general physicians. The percentage requiring dental treatment (8.1%) is probably too low. It is planned to have the dental examination in the future carried out by a dentist.

Table No. 11
FEET

	NUMBER			PERCENT		
	Males	Females	Total	Males	Females	Total
Normal	1418	433	1851	83.7	87.8	84.6
Flat	244	44	288	14.4	8.9	13.2
Other Conditions	32	16	48	1.9	3.3	2.2
Total	1694	493	2187	100.0	100.0	100.0

Showing the condition of the feet.

Table No. 12
LUNGS

Classification	TOTAL	
	Number	Percent
Normal	1947	89.0
Childhood healed	149	6.8
Adult inactive	61	2.8
Adult active	15	.7
Chronic bronchitis	14	.6
Bronchiectasis	1	....
Total	2187	100.0

Of the 2,187 examined, 61 showed evidence of inactive tuberculosis of the adult type and 15 were suffering from active tuberculosis of the adult type. Many of these students were unaware of their condition and had in some cases no symptoms of the disease.

Table No. 13
HEART

	NUMBER			PERCENT		
	Males	Females	Total	Males	Females	Total
Normal	1475	422	1897	87.1	85.6	86.7
Functional systolic murmur.	159	59	218	9.4	12.0	10.0
Chronic rheumatic heart disease	56	11	67	3.3	2.2	3.1
Other conditions	4	1	5	.2	.2	.2
Total	1694	493	2187	100.0	100.0	100.0

The important finding here is that over 3% of the group showed clinical evidence of chronic rheumatic heart disease.

Table No. 14
SYSTOLIC BLOOD PRESSURE

	NUMBER			PERCENT		
	Males	Females	Total	Males	Females	Total
Under 100	6	29	35	.4	5.9	1.6
100-119	574	290	864	33.9	58.8	39.5
120-139	978	165	1143	57.7	33.5	52.3
140 and over	134	9	143	7.9	1.8	6.5
Not stated	2	...	2	.1	....	.1
Total	1694	493	2187	100.0	100.0	100.0

Systolic blood pressure readings; mercury and aneroid instruments used.

Table No. 15
URINALYSIS

	NUMBER			PERCENT		
	Males	Females	Total	Males	Females	Total
Normal	1574	431	2005	92.9	87.4	91.7
Albumen	94	45	139	5.5	9.1	6.4
Sugar	25	19	44	1.5	3.8	2.0
Hyaline casts	9	...	9	.5	....	.4
Total	1694	493	2187	....	....	....

The routine urine analysis revealed 2% with sugar and 6.4% with albumen; only .4% had hyaline casts.

This study reveals the physical defects and disease present in a group of 2,187 students attending Dalhousie University. The group should be considered a select one, as college students in general come from better class homes, have plenty of wholesome food, good medical care, nor are they exposed to the ill effects of strenuous manual labour. The examination is of great educational value to the student, pointing out, as nothing else will, the value of periodic health examinations.

Venereal Disease

J. K. McLeod, M.D.,M.H.O., Sydney, N. S.

IT is sometimes difficult to select a subject which will prove interesting to a public gathering, but I have endeavored to select one that should prove interesting and instructive to Health Officers, and hope it will provoke a very general discussion.

When we realize that syphilis with its effects on every organ of the body is perhaps the greatest killing disease known to us, and when we realize further that even where death does not occur it leaves in its track innocently infected mothers and children, besides filling our insane asylums with many incurable cases, we can understand what a serious health problem we have on our hands. No organ of the body is exempt from this infection once it enters the blood. Statistics from Toronto surveys show that in 1929, 8.4 per thousand of the population were under treatment to syphilis or gonorrhea; 9.7 per thousand in 1931 and 9.59 in 1937. The summary for the year 1935 for work carried out in all of the provinces of the Dominion showed that about 45,000 were treated in that year in clinics established in the provinces. General paresis in the mental hospital gives some index of the late effects of syphilis. In Ontario for the five year period 1930—1934 there were 10,470 first admissions to these hospitals with 647 found to be suffering from general paresis. During the same period in these institutions of a total of 3,575 deaths, 267 were due to general paresis. There can be no doubt that what is found in the Province of Ontario is found in all the other Provinces.

Now what can be done; there can be no doubt that education of the public through the health departments, and medical men generally, in the home, in the schools, through welfare organizations, the press, and free clinics, should be carried on until the public are thoroughly informed of the dangers of this vile disease and the methods by which it is spread. It is true we have made great advances in treatment, and Health Departments through free clinics and treatment, are doing their utmost to control this disease, but until every case is reported, isolated to a certain degree at least, and punishment meted out to those who knowingly spread it, the stamping out will be a difficult health problem. Perhaps I may refer to the Cape Breton Venereal Clinic which I suppose is similar to those in other places. About eighteen years ago the late Dr. Hattie, then Provincial Health Officer of the Government of the day, established a free clinic in Sydney for the treatment of these cases.

The clinic has been carried on regularly ever since and during this time about two thousand cases of various kinds have received free treatment with very good results. It is not only a treatment centre, but an educational centre as well. The Provincial Government and its officials deserve the greatest credit for doing their utmost to prevent and control this disease.

"Vaccination Against Smallpox"

H. E. KELLEY, M.D.,
Medical Health Officer of Middleton and Annapolis Municipality.

VACCINATION against smallpox using the material from the pustules of cowpox was done by Jenner in 1798 although inoculation with material from a mild case of smallpox was introduced into England from Turkey in the early 1700's by Lady Mary Montagu where it was then in vogue although it had been practised in India and China for many years. There were probably earlier instances of vaccination with cowpox than Jenners but he put his experiment to the scientific test by subsequently inoculating his patient with fresh smallpox lymph and the publishing of his book embodying his experiments and observations brought to the attention of the world a means to rid civilization of the loathsome disease which while always present swept over the country in epidemic form every ten to twenty years taking enormous toll.

Vaccination, like other great discoveries, was not accepted unhesitatingly and long and bitter controversies waged in which medical men, the clergy and laymen took part and opposition lingers on in the conscientious objectors of our own day. In 1875 and in 1885 anti-vaccination riots occurred and on the latter occasion the troops were called to quell the riot.

With the acceptance and spread of the practice of vaccination the incidence of smallpox declined rapidly and succeeding generations remote from the horrors of smallpox with its toll of dead and aftermath of disfigured faces, neglected it in varying degree so that the results of this neglect are frequently apparent in the past century and down to the present time.

In Massachusetts rather stringent laws for the control of smallpox were passed in 1792 and inoculation and later vaccination were the rule so that for the years 1811-1837 only 39 deaths from the disease occurred in the city of Boston. Lulled to a sense of false security by the marked decrease in the disease a committee including many medical men waited on a committee of the Legislature complaining that the existing laws were useless, vexatious and burdensome, that personal rights were interfered with and that the public was subjected to unnecessary expense. As a result practically all the laws for the control of smallpox were repealed. After this action in the years 1838-1855, 1,032 fatal cases occurred in Boston and once again laws were enacted, this time more stringent than the ones repealed and smallpox again decreased. The famous epidemic in Montreal in 1885 happened after a period of neglect of vaccination and 3,164 persons died, roughly two-thirds of these being children. Smaller epidemics in recent years have occurred in Windsor, Ontario, where out of 67 attacked 32 died, all of the deaths being of persons previously unvaccinated. In Vancouver in 1931-1932 there were 56 cases with 16 deaths all deaths but one being in unvaccinated persons and that one had been vaccinated 35 years before. Mild smallpox occurred in the Gaspereaux Valley of Nova Scotia in 1919-1920 and that it is not entirely a disease of the past is shown by the statistics for 1930 when 46,712 cases were reported for the U. S. A. and 11,839 for England and Wales. Perhaps the most striking evi-

dence of the value of vaccination (and its value does seem to require demonstration from time to time) is seen in a study of the epidemic which occurred in Fitchburg, Mass., in 1932. Here 60 cases were met with and 90% of them were in French Canadians who had migrated from New Brunswick to work in the mills there. 57 cases were in persons previously unvaccinated and the 3 others were in persons who had not been vaccinated within 45 years. There were 28 households affected and 190 contacts—of 70 who were not protected 57 contracted smallpox (attack rate of 81.5%) while of 120 others previously vaccinated only three (3) took the disease.

With such definite evidence of the value of vaccination why do we still have conscientious objectors? Some are chronic antis but in many instances the C.O. is intelligent and full of arguments to prove his case and with these argument should be matched with argument. Some of the opposition is a hangover from the days of arm to arm vaccination when badly infected arms were more common than they are to-day and when it was possible that other diseases, e.g. syphilis might have been transmitted from one patient to another. There have been certain complications of vaccination but compared to the great numbers of vaccination they are comparatively rare. In 1901 in the U. S. A. there were 63 cases of tetanus following the operation and most of these were traced to a contaminated vaccine. The preparation of vaccine from selected and tested calves under strict aseptic precautions and with the vaccine in individual tubes has made complications rare today. Woodward states that in the U. S. A. between 1917-1930 out of approximately 8,500,000 vaccinations there was only one death and that occurred from pneumonia which could hardly be attributed to the vaccination. The commonest complication of latter years is postvaccinal encephalitis—English figures put it at 1:50,000. The greatest number in any year in Germany where vaccination is rigidly enforced, was 28 in about three million vaccinations and at the same time there were practically no cases of smallpox while that year England and Wales reported 11,839 cases of the disease.

In a majority of the so-called conscientious objections to-day, the objection is really an excuse to cover the inconvenience of the operation or because (in rural sections) of difficulty in getting a large family to the doctor often many miles away. I also believe that the unsightly scars of some of the older methods of vaccination where multiple scratches were used (4 scratches $\frac{1}{4}''$ apart still recommended in some English textbooks) or where two or three sites on the arm were done at the same time in the hope that one might take, play a part in the objection to vaccination. For several years I have used the puncture method (as mentioned in the literature accompanying the Connaught Laboratories vaccine) and have often been impressed with the frequency with which parents commented on the small scar resulting and the little inconvenience caused the patient. That this method is efficient, is demonstrated by the fact that out of 309 primary vaccinations done this spring cleaning up unvaccinated schools in the eastern part of Annapolis County, there were 308 takes. The excess vaccine was wiped off immediately and no dressings of any kind were used except that when the pustule formed, the patient was instructed to use an apron of clean gauze or linen fastened only at the top to prevent the shirt sleeve from chafing the sore.

"Vaccination in Rural Cape Breton County"

DR. F. O'NEIL, M.H.O.,
South Cape Breton Municipality.

Mr. President and Gentlemen:

When your good secretary, Dr. Campbell, wrote asking me to give a paper on some phase of public health, I answered stating that I did not think I could give a paper that would be of sufficient interest to the members of this Association, but later was foolish enough to succumb to his insistence and flattery. Since making that promise, the more I thought about it, the less I felt that what I am about to say would be of much interest.

After first being appointed as Medical Health Officer for Cape Breton, I felt that vaccination against smallpox was being sadly neglected and that unless something was done about it, sooner or later we would be found with a severe and expensive epidemic of smallpox, such as Cape Breton had in my early days as a public health officer, some thirty odd years ago, which ran into many thousands of dollars and on which the County is still paying interest, inasmuch as not one child in a great many schools was vaccinated. Each year I stressed this in my annual report and talked it over with the Warden of the County and various members of the Council. Various schemes were put forward, such as making a fee of 25c. or even 10c. per person for those who could not afford to pay the usual fee, but it was felt that this would not be a success. Finally, I decided that I would approach the matter from a different standpoint, namely, give free vaccination to everyone who would accept. I went into the schools with one of the provincial health nurses, pointed out to the children the necessity of vaccination, and explaining that it was compulsory before they could attend school. I then went ahead and vaccinated all the pupils present. In most schools there were few if any who objected and from these I insisted they procure a certificate from their family doctors giving the reason why the child should not be vaccinated. In, I think, only two cases was a pupil able to obtain such a certificate. In this way I was able to vaccinate every child attending school. The number vaccinated in 1938 was 1,368 and in 1939, 161.

Some seven or eight years ago I decided that it was necessary to begin a similar campaign for the immunizing of all school children against diphtheria, and I used much the same procedure as with vaccination. I went into the schools, gave the children a short talk on the dangers of diphtheria and the benefits of immunization and then immunized the children present. It is not necessary for me to take up the time of this meeting with going into detail but have this to say, that a large percentage of the children attending school, and a great many pre-school children in Cape Breton South, have been given the three doses of toxoid. To demonstrate how quickly the public respond to a little education regarding this matter, may I say that some years after starting the immunization of school children, some sixty-five pre-school

children ranging from six months up, from Scotchtown, near Waterford, were brought in to the toxoid clinic on a cold winter morning for immunization.

Before closing this report, I want to pay a tribute to my friend and predecessor, Dr. A. S. Kendall, who was, I think, the first man in Nova Scotia, if not in the Dominion of Canada, to administer anti-toxine for diphtheria and was the first to use immunization on any large scale in the country districts, having immunized some eight hundred children against scarlet fever over ten years ago.

It is hoped that during this summer, practically all the children in Cape Breton South will be vaccinated and immunized against diphtheria.

Milk and Pasteurization

Dr. C. E. A. DeWitt, M.H.O.,
Wolfville, N. S.

IN 1937 I wrote a paper on "100% Pasteurization Why and How Obtained". Last year in my presidential address, I gave considerable space to the subject of milk. So when our secretary and C.M.O. requested me to prepare a paper for this meeting on milk and pasteurization, I consented on condition that the paper should be short, and with the understanding, not, that I could present anything new, but to provoke a discussion on a subject, which should be of vital interest to all concerned.

If I deviate from the usual of going into facts and figures, pros and cons, in regard to the problem of pasteurization, and tell you about some of the snarls we have been up against at various times, perhaps this will lead to a discussion which may bring out points of interest.

The town of Wolfville is now in its fourth year, since the pasteurization by-law of all milk and cream was passed, naturally we have had many problems to settle, and constantly kept on the alert. We have had complaints, varied and amusing, from individuals opposed to the measure from the start.

Personally I am sorry such a word as compulsory has to be used in by-laws, such as the one under discussion. Individuals naturally rebel against any suggestion of force. From what I have said on previous occasions, you will appreciate that I am strongly in support of pasteurization as an essential safeguard in the production of milk. I do not overlook the fact that the most scrupulous cleanliness from every point of view should be observed in milk production.

I have not the time here to repeat what I have said before, regarding the difficulty of adequate inspection of farms where milk is produced.

For many years I tried to see that herds were kept healthy, especially with regard to Bangs Disease (which is far more prevalent in our cattle than most medical health officers realize.) At last we said to our citizens, we will continue to do our best at sanitary inspection, but to do our duty as called for in the amendment to the public health act as passed in 1934, without a full time officer in our district, was an impossibility.

Those of you who are not familiar with the amendment, I would ask to read it carefully. However, no one is more conscious of the fact than I am, that pasteurization will not clean dirty milk, and that pasteurization deals with bacterial contamination, sanitation deals with physical contamination. For this reason, our pasteurizing plant will not receive any milk which does not come up to the standard in sediment test, acidity, fat test, bacterial count, etc., and I am glad to say the public health laboratory is now assisting us in this matter and in addition to our own tests, at stated intervals samples of raw milk from each producer, as well as pasteurized milk are sent to Halifax for examination. The results of these reports are taken up with each individual producer, in this way the farmer is spurred on to deliver cleaner milk.

I am often asked the question, Is tuberculin testing as good as pasteurization? A question such as that shows the ignorance of the general public, and how necessary education is along public health lines. What has that got to do with typhoid, septic sore throat, scarlet fever, undulant fever, etc. Pasteurization is the only method by which we can eliminate all milk borne diseases.

The following quotation is from an editorial in the London *Lancet*, the best known medical journal in the British Empire.

"Tuberculin tested milk gives safety as regards tuberculosis, and pasteurization properly conducted, gives safety from all risks. The time has come when no ordinary raw milk should be sold in any of our larger urban areas, or distributed on the authority of any education or other local authority, and later the safeguard must be extended to the countryside and smaller towns."

The following is from a report of the League of Nations milk committee. "Though many pseudo-scientific objections have been advanced against it, we have been unable to find any that is supported by adequate evidence. On the other hand, there is a considerable amount of evidence to show that when pasteurization has been introduced on a large scale, milk borne disease has been practically abolished. There is a reason to believe that if pasteurization was rendered compulsory for all towns, infections derived from milk would be completely prevented. A long keeping quality can be guaranteed by cleanliness of production, but no amount of cleanliness can ensure the freedom of the milk from disease producing organisms. For this purpose pasteurization or some other form of heat production appears under ordinary conditions to be indispensible."

You might be interested in knowing just how we have been getting along in the university Town of Wolfville, where we have had the by-law for the pasteurization of all milk and cream sold in the town, in force for over three years. During that time two cases of undulant fever have been reported. One was traced to so-called boot-legged milk, the party concerned was discovered and dealt with accordingly. The other case was that of a woman, the wife of a farmer, whose family was supplied with raw milk from their own cow. Naturally, the publicity that followed, when it became known that these cases were caused by infection in raw milk, was a strong factor in support of our by-law. We have also noticed a marked decrease in epidemics of septic sore throat and diarrhoea, this especially so among university students, where a check-up is more easily made, due to the fact, that over five hundred students eat in a main dining hall. And when we include with the above, the many other infections which are transmitted through raw milk, we feel certain we are enforcing a strong preventive measure.

Each year letters are being received from parents of students coming to our university asking if pasteurized milk is being used. The same question is repeatedly asked by tourists, and the fact that we can tell them, that all milk and cream sold in the town is pasteurized, is considered good publicity.

Until about six months ago, we were supplied by two pasteurizing plants, these were continually checked up closely from every angle, not only by myself, but in cooperation with officials from the public health department.

One of these plants, a small one, was not coming up to the standard, and had caused us a great deal of worry, work and unnecessary loss of time (being situated some six miles from town) after repeated warnings, it was forced to close down.

We have carried out the phosphatase test at frequent intervals, and in this connection, I might mention the fact, that we are fortunate in having the assistance of the bacteriology department of our university, where the longer and more accurate Kay-Graham phosphatase test can be made. Ordinarily we use the small field testing kit for the Scharer test.

The enforcing of our Pasteurization By-law has not been easy sailing, but I must say the great majority of our citizens appreciate and understand what they are getting, and the protection afforded them.

Parents usually welcome anything which will give them assurance of the health of their children.

Years ago the value of supervised water supplies and sewage disposal system became evident in preventive medicine, so evident, that we do not hear objections to-day. Surely the same justification is applicable to milk supervision. We are far from reaching efficiency in the handling of this essential food. Our statistics with regard to bovine tuberculosis, undulant fever, infant diarrhoea, etc., will tell us that.

I often wonder, just how some raw milk would stand the test, which is given out to our undernourished children in various schools of the province. Important health measures such as the above may do more harm than good, if supervision is not properly carried out.

I have received many inquiries from medical health officers and town officials regarding the success of our Pasteurization By-law. I have only time to speak briefly of the struggle we have had.

One chief aim must always be foremost, and that is to give a satisfactory product, and to keep a satisfied public. Many objections were raised, but gradually by investigation and education these were overcome.

It is not necessary for me to tell medical health officers of the peculiarities of certain individuals when it comes to the point of enforcing some public health regulation. Some just love to start a fight, to write an article in the local paper, they just cater to publicity, others again are conscientious in their objections, all must be handled with consideration, many times we must swallow our pride, and from my experience some things are better handled with silent contempt.

One woman called me up by phone, and wanted to know if a Hitler, a Mussolini, a dictator had come to town, and taken away the rights and privileges of the citizens. A prominent business man, asked me if I was aware of the fact, that a farmer had fed his calf pasteurized milk, and that it had died in 24 hours. Did I know that pasteurization killed certain life giving vitamins in raw milk?

Some complained that the pasteurizing plant had a monopoly. Some even accused the M.H.O. as being a shareholder in the plant. Others that we had no right to pass a Pasteurization By-law, without calling a public meeting, and allowing citizens to vote on the matter.

Above are just a few of the many varied questions and complaints that a medical health officer must expect.

Only recently a resolution, signed by a number of citizens, was presented to the Town Council, requesting to have the By-law changed, so that raw milk could be sold. This was unanimously defeated.

Throughout the years we have been fighting for clean and safe milk we have had the whole hearted support of all practicing physicians of our town. And only a few weeks ago they signed their names to a strong article pub-

lished in our local paper, calling on all citizens, to give wholehearted support, to a health measure, which afforded additional protection to the community.

It was Ruskin who wrote:

"Let a child fall into the river, before the roughest man's eyes, he will usually do what he can to get it out, even at some risk to himself. And all the town will triumph in the saving of one little life.

"Let the same man be shown that hundreds of children are dying of fever for want of some sanitary measure, which it will cost him trouble to urge, and he will make no effort, and probably all the town would resist him if he did."

And so as some writer once said, the public will always be more interested in the spectacular eleventh hour saving of life, than in the quietly calculated uphill work of disease prevention.

Towards a Cleaner Milk Supply

Dr. J. S. Robertson, D.P.H.,
Divisional Medical Health Officer, Yarmouth, N. S.

TO begin with let me state that in my opinion much of the milk being consumed in Nova Scotia is far from satisfactory from a bacteriological point of view, and even though we have not had any serious outbreaks of milk-borne disease, all the essentials are present for such an occurrence, consequently it falls to us as Health Officers to forestall such happening. In neighboring provinces in the Dominion there have been serious outbreaks with high morbidity and many deaths, as for example septic sore throat in Kirkland Lake, Ontario, and typhoid fever in Montreal. Even in our own province it is difficult to say with available data just how much bovine tuberculosis, undulant fever, septic sore throat and dysentery are due to contaminated milk supplies. It cannot be denied that some of these cases are due to milk.

Recently I have had further occasion to obtain some first hand information on milk conditions. This was in connection with inspections of dairy farms made necessary by the passing of a milk by-law by a town council, this by-law required inspection of all dairy farms previous to giving a permit for the sale of milk in the town. The area under discussion is, I believe quite typical, taking in a radius around a town of 6,000-7,000 of approximately 15 miles—all types of dealer and dairy farm being included, in all, probably 35 producers were visited. Only the most glaring faults are noted here.

(1) In all the herds inspected not a single animal had flanks or udders clipped—one of the recognized procedures in the production of sediment-free milk. Nor did we find a single producer who wiped off the udders with a damp cloth to prevent loose manure and dust from falling into the milk pail—most producers felt that straining out such sediment afterwards was quite satisfactory.

(2) Not more than 1 or 2 used a small mouth milking pail, another important aid in producing clean milk.

(3) It was the exception to find a satisfactory milk house with cooling facilities—many used the kitchen as a milk house with consequent danger of illness in the house being transmitted to consumers. Very few bothered cooling—with milk such a good culture medium the result is easily imagined.

(4) The only bottle cappers in the area were in two dairies in the town—personally I object to the thought of two dirty thumbs in every bottle of milk being filled.

(5) The cleaning of equipment was often faulty, inadequate amounts of hot water were being used, one dealer used chlorine solution occasionally. The sooner milk dealers can be educated that chlorine solution is their best friend the better for all concerned.

I will not weary you further with the findings of the milk inspector and myself, suffice it to say that I will not take part in any "Drink More Milk" campaigns until I am more certain as to the quality of the product being recom-

mended. In this regard it is interesting to note that a recent survey in the same town showed a per capita consumption of about ½ pint per person, considerably below the recommended standard of ¾ to 1 quart. With an improved milk supply this average should rise.

I do not wish to leave the impression with you that the area I speak of is an exception, I feel quite sure that if anyone of you would take the trouble to investigate milk conditions in your own community that identical conditions would be found; consequently it is with this hope in mind that this paper has been written; for the first step in the improving of any unsanitary condition should be a survey designed to bring before the public conditions as they really are. I have been in all parts of Nova Scotia and nowhere did I see conditions among milk dealers which could not stand considerable improvement. Such conditions are for the most part due to ignorance and indolence and no great financial outlay is necessary for improvement. Another factor which is important in the improvement of conditions is the tourist trade which is important financially to us all. More and more do we hear inquiries regarding milk supplies—the places where pasteurized milk can be easily obtained are all too few.

Now taking it for granted that all too frequently unsanitary conditions do exist in the milk trade whose responsibility is it to see that such conditions are improved? Strange as it may seem it is more a problem to be solved by the urban authorities than the rural, the reason for this being that the greater proportion of milk produced is consumed by urban dwellers, consequently it is up to cities and towns to enact ordinances for the protection of their citizens—these ordinances or by-laws do not state just how the farmer shall equip and conduct his dairy farm but they do state that if the farmer intends selling milk in the town he must equip and conduct his farm according to regulations, thus putting it up to the farmer whether or not he desires to continue selling his milk in the town. Accordingly the enactment and enforcing of milk regulations is very much the business of the Urban Health Officer—it is his responsibility and must be recognized as such. In many instances sanitary inspectors specially trained do the actual inspections but these are only agents of the Health Officer.

Incorporated in the Public Health Act there are definite clauses regarding milk sanitation, providing for inspection of dairy farms by local Health Officers or sanitary inspectors, also minimum standards for butter fat and total solids and maximum standards for bacteriological content; a clause regarding preservatives is there also. The Act gives wide powers to town and municipalities to enact their own regulations and they are encouraged to do so. However to date few towns or cities have taken advantage of this all important method of controlling the quality of the milk supply coming into their respective areas.

Milk to be considered clean must be free from visible dirt, must have a bacteriological content below set minimum standards and must be free from preservatives, the use of which is an admission of dirty milk. The greater part of the visible dirt in milk comes from dirty cows and dirty milkers using open top pails in a dusty barn. By incorporating in regulations that cow flanks and udders must be clipped at regular intervals, wiped down before milking and the use of small mouth pails insisted on it will be found that the visible dirt in milk will be prevented to a marked degree. Many producers prefer to let the dirt get in the milk, then remove it by means of strainers,

cloths, etc., these are often in an unsatisfactory condition resulting in further contamination. Although it is recognized that it is not possible to produce raw milk free from B. coli, it is possible to produce milk free from flakes of visible cow manure. By means of a sediment tester it is an easy matter to demonstrate visually to the producer the amount of dirt in a pint of milk—this sediment tester should be part of the equipment of every sanitary inspector, it is an important aid in his educational work among producers.

And now we come to the bacteriological content—which is of cardinal importance. The bacteriological count is a good criterion as regards the producer—a high count indicates a careless producer—he may be careless enough to allow milk to be bottled in the kitchen with a case of scarlet fever in the home, he may allow a helper with an infection on his hand to milk, he may not bother having his cattle tuberculin tested or tested for Bang's Disease—any one of which may lead to an explosive outbreak of disease. When we come to investigate the cause of high bacterial counts in milk we find the greatest cause to be dirty utensils and improper cooling. These things can be eliminated readily and at small cost to the producer—but he must be educated and shown—it is no use handing out a regulation and expecting results. An adequate milk house with a cooling tank together with proper cleansing of utensils using plenty of hot water and chlorine solutions soon give results. It should also be a requirement that bottle cappers be installed—thus eliminating two thumbs as potential contaminating agents from each bottle filled.

Providing that the above suggestions are carried out and at the same time a constant educational program is part of the sanitary inspector's duties—there is every reason to expect that a clean milk supply will result—but it must be remembered that it is not necessarily a *safe* milk supply.

Now let us suppose, and it is by no means a Utopian thought, that all herds in Nova Scotia have been tuberculin tested, that all towns and cities have passed and are enforcing a milk inspection ordinance as discussed, then we should use all our efforts to put into effect the final step in the production of clean safe milk, namely pasteurization—for it is recognized that the only safe milk is pasteurized milk. You will note that I emphasize that the milk supply should be cleaned up before being pasteurized, thus short circuiting the oft repeated objection "I would just as soon eat raw bugs as boiled bugs"—personally if I must ingest bacteria I prefer mine cooked. In any event every effort must be put forth to have only clean milk pasteurized, and thus control such diseases as bovine tuberculosis (that this can be done was demonstrated in Toronto), septic sore throat, undulant fever (a case crops up every now and then and it is impossible to state just how many cases are missed) *dysentery* and other contagious diseases.

An educational program should precede any effort to introduce a pasteurization ordinance—occasionally this will be helped along by the occurrence of a case or two of undulant fever as I believe happened in Wolfville.

Up until a short time ago we had no accurate test for correct pasteurization. During the last two years an exceedingly accurate test, known as the Phosphatase Test has been developed in England. This test depends on the presence in raw milk of an enzyme, phosphatase, which is destroyed during correct pasteurization. This enzyme will react with a phenol compound, releasing free phenol which can be shown by a color test. The test is exceedingly delicate and will show a few degrees of underheating, a minute or so short in heating time on the introduction of minute amounts of raw milk.

This test is a great stride forward in the control of pasteurization, and the test is being carried cut in the Provincial Laboratory. Frequent specimens should be sent in from all pasteurization plants and if found deficient then search can be made for the fault. Recently an interesting case came up. A dairy had been inspected and at that time some doubt as to the efficiency of the bottle washing was held. However the specimen sent in was found to be correctly pasteurized according to the Phosphatase Test but B. coli were found in all 1cc. specimens examined. This was excellent evidence that contamination had occurred after pasteurization as a temperature which will destroy phosphatase is much higher than that required to destroy B. coli. Improvement of the bottle washing will, I feel sure correct the condition, which has been used as an example of the problems encountered in dairy inspections.

And now let me go over again the steps which should be taken in all urban communities in an effort to obtain a better milk supply.

(1) A careful program of educational talks—especially to Institutes, Women's Clubs, Service Clubs and so on, which will teach the public what is meant by clean milk and what dangers are associated with a dirty milk supply. This educational program should include a meeting of milk producers with a frank explanation of what is expected of them and the beneficial results both to themselves due to increased consumption and to the consumer by a better milk.

(2) The passage of regulations by the town council which provide for the following:

(a) Regular inspection of the premises, equipment and animals of all producers sending milk into the town.

A permit is issued to those coming up to the set standard, a nominal fee being charged for the permit.

(b) Regular examination of specimens from all producers by the Provincial Laboratory.

(c) Regular inspection of all dairies and pasteurization plants.

(d) The ordinance should emphatically state that no bulk milk is to be sold—all milk must be vended in its original container into which it has been placed at the farm or dairy. (Too often we find a gallon can in the delivery cart, if the filled bottles run out the dairyman fills bottles taken off the doorstep—the dangers involved are quite easily imagined).

(e) At as early a date as feasible an ordinance should be passed requiring all milk sold in the town to be pasteurized—education is an important factor in its introduction. This is the goal which we are all striving for—pasteurization is now a recognized scientific process, the days of long winded controversies pro and con are over, I trust. In any event we should continue to insist that "the only safe milk is pasteurized milk".

Presidential Address

Dr. R. A. MacLellan, M.H.O.,
East Hants Municipality

Mr. Minister and fellow members of the Nova Scotia Medical Health Officers' Association:

MAY I preface my remarks to-day by expressing my appreciation of the honour conferred upon me a year ago, when you were pleased to select me as President of this Association.

I assure you I appreciate this honour very highly indeed, both because of the intrinsic nature of this Association with its great possibilities of beneficent influence upon both the physical and economic well being of our fellow citizens, and because of the association, actual and implied, with the many men of outstanding service in the interests of the public health who have preceded me in this office.

I must also express my appreciation of the efforts of the officials of the Public Health Department, especially the Chief Medical Health Officer, who have succeeded in making my position a sinecure, until, in an unguarded moment, they allowed the committee in charge of the preparation of this program, to assign me 30 minutes, a full half hour, in which to make a presidential address.

The scriptures record the story of a woman, who found a man who told her " all things that ever she did", and I felt that certainly I had at least found a man who had given me ample time in which to tell all that ever I knew on the subject of public health; much less any one branch of the subject.

Now gentlemen, I think it is beyond dispute that man has tended from the earliest recorded times to laud the heroic, the striking, the unusual, the new, and rightly so, for unquestionably it is right that accomplishment should be lauded, and laudation stimulates man to new accomplishments.

But while I join with pleasure in lauding, and in a humble way evaluing and utilizing the accomplishments of genius, I suggest there are many situations confronting the Medical Health Officer in Nova Scotia, more particularly perhaps in the rural sections, where he may with complacency leave the man of genius to the workings of the God-given urge, which I think frequently drives genius to successful result, almost whether it will or not, and devote himself to the most practical application of those commonplace means which are available to us everywhere, and without which even the discoveries of genius may be made of no avail.

As a country doctor, and Medical Health Officer in a municipality almost entirely rural, you will, I hope bear with me, if I leave the scientific and erudite to those better qualified to deal with them, and for a time laud the commonplace, and lay emphasis on detail.

Along these lines then I suggest that the Medical Health Officer (especially in a rural municipality) can increase the efficiency of public health effort by attaining and maintaining an amicable relationship with the councillors of the municipality who, under section 14 of the public health act, are

the chairmen of the local boards of health in their respective districts, and incidentally control the municipal purse strings.

By a willingness to address various organizations, such as women's institutes, rotarians, etc., on questions (matters) related to the public health, the people may be led to be more public health minded; and by an annual report to the warden (prescribed by law) which in addition to citing a cold array of figures showing so many cases of this and that disease, amplifies upon some outstanding occurrence in the public health field during the year and clarifies to the vision of these men, the benefits flowing to their citizens through public health activities, a much more sympathetic attitude may be engendered toward special appeals involving municipal support both financial and executive.

In many instances, the personnel of the local board of health has an important bearing on the conduct of affairs, in relation to the spread of communicable disease, and this personnel may be largely moulded by the Medical Health Officer suggesting to the councillor that citizens whom he knows to be alert, intelligent, and properly seized of their responsibilities, be appointed to the local board of health, in order that, when action is required by the local board, the Medical Health Officer may be supported by a body of men who can in minor things act on their own initiative, and in major events are capable of appreciating instruction, and have the necessary fibre to enforce the law.

I suggest that as a worthwhile effort toward familiarizing the growing generation with their responsibilities to their fellow citizens in health matters, excerpts from the public health act of the province, comprising those sections which deal specifically with children attending school and the responsibilities of teachers, should be made and posted upon the wall of every schoolroom, so that every child would have an opportunity almost automatically of becoming acquainted with these provisions of the law; and every teacher would be provided with a ready answer for irate parents when their children were sent home for reasonable suspicion of being carriers of a communicable disease.

If printed in the requisite mass the cost of a copy of these excerpts, properly framed, would be negligible; and by cooperation between the department of public health and department of education might very reasonably be made a compulsory portion of the equipment of every schoolroom.

A gentle reminder to our fellow practitioners who are known to be lax in reporting contagious diseases, may succeed in securing a report on many cases which would otherwise only be discovered through having infected many others; and despite modern advances there is still essential truth in the old saying—"an ounce of prevention is worth a pound of cure".

Indeed in public health matters where the effort or aim is becoming more and more preventive medicine, the truth of this old saying is peculiarly applicable, and as prevention of further cases must so frequently depend on knowledge of primary cases, every effort to secure the cooperation of our fellow practitioners in reporting cases which come to their attention should be made.

In this connection, I suggest that it might well be made part of the routine duty of the public health nurse, during her visit to the community to call on each physician and assure that he has a supply of necessary forms for reporting contagious diseases.

I wish now, to draw your attention for a short time to a condition which I regard as very important, viz:—Whooping Cough.

WHOOPING COUGH

History: Comparatively youthful. No clear record in ancient writings. First epidemic recorded in France, 1578, by Ballonins. In London described by Thomas Willis in 1658 and carried to America in 1732.

Causation: A Bacillus described by the French observers Bordet and Gengon in 1906.

Susceptibility: Almost universal in infancy and childhood and is then greater than to any known infection except measles.

Age Incidence: About 20% occur in first year, 39% under 2 years and roughly 60% occur under 5 years of age.

Sex: More cases in females than males roughly 106 cases in females to 100 in males and 112 deaths in females to 100 in males.

Mode of Transmission: The organism is disseminated in droplets of sputum emitted during coughing and sneezing.

Incubation Period

Difficult of exact determination owing to insidious onset of the early symptoms but commonly from 7 to 10 days, and if no evidence of illness within 14 days of exposure infection may be considered not to have taken place.

Three Characteristic Stages Recognized
1st. or Catarrhal Stage

Onset gradual and insidious. No characteristic clinical finding and early diagnosis may be extremely difficult. Usually, slight fever, coryza and cough. The cough gradually increases in frequency and severity and tends to become spasmodic, choking, and worse at night. Usually in from ten days to two weeks, the typical paroxysmal cough begins, ushering in——

2nd or Paroxysmal Stage

Which may last from 4 to 6 weeks and consists practically of repeated paroxysms of the typical cough, although in mild cases the whoop may be absent.

3rd or Stage of Decline

The attacks become gradually less severe, then less frequent, the whoop disappears and finally a few coughing efforts represent the whole attack.

Diagnosis

In infancy, and atypical cases the diagnosis may be extremely difficult. The spasmodic cough occasionally present in influenza or in infants with bronchitis may be hard to differentiate.

The physical signs in whooping cough are few and not in proportion to the severity and persistency of the cough. There is little or no fever; but a convulsive cough of steadily increasing intensity, worse at night, accompanied by congestion of the face and vomiting is extremely suspicious, and justifies the institution of precautionary measures to prevent spread of the disease. In the presence of an epidemic, a known exposure, ulcers of the frenum of the tongue (which is claimed to be peculiar to whooping cough) the symptoms enumerated above should justify a diagnosis, for precautionary purposes, without more scientific aids.

In doubtful cases, or where more conclusive evidence is desired than the clinical course affords, a blood count will show an increased percentage

of small lymphocytes early in the catarrhal stage, reaching 60 to 80 per cent of the total white cells; and four or five days later a leukocytosis appears running up to 15,000 to 30,000 with 60 to 80 per cent of lymphocytes.

No other non febrile respiratory disease shows such an increase, and a lymphocytosis of over 50 per cent in a child more than three years of age who has a suspicious cough almost certainly indicates the presence of pertussis.

Most cases show a positive complement fixation test in the catarrhal stage, and it persists throughout the disease. A negative test is inconclusive.

Finally a bacteriologal examination of the sputum, for the characteristic bacilli:

I appear to be, and may admit that I am here placing the commonplace in precedence of the uncommon and scientific, but with no intention to detract in any way from the glorious accomplishments of science, and the indispensable part played by our colleagues of the laboratory. I do however, wish to emphasize, that all that is necessary for the protection of the public health in the great majority of cases of whooping cough is available to every Medical Health Officer, and every general practitioner alike; the history, clinical signs and symptoms, judgment and experience.

I mentioned the blood findings in second place, feeling that many a younger man, being more familiar with a microscope, might well use the microscope for a blood count to augment his judgment, necessarily lacking in the basis of experience possessed by his older brethren in the profession.

Prognosis

Poverty, as is so often the case, adds to the gravity of the prognosis, and, in general, the death rate is higher among the poorer classes than among the well to do, probably owing to the co-incident over-crowding, improper hygiene, faulty diet, and unintelligent care with their increased tendency to complications such as broncho-pneumonia, diarrhoea, and convulsions.

The severity of the case may be predicted to some extent, by the number and severity of the paroxysms and, in general as these are more frequent (50 or 60 times in 24 hours) the prognosis is bad; and conversely long intervals, between paroxysms and general good physical condition are favourable signs.

Negroes are more susceptible than whites, and the mortality among them is much higher.

But the most important factor in prognosis, as it is the most universal, is that of age, as Luttingers figures for 10,000 cases in New York City show 50.8% of deaths from whooping cough to have occurred in those under one year of age, and 96.9% in those under five years of age.

What is the practical interest to us as Medical Health Officers in Nova Scotia of this disease? What toll does it exact from our population and what can we do to modify its exactions?

The answer to the first of these questions would seem to be involved in the answers to the other two.

An examination of the records shows that from 1920 to 1937, 7,861 cases of whooping cough were reported in Nova Scotia with a total mortality of 1,169, whereas during the same period scarlet fever caused 315 deaths; measles, 338, and diphtheria 453; showing that during this period whooping cough was responsible for more deaths in this province, than scarlet fever, measles and diphtheria combined.

Prophylaxis

What can we do to modify this toll upon our population? I suggest first that we should endeavour, as opportunity offers, to instruct the laity as to the serious nature of this disease especially to children under five years of age, and that the longer infection can be delayed, or the older the child is when he contracts it, the greater his chances of recovery.

A child with frank pertussis must of course be excluded from school and separated from other children who have not had the disease. Children who have been exposed to contagion must be excluded from school and separated from others until at least fourteen days after their last exposure.

Particular care should be taken to protect infants and delicate children and during an epidemic infants and young children should be kept from all public gatherings.

Cats and dogs should not come in contact with children who have the disease. The more careful and prompt reporting by physicians of the cases encountered in their practices should be urged.

The period of communicibility of an individual case can be determined by bacterio logical examination of the sputum.

The American Public Health Association sets the period of communicibility at from seven days after exposure to three weeks after the development of the whoop.

Immunization by vaccine seems in process of being perfected, and I note the Michigan Department of Health advises the administration of four doses consisting of 1, 1.5, 1.5 and 3 c.c. at weekly intervals.

Treatment

Apart from the use of vaccines, there is no specific treatment for pertussis. It is a self-limited disease for which intelligent general management suffices to meet the needs of many cases.

A well ventilated sunny room is desirable, with an abundance of fresh air day and night.

The room temperature should generally be from 65° to 70° F. During the summer, and in the absence of complications children should be kept outdoors as much as possible. With infants and patients with complications outdoor treatment must be used with caution in cold weather.

All secretions from the nose and mouth should be received in paper napkins or cloths that can be burned.

Diet necessarily varies with the individual case. The problem and purpose being to maintain nutrition. The intervals between paroxysms should be utilized as far as possible for feeding as there is then a greater chance that food will be retained.

A daily movement of the bowels should be secured either by mild laxatives or low enemata.

In cases where the abdominal muscles are weak a snugly fitting abdominal binder gives support, relieves the strain of the paroxysms and lessens vomiting.

Medication, in general, may be summed up in two words:—sedatives and antispasmodics.

The number and kind that have been recommended and used are legion and this is probably the best evidence of their inefficiency as curative agents. It is of interest, at least in this regard that an article in a recent issue of the

Year Book of General Medicine, lauds the lowly bi-carbonate of soda as an effective remedy in controlling both the whoop and the vomiting.

Surprisingly large doses are recommended. Thus a weakly, undersized child of two years may need as much as 30 grs. 5 times in 24 hours in order to be freed from the whoop. This dosage to be continued for a week, then 4 times a day for a second week. Older children may require one drachm doses, with the same frequency.

Vaccines

There is no doubt vaccines constitute the most important and hopeful advance in the prophylaxis and treatment of pertussis and the sooner after exposure treatment is begun, the greater is the benefit likely to be.

Gentlemen, this is not intended to be in any way an authorative treatise on whooping cough; but merely a hurried effort to bring, what I regard as a matter of great importance from a public health point of view to your attention at the same time pointing out a few salient facts in relation to the same.

If I have seemed to give too much prominence to the simple and commonplace, in control and treatment, I assure you it has not been due to any lack of appreciation, of the inspired and frequently successful efforts of more scientific minds, but rather in the hope that in this period of economic stress and emphasis upon the elaborate, sight should not be lost, of many of the simple means available to all for the control of, or at least mitigation of the depredations of this menace to the safety of our population. And finally upon all, whether reactionary or ultra-progressive, I would urge in the words of Tennyson that you should:

> Hold thou thy good: define it well:
> For fear divine philosophy
> Should push beyond her mark, and be
> Procuress to the Lords of Hell.

which I feel sure is but a poetic way of saying if you have found anything effective, however simple, by all means hold to it, until assured that you have a more effective substitute.

Tuberculosis Mortality in Nova Scotia

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FROM material contained in the annual vital statistics reports issued by the Federal Government, and by information obtained from the original death certificates on file in the Registrar-General's office in Halifax, it has been possible to make a detailed study of tuberculosis mortality in Nova Scotia, covering the years 1921 to 1934, inclusive. In this study, mortality has been considered from two main aspects:

(1) In relation to tuberculosis mortality in other provinces;

(2) In relation to tuberculosis mortality on a residence basis, within the province itself.

In this paper, however, only a few general observations on the findings for the 14-year period are presented.

A comparison of the crude annual rates of the province obtained from figures in the annual V. S. reports shows that, for eastern and central Canada, there has been a steady reduction of tuberculosis mortality over the 14-year period. For Western Canada, however, an increase was noted up until 1930, followed by a decline. This increase of annual rates in the Western provinces has been attributed to the more complete reporting of Indian deaths following the establishment of the registration area in 1921.

Throughout the 14 years, annual tuberculosis death rates of the Eastern Provinces have been the highest, followed by British Columbia, then Ontario, with the lowest rates prevailing in the Prairie Provinces.

Prince Edward Island, New Brunswick, Quebec, and Nova Scotia, the four easterly provinces, had rates consistently above 100 per 100,000 population for some time, Prince Edward Island's rate dropping below 100 for the first time in 1927 and New Brunswick's in 1929, but it was not until 1933 that this was noted in Nova Scotia and Quebec. Rates in the other five provinces were all 100 or less throughout the 14-year period. By excluding the Province of Quebec, which was not included in the registration area until 1926, Saskatchewan has had the lowest rates and Nova Scotia the highest.

Between 1921 and 1934 the annual tuberculosis rate of the registration area declined from 75 per 100,000 population to 48, a decrease of 36%, while Nova Scotia's rate during the same period fell from 134 to 89, a decrease of 34%. This percentage decrease noted in Nova Scotia was exceeded by two provinces only, Ontario and New Brunswick.

The correction of provincial rates for age, sex and race was found to have little effect on the Nova Scotia rate. Nova Scotia's crude rate, which was second highest in the registration area for 1921-22, became the highest when corrected, while the 1931-32 average rate, crude or corrected was highest of all provinces included in the registration area as of 1921.

According to the 1931 census, 38% of all negroes in the nine provinces of Canada resided in Nova Scotia, but formed only 1.4% of the population. Indians and negroes together constituted less than 2% of the population.

The effect of excluding Indian and negro deaths on Nova Scotia's rate was a reduction of approximately 6%, whereas in the Western provinces a reduction of from 25 to 30% was noted.

The reallocation of tuberculosis deaths from place of death to place of residence caused in some instances a marked change in individual county rates in Nova Scotia. Using the 14 year totals to express these changes, 14 counties had an increase when deaths were reallocated on a resident basis, ranging from 3% to 15%. One, Annapolis, was unaffected and three, namely, Halifax, Antigonish and Kings had decreases of 8%, 10% and 52% respectively. Furthermore, 86% of all county non resident deaths occurred in three counties (Halifax, Antigonish and Kings), the Nova Scotia Sanatorium in Kings County supplying over half of these.

In considering the distribution of tuberculosis deaths among the 18 counties of the province, a wide variation in county rates over the 14 years was noted, due chiefly to the large differences in county populations, which ranged from 8,000 to over 100,000, the population of all except two being less than 40,000. For the years 1922-24 tuberculosis mortality on a residence basis showed that 14 counties had average rates above 100, the other four, namely, Colchester, Cumberland, Kings and Victoria, between 90 and 100, the extremes being 93 and 224. For the years 1932-34, a period ten years later, 6 counties, namely, Yarmouth, Shelburne, Halifax, Guysboro, Inverness and Richmond, had average rates above 100, 12 had average rates under 100, 8 of these, namely, Pictou, Colchester, Annapolis, Victoria, Kings, Queens, Lunenburg and Hants, being under 80, the extremes being 37 and 161 per 100,000 population.

Tuberculosis mortality by sex and age shows that both male and female rates declined over the 14-year period and that the annual female rate was higher than the male, eleven of the 14 years. The male rate dropped below 100 in 1929, the female not until 1933. The excess of female over male rates was 10% for the whole period. By age, average rates for the seven years, 1928-34, were lower in every group than for the preceding 7 years, 1921-27, the greatest reduction being noted from 10 to 19 and over 40 years, the least in the age group, 25 to 29 years.

Tuberculosis rates of Cape Breton Island were compared with those of the Nova Scotia mainland. The Island, with a population of 132,581 in 1931, had 26% of the total population of the province. Annual tuberculosis rates for the Island were higher than for the mainland, 12 out of the 14 years reviewed. The mainland rate first fell below 100 per 100,000 population in 1929, the Island rate not until 4 years later, 1933. Over the entire period the Island rate exceeded the mainland by 7%. By sex, male rates for the Island were on the average 5% higher than for the mainland, while female rates were 9% higher. It was noted, however, that the decline of rates for the Island and mainland appeared quite similar. On both Island and mainland, female rates were higher than male, the excess averaging 12% on the Island, 9% on the mainland.

Using the 1931 census figures, urban and rural rates were compared. Urban centres were considered to be those communities with populations of 2,500 or more. The effect of reallocating deaths to place of residence was to lower the urban rate by 14% and to raise the rural rate by 10% for the period

as a whole. The excess of urban over rural rates on an occurrence basis was 32%, whereas on a residence basis the excess was small, being reduced to 3.5%.

Deaths of urban residents during the 14 years of the study comprised 40% of all tuberculosis deaths, 3% of the urban residents dying in rural territory, while 11% of rural residents died in urban parts.

In considering the effect of race on tuberculosis mortality in Nova Scotia it was found necessary, due to the number of races represented to group these into 3 groups, British, French and all others. It was found that over the 14-year period tuberculosis mortality amongst the French was 25% higher than for the British, while for all other races combined the rate was 15% less than the British.

The percentage of tuberculosis deaths occurring in 77 institutions, which were grouped for convenience as sanatoria, general hospitals and other institutions, increased steadily over the period, from comprising 18% of all tuberculosis deaths in 1921 to 29% in 1934. Of the 3 classes of institutions, the sanatoria group had a larger total number of deaths and a higher rate of increase over the period than any other class of institution, deaths in sanatoria forming 5% of all tuberculosis deaths in 1921 and 15% in 1934. Deaths in both general hospitals and other institutions decreased in actual numbers, but increased slightly in the percentage of all tuberculosis deaths. Forty-five of the 77 institutions were located in urban parts. These were chiefly the sanatoria, tuberculosis annexes and general hospitals, while in rural areas the majority were chiefly county homes. The 45 urban institutions provided 80% of the total tuberculosis deaths occurring in institutions during the study period. Of all tuberculosis deaths occurring in institutions 59% were urban residents. It was noted, too, that 31% of urban resident, but only 15% of rural resident deaths occurred in institutions.

In 1921 tuberculosis deaths in Nova Scotia accounted for 11% of deaths from all causes, in 1934, 8%. Likewise from a leading cause of death in 1921, deaths attributed to this disease dropped to third place in 1934, being exceeded by heart disease and cancer. In the registration area for these same two years, tuberculosis ranked fifth and seventh respectively. For the year 1934, tuberculosis in Nova Scotia was the leading cause of death in all age groups from 10 to 39 years; in the registration area it ranked as the leading cause from 15 to 39 years. In the one age group, 20 to 24 years, tuberculosis caused 49% of all deaths in Nova Scotia, but only 29% in the registration area.

In the year 1921, Nova Scotia had, for the care of patients suffering from tuberculosis, one provincial sanatorium, a small sanatorium at Lourdes and the Halifax City Tuberculosis Hospital. These institutions had at that time 369 beds. Since then, beds have been added to these, and in addition tuberculosis annexes had been built at 6 general hospitals, raising the number of treatment beds to 572.

With the increasing number of beds available for treatment, the establishing of full time district health departments, with full time personnel for case finding and supervision, it is expected that mortality from tuberculosis in Nova Scotia will show an even more rapid decline in the future than in the past.

"Health Services in the Lunenburg Schools"

DR. RUSSELL ZINCK, M.H.O.,
Lunenburg.

SPEAKING to you on the above subject I do so not with the anticipation of bringing something new to your attention but rather with the intention of showing what is done, how we do it and the results obtained therefrom.

Up to the school year 1933-1934 nothing from the health point of view was done in the Lunenburg School. However in 1933 a nurse of the V.O.N. organization was placed in the town and shortly after her coming I, as Health Officer, was requested by this nurse to cooperate with her in some form of inspection and examination of the pre-high school pupils. Without thinking very much of it I readily assented and from that small beginning there is now accepted as part of the duties of the Health Officer of the Town of Lunenburg this annual examination of each child which I assure you greatly adds to his work, without adding to his remuneration, that remaining the legal minimum.

Now what do we do? Each and every school child up to and including the eighth grade is examined in respect to the following:—vaccination; height and weight; hearing and the examination of the ear canal and drum; the presence of pediculi; the teeth; the tonsils; vision and a stethescopic examination of the heart. We have no particular methods of examination. The findings whether positive or negative, are so recorded; so that as these children pass from grade to grade, we have the written record with some particulars of a few organs and most of the senses.

This recorded data is in the possession of the nurse, who a few days after the examination presents to each child a card whereon is written a summary of the findings. This card is taken home to the child's parents.

Obviously the range of such an examination in school children picks up many defects. To the parents of the children with defects requiring attention it is suggested that their child be seen by the family doctor.

May I briefly trace for you what action is taken when some of these defects are found?

1. *Vaccination.* Up to the year 1933 i.e., the year this examination was started the percentage of vaccinated school children in Lunenburg was approximately 50%. To-day it is 99%. The child comes to school either vaccinated or not. If not vaccinated nor in the possession of either a conscientious objector's certificate or a physician's excuse, this information is duly recorded on the child's card with the suggestion it be taken to the family doctor. The parents are thus confronted with the fact that their child cannot attend school without something being done. The nurse calls at the home and the fact of our very high percentage of school children shows her efforts and tact to be eminently successful.

An incidental benefit of the work done in the Lunenburg School is reflected in the schools of the surrounding villages where it is now the rule and not the exception to find the children vaccinated.

2. *Height and Weight.* Where there is an appreciable disproportion either as an over or under weight, the nurse takes this problem up with the child's parents who are assisted in the matter by pamphlets and talks on the question of the child's food, bowel habits, sleeping hours, etc.

3. *Tonsils and Adenoids.* Here again when necessary the parents are advised to have the family physician see the child.

4. *Teeth.* Details of the presence or absence of the six year molars, cavities, extractions, cleanliness, malalignment, etc., are recorded and when required the recommendation is made that the child see the family dentist.

5. *Vision.* This is tested on the Snellen chart at 20 feet. If a defect is found, this is checked a week later and if then corroborated, the parents are informed thereof.

The defects having been determined and the parents informed of them what happens in our experience is that the parents are only too willing to cooperate with us in having the defects corrected. Economically these parents fall in either of two groups. Those financially able and those not so able to pay for the remedying of defects. Those in the former group have their children attended to. Those in the latter group are willing but unable; and other means must be found to defray the expense. Let me illustrate this by mentioning the work done in several types of defects.

A. Teeth. The assistance of the dentists of the town was solicited and given. Each dentist of the town gives one afternoon per week for as long a period as required in doing the dental work. Each follows as their own the class on whom they began work. The children are brought to their offices by the nurse and all defects are treated there. For material expended the dentists each receive the sum of twenty-five dollars from the town monies.

B. Those requiring Glasses. This is our biggest financial problem. In getting around this and raising the necessary funds, the nurse has been very successful in having local organizations as the I.O.D.E., the Women's Institute, the W.C.T.U., etc., pay the account.

From the above I feel you will observe that we in Lunenburg have been very successful in looking after some phases of the health of our school children. Not that the subject is complete. Much remains to be done. At the present time the Lunenburg School Board has before it the matter of Schick testing these children. Once their consent to this is given, we shall offer this service to the parents and I feel certain a great number of them will permit their children to be immunized against diphtheria.

Administration of Toxoid and Results of Schick Testing in Glace Bay, 1938-1939*

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THE dreaded disease, diphtheria, has been a matter of concern for some years in Cape Breton County. Review of statistics for the ten year period, 1929 to 1938, shows a total of 77 deaths from this disease. During the years 1930 to 1938, a total of 485 cases were reported. That this reporting was not complete, is indicated by the fact that in twenty-six instances deaths were recorded in communities from which no cases were reported.

The use of diphtheria toxoid in this County is not a new procedure. It had been used in North Sydney and Dominion No. 6 as early as 1929 and 1930. For the past few years the M.H.O. for Cape Breton South has made a routine practice of visiting county schools yearly and toxoiding the children. The M.H.O. for the town of New Waterford states that during the past few years three thousand children were toxoided. Unfortunately there are no records as to who received toxoid nor, what is more important, who received three doses. For, as is generally known, immunity can only be expected with three doses of the plain toxoid.

Following the increase in the nursing staff after the formation of the Cape Breton Island Health Unit, it became possible to give the local M.H.O.'s additional nursing service in their immunization program and to organize the various communities so that toxoiding would become a yearly procedure. School and pre-school toxoid clinics are now carried out in rural Cape Breton County, north and south, Sydney, New Waterford, Dominion, North Sydney, Sydney Mines, Louisburg and Glace Bay. During the year 1938 in these communities a total of 10,994 children started the series of toxoid inoculations and 9,669 or 88%, completed the inoculations necessary to establish immunity.

On considering these figures it seemed remiss not to ascertain whither this program was leading us and what results might be expected from the procedure. As all the urban communities had much the same diphtheria experience, it was felt that a detailed study of one community would serve as a sample to indicate what might be expected. The town of Glace Bay was approached and complete co-operation from officials, doctors and parents obtained.

The town of Glace Bay has a population of 20,706 (1931). It is a mining town with medical practice chiefly financed through the "check-off" system. The reported diphtheria experience for the ten years 1929 to 1938 was fifty-six cases and twelve deaths. This represents a case fatality rate of twenty-one which is more than twice that usually experienced with diphtheria. It may therefore be inferred that reporting of cases of the disease was incomplete.

*Presented at N. S. Health Officers' Association, Digby, July, 1939.

Administration of Toxoid

The toxoid campaign was begun in January of 1938. The campaign was prefaced by contacting the Board of Health, the School Board and the physicians. All physicians were willing and anxious to give their services in forwarding the campaign. Space for publicity was generously donated by the local newspaper. The publicity consisted of a few pertinent articles, endorsation commentary by local physicians and several editorials.

The system to effect the toxoiding throughout the town employed the schools as the unit of administration. Permission slips supplied by the Department of Health were left with the school principals, who instructed the teachers to distribute them among the various classes. No school child was given toxoid unless the permission slip was signed. No age limit was placed for receiving toxoid. Clinics for pre-school children were arranged at suitable places, usually at a school. No permission slips were used for this group but parents were requested to accompany their children.

A schedule was then drawn up and the doctors, who had indicated their willingness to attend, were notified as to the place and hour their services were required. If a doctor was unable to attend, he accepted the responsibility of supplying a substitute.

In the school, a central station was made ready to give the inoculations. Two physicians and five nurses attended each clinic. Each physician had two syringes for his use. One nurse attended to the refilling of these syringes and sterilization of needles. Other nurses attended to the sterilization of the children's arms with alcohol. This system worked well as there was no case of infection in the series. The fifth nurse was responsible solely for the records.

The individual record card had the child's name on it and the permission slip attached. The children from each classroom were lined up and as they approached the physician, the card was left with the record nurse who entered the date of the inoculation. At the conclusion of the clinic a summary of the work was made and the cards returned to the teacher so that they would be available for further reference. When the toxoiding had been completed, the cards were filed in a central place.

The Department of Public Health supplied the toxoid and the records and, in conjunction with the local M.H.O., developed the system employed. The town of Glace Bay supplied the syringes, alcohol and needles. Sterile goods were supplied by the local hospitals, who also sent undergraduate nurses to assist. Plain diphtheria toxoid as produced by the Connaught Laboratories was used. This requires three inoculations of one-half c.c., one-half c.c., and one c.c. at intervals of three weeks.

Results of the Campaign

The school enrollment in Glace Bay in 1938 was 5,324. Of this group 82.6% started the series of inoculations and 77.8% completed it. This indicates there was a falling off of about 5%. Actually, 94.3% of school children starting received three doses. With this "school series" has been combined the "pre-school series" so that in the tables, the division of "school" and "pre-school" disappears and is replaced by age group divisions. This has been done to avoid purely artificial distinction.

Two tables have been drawn up analyzing those receiving toxoid according to sex and age groups.

TABLE 1.

NUMBER RECEIVING PLAIN TOXOID ACCORDING TO SEX AND NUMBER OF DOSES RECEIVED. GLACE BAY—1938.

Sex	Doses of Toxoid						Total	
	1 Dose		2 Doses		3 Doses			
	No.	%	No.	%	No.	%	No.	%
Male	136	4.4	124	4.3	2602	91.3	2862	100
Female	124	4.6	146	5.1	2667	90.3	2937	100
Total	260	4.4	270	4.6	5269	91.0	5799	100

Table one shows very little difference in the number of each sex receiving toxoid and practically the same percentage of each receiving one, two or three doses.

TABLE 2.

NUMBER RECEIVING PLAIN TOXOID ACCORDING TO AGE GROUP AND NUMBER OF DOSES. GLACE BAY—1938.

Age Group	Doses of Toxoid						Totals	
	1 Dose		2 Doses		3 Doses			
	No.	%	No.	%	No.	%	No.	% of T.
0- 4 yrs.	115	11.2	84	8.2	825	80.5	1024	17.6
5- 9 "	82	3.5	102	4.4	2109	92.1	2293	39.5
10-14 "	50	2.3	74	3.4	2013	94.3	2137	36.3
15-19 "	13	3.7	10	3.4	322	92.9	345	6.6
Total	260	4.4	270	4.6	5269	91.0	5799	100.0

Table two analyzes the number receiving one, two or three doses of plain toxoid according to age groups. The following points are worthy of mention:

1. Only 80.5% of the 0 to 4 age group were brought for three doses, whereas among the "school age" groups, the range was from 92% to 94%. This cannot be explained on the basis of toxoid reactions, for no "combined" Schick reactions were observed before the child had received three doses. It may be that there was misunderstanding as to the number of doses required for immunity, or perchance some soft-hearted parents may have felt timid about the use of the needle. On the other hand, the school children had little choice and what misgivings they may have had about the repeated dosage were largely offset by the School Board putting up a cup to be awarded to the school with the greatest percentage of its enrollment completing the series.

2. A further point to be noted in this table is the absence of age limits for those receiving toxoid. Some authorities are diffident about giving toxoid over the age of eight, others go as high as twelve years. Those in Glace Bay who wished to have toxoid received it, regardless of age, and the percentage

TABLE 3.

SCHICK TESTS GIVEN AND READ ACCORDING TO AGE GROUP AND TOXOID RECEIVED. GLACE BAY—1939.

Age Group	No. Toxoid			1 Dose Toxoid					2 Doses Toxoid					3 Doses Toxoid				
	No. Schick Tested	Schick Tests Read		No. Rec. Tox.	Schick Tested		Schick Tests Read		No. Rec. Tox.	Schick Tested		Schick Tests Read		No. Rec. Tox.	Schick Tested		Schick Tests Read	
		No.	%		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%
0- 4 yrs....	34	34	100	115	17	14.7	17	100	84	12	14.6	12	100	825	363	44.0	352	98.3
5- 9 "	298	272	91.3	82	62	75.5	58	93.5	102	80	66.2	76	95.0	2109	1891	89.6	1836	97.1
10-14 "	157	145	92.4	50	41	82.0	38	92.7	74	67	90.5	66	98.5	2013	1796	89.2	1749	97.4
15-19 "	310	233	75.1	13	3	23.8	3	100	10	5	50	5	100	322	209	64.8	201	96.1
Total.....	799	684	85.6	260	123	47.4	116	94.1	270	164	60.8	159	97.0	5269	4259	80.6	4138	97.1

TABLE 4

ANALYSIS OF SCHICK TEST READINGS ACCORDING TO AGE GROUPS, REACTION AND DOSES OF TOXOID GIVEN. GLACE BAY—1939.

Age Group	Negative								Positive								Combined							
	Doses of Toxoid								Doses of Toxoid								Doses of Toxoid							
	No Tox.		1 Dose		2 Doses		3 Doses		No Tox.		1 Dose		2 Doses		3 Doses		No Tox.		1 Dose		2 Doses		3 Doses	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0- 4yrs.	2	6.0	7	41.2	10	83.3	333	94.6	32	94.0	10	58.8	2	16.6	7	1.9	0	0.0	0	0.0	0	0.0	12	3.3
5- 9 "	60	22.1	18	31.0	48	61.5	1649	89.8	202	74.3	35	60.3	23	29.5	97	5.3	10	3.6	5	8.4	5	6.4	90	4.8
10-14 "	28	19.3	10	26.3	37	50.0	1528	87.4	103	71.0	15	39.5	19	28.8	40	2.3	14	9.6	13	34.2	10	14.5	181	10.4
15-19 "	39	16.8	1	?	0	....	169	84.1	173	74.1	2	?	2	?	12	5.8	21	9.0	0	0.0	3	?	20	9.8
Totals ...	129	18.8	36	31.0	95	59.7	3679	88.9	510	74.5	62	53.3	46	28.8	156	3.8	45	6.4	18	15.5	18	11.3	303	7.3
	3939—77.1%								774—15.2%								384—7.7%							
5097—100%																								

receiving one, two or three doses runs remarkably close when broken down into age groups, although as we will see later, combined reactions were most evident over the age of ten. Unfortunately it was not possible to keep an accurate record of reactions from toxoid but inquiry of the physicians indicated very few. Certainly no serious reactions were experienced under twelve years of age. Several febrile reactions associated with localized swelling were observed in the older age groups.

3. It is to be noted further, that of all receiving toxoid, 17.6% belonged to the 0 to 4 age groups, 39.5% to the 5 to 9, 36.3% to the 10 to 14 and 6.6% to the 15 to 19, and finally, that of all those starting, 91% received the three doses.

The Schick Test and Its Significance

The Schick Test is used to determine the immunity status in reference to diphtheria. It consists of two parts, the test with the toxin and the test with the control. Dilute diphtheria toxin containing 1/50th. M.L.D. in 0.1 c.c. is injected intradermally. If there is sufficient circulating antitoxin in the patient's blood stream, the toxin is neutralized and no reaction occurs. If there is less than the necessary amount of antitoxin to protect against the disease, a reaction is noted in the skin which lasts from several days to several weeks, depending on the intensity of the reaction. The diphtheria toxin also contains diphtheria protein to which a person may be sensitive, and this can produce a reaction which without further aid might be interpreted as a positive reaction. In order to differentiate this protein sensitivity from susceptibility to disease, a control test is employed. This is 0.1 c.c. of dilute toxoid, which contains no toxin but does contain the diphtheria protein. It will therefore be seen that the following reactions to the Schick Test are possible:

TOXIN	CONTROL	READING
1. No Reaction.	1. No Reaction.	1. Negative.
2. No Reaction.	2. Reaction.	2. Negative.
3. Reaction.	3. No Reaction.	3. Positive.
4. Reaction.	4. Reaction.	4. Combined.

Combined reactions cannot be interpreted accurately with reference to immunity status. With reactions from the control test as well as the toxin, it is not possible to state definitely whether protein or toxin or both are causing the reaction. To classify these combined reactions, blood from the individual should be taken and the antitoxic titre established. An endeavor was made in this study, by comparing the intensity of the two reactions, to classify any combined reactions as probably negative, probably positive and doubtful. In the tables however, the combined reactions are classified as such without differentiation.

Administration of Schick Test

In this series both arms were used for the test, the left for the toxin and the right for the control. The skin of the anterior surface of the forearm was the site of injection. To reduce error to a minimum, all toxin injections were made by Dr. A. L. McLean or myself; also the majority of the control tests. The tests were read at an interval of seven days from the time they were given. The first one thousand or more tests were read by myself and our Public Health Nurse in the district after which the majority were read by the nurse. It was decided to read the tests very stringently and therefore the results

may be taken as the minimum of negative and the maximum of positive and combined reactions.

Immunity following three doses of plain toxoid is usually established six weeks or two months after the last inoculation. At this time the highest level of immunity is found. In this series the tests were not given until ten to twelve months after the last inoculation of toxoid. Thus the results indicate the level of immunity one year after toxoiding was completed.

Analysis of Observations on Schick Test Readings

When it was decided to Schick Test, we offered to administer the test not only to those completing the series of three inoculations but also to anyone in the school or pre-school group who desired it whether they had received no toxoid, one, two or three doses. This resulted in a series of 5,345 Schick Tests of which 5,097 or 95.4% were read. 799 who had received no toxoid were given the test and of these 684 or 85.6% were read. This latter group served as a significant control as well as indicating the level of immunity in the untreated children. Of those receiving one, two or three doses of toxoid, 4,546 or 78.4% were tested and 4,413 or 97.1% were read. Of the 5,097 Schick Tests done and read, 15.1% had received no toxoid, 2.3% had received one dose, 3.1% two doses and 79.5% three doses of plain toxoid.

The tables are drawn up to place before you in as brief a manner as possible, the results of our observations on the reading of the tests. All negative reactions are statistically significant.

TABLE 3A.

SUMMARY OF SCHICK TESTS GIVEN AND READ.

Age Group	No. Rec. 1 or more Doses Toxoid	Schick Tested		Schick Tests Read		No. Toxoid & Schick Test	Schick Tests Read		Total Schick Tests	Total Schick Tests Read	
		No.	%	No.	%		No.	%		No.	%
0- 4 yrs.	1024	392	38.2	381	97.3	34	34	100%	426	415	97.4
5- 9 "	2293	2033	88.6	1970	97.3	298	272	91.3	2331	2242	96.2
10-14 "	2137	1904	88.6	1853	97.3	157	145	92.4	2061	1998	96.9
15-19 "	345	217	62.9	209	96.3	310	233	75.1	527	442	83.9
Total....	5799	4546	78.4	4413	97.1	799	684	85.6	5345	5097	95.4

Table three shows a summary of Schick Tests given and read according to doses of toxoid received and age group. The following is to be noted:

A group of 799 who had received no toxoid desired to be tested. 85.6% (684) tests were read.

260 received but one dose of toxoid. Of these 123 were tested and 94.1% read.

270 received two doses of toxoid. 164 were tested and 97.0% read.

5,269 received three doses of toxoid. Of this group, 4,259 or 80.6% were tested and 97.1% read.

Table four is a summary of the result of Schick Test readings according to age group and number of doses of toxoid received. Reactions are grouped as negative, positive or "combined" and study of each of these headings is of value.

Study of the negative reactions shows that in the age group 0-4 only 6% of those who did not receive toxoid were immune. The number in this group is extremely small, but the percentage can be accepted as reflecting the immunity status. The next age group (5-9) shows 22% immune without benefit of toxoid. It is acknowledged that as age increases more will be found immune, but this is not shown clearly in our observations, probably because the groups are not large enough. The whole group receiving no toxoid showed only 18.8% immunity, which emphasizes the low level of immunity in a "non toxoided" population. One can picture what might happen if an outbreak of diphtheria occurred.

The group receiving toxoid shows an immediate and increasing level of immunity as one passes from the group receiving one and two doses to those receiving three doses. I wish to point out that the 88.9% negative reactions observed in the group receiving three doses of toxoid, represents the "pure" negative reactions. If, along with this group, the "combined probably negative" reactions were included, the level of immunity would be increased to 93%. Because no titrations for circulating antitoxin were carried out, this group was not included in the results. From the practical standpoint they are probably immune.

The positive reactions are the inverse of the negative. Among the "no toxoid group" the percentage showing susceptibility to diphtheria further emphasizes the low level of immunity in an "untoxoided" district and the fact that only 3.8% (156) showed a clear cut positive reaction after three doses of toxoid, is conclusive evidence of the efficiency of toxoid in producing immunity to diphtheria.

The combined reactions, as previously mentioned, indicate reaction to the control and apparent or real reaction to the toxin. The reaction to the control itself indicates sensitivity to diphtheria protein, and therefore some degree of reaction to the inoculations of diphtheria toxoid may be expected in this group. Of the whole series of 5,097 read 384 or 7.7% showed combined reaction. Of all the combined reactions 12 or 3.1% occurred under 5 years of age; 110 or 28.6% between 5 and 10 years of age; 204 or 53% between 10 and 15 years of age and 84 or 15.2% between 15 and 20. These observations indicate clearly that reactions to toxoid may be expected in a fair proportion of cases over the age of ten, although these reactions are only transient in nature and rarely are severe. It will be noted further that the largest percentage of combined reactions (34.2%) occurred among those who received one dose of toxoid in the 10 to 14 age group. It is highly probable that reaction to the first dose is the reason this group of children did not proceed to receive the second and third doses of toxoid. Another interesting point is the similarity in the percentage of combined reactions among those who received no toxoid (6.4%) and those who received three doses, (7.4%).

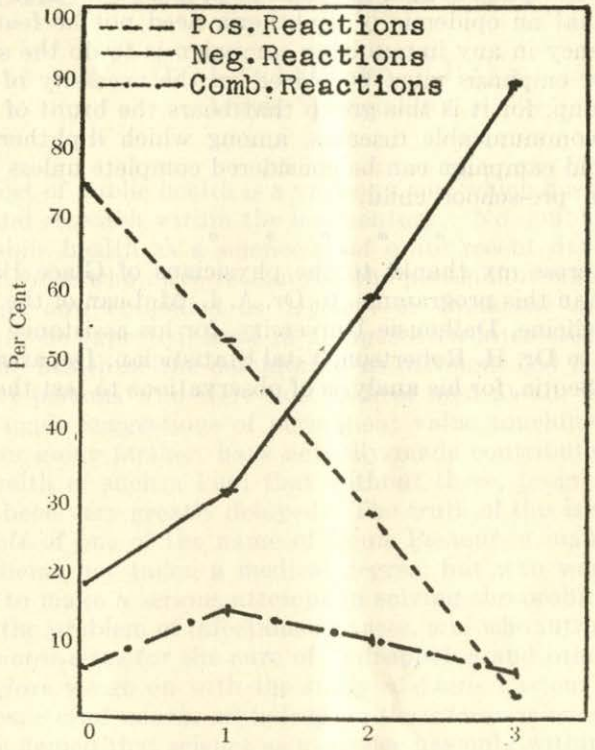
Conclusions

1. The administration of plain diphtheria toxoid in three doses at intervals of three weeks on the mass immunization plan is a safe procedure.

2. More attention must be given to children of the pre-school age to assure that they receive the three doses required for immunization.

3. 5,799 children who received one to three doses of toxoid were offered the Schick Test to ascertain their immunity status. 4,546 or 78.6% received

Results of Schick Tests (5097) According to Doses of Toxoid Received Glace Bay, 1939.



GRAPH I

Doses of Plain Toxoid

the test. In addition 799 children who had not received any toxoid were tested. Of 5,345 Schick Tests done 5,097 or 95.4% were read.

4. Three doses of plain diphtheria toxoid is efficient in producing immunity to diphtheria as gauged by the Schick Test. This is evidenced by negative reactions ranging from 18.8% in those with no toxoid to 89% in those with three doses or conversely, 74.5% positive in those who did not receive toxoid to 3.8% in those with three doses. Combined reactions are not included in these figures.

5. Despite an increasing immunity noted with one, two and three doses of plain toxoid, only three doses can be relied on to produce immunity.

6. While no serious reactions were encountered in the 5,799 receiving toxoid at all ages up to twenty, it is probably advisable to test children over the age of twelve for sensitivity before proceeding with the administration of toxoid. All adults must be Schick Tested before toxoid is administered for two reasons, (a)—to determine the presence or absence of immunity and (b)—to determine whether there is sensitivity to diphtheria protein. If the latter exists, and the individual is susceptible to diphtheria, a special preparation of dilute toxoid is available for immunization.

7. A community cannot be considered as secure against an outbreak of diphtheria if the child population, especially those of the pre-school age group,

has not been toxoided. The level of immunity resulting from the administration of three doses of plain toxoid develops such a high level of immunity in the population, that an epidemic of diphtheria need not be feared.

8. The tendency in any immunizing campaign is to do the schools. Important as this is, emphasis must be placed on the necessity of immunizing the pre-school group, for it is this group that bears the brunt of an epidemic of the common communicable diseases, among which diphtheria is no exception. No toxoid campaign can be considered complete unless its organization includes the pre-school child.

* * * * *

I wish to express my thanks to the physicians of Glace Bay, for their close co-operation in this programme, to Dr. A. L. McLean of the Department of Preventive Medicine, Dalhousie University, for his assistance in doing the Schick Tests and to Dr. H. Robertson, Vital Statistician, Department of Public Health, Nova Scotia, for his analysis of observations to test their statistical significance.

Public Health and Louis Pasteur

Dr. J. E. LeBlanc, M.H.O.,
Argyle Municipality.

THE subject of public health is a vast one, one which has given rise to much study and research within the last century. No doubt, the formal recognition of public health as a science is of quite recent date, but there have always been those who have recognized the paramount claims of that branch of knowledge, now embodied as *Hygiene* or *Preventive Medicine*. Medical men, as might be expected, have in all ages been interested in measures that tended to the health of the community as distinguished from the individual merely. But persons who were not medical men at all, have from time to time either made suggestions of permanent value touching on the health of the people, or going farther, have actually made contributions to the science of public health of such a kind that without these, progress in that science would have been very greatly delayed. The truth of this is strikingly brought out in the life of one of the name of Louis Pasteur, a man who had neither studied medicine nor taken a medical degree, but who was nevertheless the first person to make a serious attempt in solving the problem of spontaneous generation, the problem of infectious diseases, and who introduced inoculation of the *attenuated virus* for the cure of hydrophobia and other diseases.

But, before we go on with the study of Louis Pasteur's work, we might ask ourselves: *what was the attitude of the times towards science before Pasteur*? It cannot be denied that science as a science has only within the last century, that is, the nineteenth, been allowed to have an independent existence in the national system. In England, the time is within the memory of all those who study history, that the attempt to introduce laboratory teaching into the University of Oxford about the middle of the 18th century, was met with a furious resistance. The same attitude prevailed in France when the ex-priest, Dupin, upon demanding the execution of Lavoisier, declared: "*The Republic has no need of chemists.*" This was said in 1794, thirty-eight years before the birth of Louis Pasteur.

But, as you all know, in the course of times things changed, and changed very rapidly. Science as a science soon came to its own, particularly with regard to public health. It was listened to and studied with intense eagerness, because it underlied so many things necessary to the well being of the population of the community, and of that of our towns and cities. Ventilation was introduced in England by the Rev. Stephen Hales: that is, the knowledge that the constant removal of bedroom air without a *draft* is necessary to health, particularly in the fight against tuberculosis. From that day, the science of public health grew in importance, because it plays such an important role in our daily existence. It has something to say in almost every domain of intellectual activity. For instance, it has something to say as to the duration of *sleep* proper to the different ages of the child and of the youth; how the lack of it leads to inefficiency at school. Science has something to say about the arrangements of hours of work and play in the school time table; how fatigue of body and of mind can be recognized, prevented or cured;

how the deficient child may be distinguished from the backward or merely lazy one. In short, science in our daily life, in our so-called common life, is the great need of the community of to-day, affecting the health of our cities on which, as one of my professors used to say, the "light of nature" throws very little light indeed.

With these principles in mind, the great English statesman, Mr. Disraeli, never hesitated to promote public health measures with all the energy at his command, because, as he often said, "Public health is the foundation upon which lies the happiness of a nation and the power of state. Have the best of kingdoms; give them intelligent citizens; prosperous manufacturers; progressive agriculture; let the arts flourish; let the architects cover their soil with temples and palaces: to protect all this, have a strong army. If the population remains stationary; if each year it weakens in stature and vigor, the nation will perish, and that is why I maintain that the fostering of public health legislation is the first duty of a statesman."

This speaks highly enough of the esteem and admiration we should have for everything which pertains to public health matters—and that is why I am so anxious to speak to you *briefly* to-day about one who has done so much to promote *public health.* I mean Louis Pasteur.

Two centuries before Pasteur, Robert Boyle made use of an expression wonderfully prophetic in its accurate penetration of the future: "He that thoroughly understands the nature of the ferments and fermentation shall probably be much better able than he that ignores them, to give a fair account of divers phenomena of certain diseases (as well fevers as others) which will perhaps be never properly understood without an insight into the doctrine of fermentation." The marvel is that the very first man who understood the nature of fermentation, proved to be the one destined to unlock the mystery of contagious diseases and its origin.

Pasteur's first investigations in the field of disease concerned a mysterious malady that affected the silkworm and was ruining the silk industry of France —and which involved a yearly loss of $20,000,000. This disease was first noted in 1850. Pasteur showed that the failure of the silkworm was not due to one disease but to two diseases—*pebrine* and *flacherie.* These diseases are communicated to the eggs of the worms, so that the young begin life handicapped by the maladies. The crawling of the worms over leaves and stems makes these liable to communicate the diseases. The prevention of the diseases is accomplished by procuring absolutely healthy eggs, and then never letting them come in contact with anything that may have been touched by diseased worms. If, at the egg-laying period, worms show any signs of disease, their eggs are to be rejected. These simple suggestions were the result of rigid experimental demonstration of the spread of the disease from *worm* to *worm, including* the demonstration of the *microbic causes* of the two *diseases.*

Pasteur's attention was next naturally directed to the diseases of animals and human beings. His studies in fermentations and in silkworm disease had taught him the use of the microscope for such investigation. Splenic fever, known as anthrax—a disease that attacks most species of domestic animals, and may also prove fatal to man—was the first to yield the secret of its origin. The cause proved to be a bacterium, that is, a small rod-shaped plant. This was but the first of a series of similar discoveries until now the science of bacteriology has become one of the most important branches of knowledge.

The germ of gas gangrene Pasteur discovered in 1887. It is commonly known as the bacillus of malignant oedema. It is a rod-shaped organism which closely resembles anthrax, but has a greater tendency to grow into long threads. It is actively motile and forms oval spores which may be placed at the centre or at the end of the rod. Pasteur showed that these cultures only develop under anoerobic conditions, and if the culture medium contains glucose, a large amount of foul smelling gas is produced.

In 1879 *staphylococci* were first demonstrated in local infections containing pus such as boils. This germ is found in superficial infections. Staphylo—means clumps, similar to bunches of grapes.

Streptococci were discovered in 1880, from a case of puerperal fever. The germ was extracted from a serous cavity. This germ is to be found in deep infections.

But one of the greatest discoveries Pasteur made was in connection with his study on *chicken cholera.* In investigating this disease, he discovered another great basic principle in the knowledge of disease, especially in its treatment. After considerable difficulty he succeeded in finding the germ of this disease which was causing great losses in the poultry industry of France and other European countries. This germ was cultivated for a number of generations on artificial media, and never failed to produce the disease when fowls were inoculated. During the course of his studies Pasteur was called away to a distant part of France in connection with his investigation of anthrax. He was away from his laboratories for several months. When he returned, he inoculated some fowls with the cultures of chicken cholera which he had left behind. To his surprise and annoyance, the inoculations failed to produce the typical symptoms of the disease.

One of the great mysteries of medicine, the varying virulence of disease had been thus solved by what seemed an accident. Pasteur understood at once the wonderful utility there might be in this discovery for the protection of men and animals from disease. He proceeded at once to practical application of the new theory by providing old cultures for the inoculation of fowls in districts where chicken cholera produced serious damages. Then working on the same lines as for chicken cholera, he proceeded to elaborate vaccine for anthrax and other diseases. The problem of immunization was solved.

As you can readily surmise, from the brief study of Louis Pasteur's work in connection with infectious diseases, his influence on public health was great —(and is still great). It attracted not only the attention of his compatriots, but that of all the nations of Europe.

During the month of May of 1892, Denmark, Sweden and Norway formed committees with the expressed purpose of coming to Paris for the celebration of Louis Pasteur's seventieth anniversary. The ceremonies took place in December of the same year, and all the principal universities of Europe sent their representatives for the occasion. England was there in the person of Lord Lister, who represented the Royal Societies of London and Edinburgh.

The Minister of Public Instruction, Mr. Charles Dupuy, first addressed the delegates, and briefly commented on the work of Pasteur. "Who can say," he said, "what human life owes to you: what it will owe you in days to come? Some day a poet will sing, in a new poem, the immortal genius who did so much for suffering humanity."

And then, Lord Lister rose to pay a special homage to the one who was being celebrated on his seventieth birthday. Turning towards Pasteur, he

said, "You have at last lifted the veil which shrouded for centuries, the infectious diseases. You have discovered and demonstrated their microbic nature." Touched by these words Louis Pasteur quickly arose and embraced Lord Lister. This was the culmination of a reward for the labor he had done in the interest of humanity and civilization. The contact of these two men gave the impression that a solid scientific fraternity was working to reduce the ills of suffering humanity.

Control of Open Cases of Tuberculosis

GERALD C. W. BLISS, M.H.O.,
Town of Amherst.

To the Health Officers' Association of Nova Scotia.

Gentlemen:

More than twenty years ago I had the honor of being President of this Association. At a meeting held at Windsor, N. S., at that time in my address I pointed out that unless and until open cases of tuberculosis were segregated and effectually quarantined as in other contagious diseases, we could not hope to materially cut down our high death rate from the disease in question.

Those financially able should be held responsible for the keeping of any members of their families who are active cases of tuberculosis from contact with persons free from the disease, particularly children. All cases that cannot be cared for as above by their relatives should be maintained by the Government in suitable special hospitals. No fair minded person will want to expose others to the danger of contracting tuberculosis from his family. All others should be compelled to obey legal regulations for the prevention of tuberculosis in open cases. We enforce protection of the public in other contagious diseases. Why not in tuberculosis? Until this is done, it remains the weakest link in the chain with which we hope to bind the most subtle and dangerous enemy to mankind.

In support of my opinion upon the quarantine and complete control of open cases of tuberculosis I refer you to a programme for an "Intensive Campaign against Tuberculosis" published in Ontario. The second step in their programme is headed, page two, "segregation of spreaders". Item No. ten on page six says as follows:—"Compulsory hospitalization for those who do not observe recognized means of preventing infection of others".

With many cases of deaths from tuberculosis reported as pleurisy, pneumonia, heart failure, etc., our high per capita mortality from tuberculosis is certainly not decreasing and the pressing demand for more sanitoria or annex accommodation does not deny the fact.

The sale of tuberculosis stamps, milk and eggs for children and invalids, and fresh air camps are all most necessary and beneficial but nullified to an unknown extent by our inaction against the obvious spread of the disease in question before our very eyes.

When if ever will we awake from our lethargy?

More About Typhoid Carriers in Nova Scotia

J. J. MacRitchie, M.D.,
Divisional Medical Health Officer, Halifax, N. S.

FOR introducing this subject again I make no apology, for it is of such Public Health importance to warrant more than passing attention. Since the discussion on "Typhoid Carriers in Nova Scotia" about a year ago at the meeting of the Canadian Public Health Association at Halifax, several more have been added to the list of the previously known and were definitely established as carriers. That many more exist it is only reasonable to assume, and according to Anderson of Boston, who has made an extensive statistical study of carriers in the state of Massachusetts, very many more remain unrecognized than are recognized. With the passing of time and the elimination of old carriers through natural processes, and, with the lower yearly incidence of typhoid with the resultant lower percentage of carriers, the number of carriers decreases yearly; but nevertheless, constitutes a problem in reducing typhoid to a minimum.

Water and milk borne epidemics have been so rare the last few years as to be considered an insignificant fraction of the total typhoid in the province each year, hence, our attention must be centered on a carrier as a causative factor in each reported case of disease.

Carrier infection is quite accidental but at that it is quite inconceivable that we have not more cases of the disease. The explanation may be in environment. For a case of typhoid to develop from a carrier a series of separate events must occur in succession, and if the chain of events is broken in any way, the infection will not develop. The organism must be ingested by a susceptible individual and in such numbers to produce disease. Apparently in some instances members of a carrier family become immune and only when new material is introduced, does disease develop. This is well illustrated in one of the cases reported last year. The man I refer to—a cook in a lumber camp—infected one or two of the personnel of the camp each year but there was no history of any of his own household having had the disease.

Some writers make the claim that a carrier is more infectious within ten years of his own infection, but in our short observation and study it was shown that some were infective from twenty to sixty years after their illness.

The detection of carriers in most cases is comparatively easy, particularly in suburban districts where the individual ramifications are not so widespread. In carrying out an investigation the first and proper course of procedure is to get a history of past typhoid in the immediate family, where an illness is or has been; or get a history of past illness among friends, neighbors, or visitors. In most cases we have found it is unnecessary to go further afield for the responsible individual. In a group such as those which constitute a lumber camp crew or a construction gang, in which a case of typhoid or paratyphoid has been reported, the infector is almost always within the group circle. Without going into further detail, as time is limited, I will make short reference to certain carriers detected within the last year.

Case No. 1. This case is in the area in which the President is Medical Health Officer, and refers to a lady about 75 years of age. Ten years ago a teacher boarding with her developed typhoid. No more cases were reported in that area until last year when a maid, employed with this lady, took ill and was replaced by another maid who after a period of residence in this household also took ill and was sent to hospital for the necessary period of treatment. The illness of these two maids was diagnosed as being paratyphoid B. Three cases of typhoid within ten years, in one household, would point to this home as harboring the infection. On investigation it was found that the old lady had had typhoid 20 years ago. Specimens of faeces and urine from her were found positive for paratyphoid B., and later specimens for follow-up were also found to be positive for paratyphoid B., thus establishing her position as a carrier.

Case No. 2. This is a man, 72 years of age, living in one of our eastern counties. His wife became ill last fall. Her daughter nursed her and then she became ill and was sent to hospital with a diagnosis of paratyphoid B. This led to further investigation of the mother's illness, with a result that paratyphoid B. was also diagnosed. The grandson next took ill—same diagnosis. Investigation disclosed that the grandfather had had typhoid 40 years previously. Specimens of faeces and urine were sent in from the grandfather with the Laboratory result positive for paratyphoid B. Further specimens sent in confirmed this. This listed him as a carrier of long standing. In this case the wife undoubtedly was a case of carrier infection, but the daughter and grandson were probably contact cases. No comparison of the strains was made.

Case No. 3. This most recent case refers to a probable carrier in an eastern town, where a young girl is now recovering from paratyphoid B. Inquiries by the attending physician as to the possible source of infection revealed that a neighbor—a housewife—had an illness of the typhoid group about 10 years ago and had delivered some milk to the young girl's home before she became ill. This housewife was the only possible source of infection in the neighborhood and as a suspect is now being investigated.

Case No. 4. This is a most interesting one as a widespread epidemic of paratyphoid was probably averted. A young girl, age 22, was taken to hospital ill with paratyphoid B. This girl came out of a household in which there were fifteen members, comprising her parents, her grandmother, an uncle, and ten brothers and sisters, ranging in age from twenty to two years. At the onset of this girl's illness, several members of the household had been ill with "flu" and previous to her paratyphoid B. illness, she also had had a slight attack of the "flu". Carrying on an investigation in this home for a possible source of infection it was found that this family distributed milk on quite a large scale. They lived on a farm and had ten dairy cattle and daily customers ranging from 50 to 70 people. No previous history from any members of the home could be elicited, but the grandmother gave history of having had peritonitis 30 years previously. Delving into this history further we found that her illness at that time lasted about ten days and this did not fit very well into the picture of peritonitis and we became suspicious that what was thought to be peritonitis might have been a mild attack of paratyphoid. This was later confirmed. Specimens of urine and faeces were taken from all members of the household with the result that the grandmother gave a positive result for paratyphoid B. Specimens from all the members were reported on

at different times and all cleared up with the exception of the grandmother and she was thus established as a carrier and the cause of the infection, a period of 30 years having lapsed since her own infection. Distribution of milk from this dairy was immediately stopped and we found that the proprietor was only too pleased to cooperate and assist in every way possible in establishing the cause of the infection and using every means at his disposal to prevent any further cases from developing. The grandmother also was very anxious to cooperate and assist in every way and went to live in a home with her son so as not to have any contact with those that she previously lived with. The handling of the milk on this farm for distribution was done under the most favorable and sanitary conditions, which undoubtedly accounts for no cases of paratyphoid developing among any of the customers.

I wish to point out that these cases noted have more of a geographical distribution than those referred to in the last paper; on that occasion the cases cited were confined mainly to one county. Those noted above were distributed in four counties.

In conclusion I would again call the attention of the practitioner to the advisability of following all cases of illness of the typhoid group, sending specimens of urine and faeces to the laboratory for examination, for a period of at least six months and better still, a period of twelve months, to determine whether they are remaining carriers or not.

The Laboratory Diagnosis of Typhoid

D. J. MACKENZIE
Director of Laboratory, Dept. of Public Health, Halifax, N. S.

IN the prevention and control of communicable diseases, no factor plays a more important part than an early and accurate diagnosis, in the establishment of which laboratory investigation must be used to the fullest extent. In the study of the enteric group of diseases the information to be gained by suitable laboratory investigation is especially important. Such investigation assists not only in arriving at an early diagnosis but also, and by this means only, can the attending physician determine when it is safe to allow convalescent cases to resume their normal unrestricted place in the community in which they live.

Laboratory aid in the diagnosis of typhoid fever dates back to 1896 when Widal described the agglutination test which still bears his name. It is a fact worthy of recognition that within one year of Widal's discovery, this test was carried out on 108 specimens of blood from suspected cases of typhoid fever by the late Dr. Hattie who at that time held the position of Provincial Bacteriologist directing the small diagnostic laboratory maintained by this province, then in the second year of its existence. In the 43 years that have elapsed, the Widal reaction has continued to function as a diagnostic aid and is still the test which first comes to mind when the possibility of typhoid arises, not only to the older medical practitioners but also to many of those who graduated from our medical schools this year. Bacteriological technic has advanced rapidly during those years until to-day the Widal test on which so much reliance was placed, has become the least accurate and least valuable of all the procedures carried out by a modern laboratory in the diagnosis of typhoid.

As a foundation on which to build a rational sequence of investigation, I think it is important to review that phase of the pathology of typhoid fever which has a direct bearing on our subject.

The mode of entry of B. typhosus in man is by the alimentary route. The organisms are swallowed and encounter their first obstacle in the acid juice of the stomach. If this gastric juice is neutralized by food or diluted by water, many of the bacteria may pass safely into the duodenum where they find a more favourable environment in the bile and alkaline secretion of the upper part of the small intestine. Here they penetrate the mucosa and get into the lymph channels, where we find the first notable increase in their numbers. Soon they are carried along the thoracic duct and into the blood stream. It is at this stage that we meet with the first symptoms of the active disease, malaise, headache, fever. Many are destroyed by the phagocytic activity of the leucocytes but the remainder are disseminated by the blood stream through the body, but for our purposes, mainly to the liver, kidney and intestine. From the liver, they are carried into the gall bladder and intestine where the bacilli may be isolated from the faeces in small numbers about the end of the first week. They are also excreted by the kidney, chiefly during the second and third weeks. In the intestinal wall, they attack the

Peyers patches where a combination of toxic action and multiplication of lymphocytic tissue interferes with free blood supply to the tissues and causes necrosis. This necrotic tissue is then invaded by pyogenic bacteria present in the bowel, causing the ulceration which characteristics the third or fourth weeks.

If one remembers this resume of the pathological changes, the proper sequence of laboratory investigations in a suspected case is reduced to one of the utmost simplicity. It will be evident that up to about the tenth day, blood culture is the only procedure that will give a positive finding in the great majority of cases. After the 14th day, the organisms have been eliminated from the blood which then remains sterile. The technic of blood culture has, from the standpoint of the practitioner, been greatly simplified by a combined blood culture and Widal outfit which is provided by the Public Health Department, free of charge, and which contains full but simple instructions for its proper use.

While it is true that blood culture yields the highest percentage of positive findings in the early stages, it must be remembered that refinements in technic and the use of newer culture media have enabled laboratory workers to isolate typhoid bacilli from the faeces of patients in some cases early in the first week, when some of the bacteria are penetrating the duodenal mucosa on their way to invade the blood stream. Though the percentage of recoveries of bacilli at this stage is much smaller than that obtained during the later weeks of the illness, nevertheless, the attempt should be made and with repeated specimens taken daily. These specimens must be forwarded to the laboratory at once, not kept until three or four can be sent at the same time. A delay of 24 hours before examination is started, may greatly lessen the probability of a positive finding. The urine should also be examined and usually becomes positive during the second week of illness. A suitable container for specimens of faeces or urine is also provided by the Department of Health and contains instructions for use. I would emphasize the importance of following these instructions carefully and explaining them to your nurses or attendants when leaving containers in which the attendants may collect and forward specimens. That this is not usually done is shown by the way specimens are received at the laboratory. The commonest fault consists in filling the container too full. Never fill a container more than half full of faeces. Remember that fermentation occurs with the liberation of gas which cannot escape from the bottle. I have often seen containers filled so full that they exploded before they could be opened in the laboratory.

In the diagnosis of typhoid, mention must be made of the Widal test. This is the oldest and most frequently requested test and despite all the improvements in technic which have been developed in the last forty-three years, it is the least reliable of all the laboratory aids in the diagnosis of typhoid. This test, unlike the cultural methods described, does not depend on the recovery of the infecting agent from the patient, but does not become positive for about 12 to 20 days until the immunizing effect of the infecting bacteria has been developed in the patient. It may never become positive in the course of the disease and still more confusing, may be positive in the absence of the active disease due to an attack of typhoid fever in the past, or may remain positive following active immunization of the patient with T.A.B. vaccine. It is now common practice to culture all blood clots from specimens

of blood submitted for Widal reaction and do the test on the serum. This increases its usefulness but not up to the level of culture of the blood or faeces.

One more suggestion, while I am on the subject of diagnosis. Never be content with a single negative laboratory finding. No laboratory finding is so accurate, no technic so fool proof that a single negative report can be regarded as accurately reflecting the condition of the patient. A specimen collected to-day may be negative, but a similar one may be positive in a day or two. Never drop your investigation after a single test. If negative, follow up to establish a diagnosis; if positive, follow up with regular examinations of faeces and urine for a period of at least six months to insure that the convalescent case will not develop into an unrecognized carrier and be a menace to everyone with whom he or she may come in contact.

There is nothing new to report on the subject of carriers of which there are many as yet unrecognized in the province. I have not yet ceased to wonder why they are not responsible for a higher incidence of typhoid. An intelligent and conscientious carrier who is aware of his unfortunate condition is of relatively little menace to his community, but not so the unrecognized one. It is only the fortunate fact that the route of infection from carrier to victim is made up of several distinct stages, a breakdown in any one of which is sufficient to prevent infection, that often protects a community from contracting typhoid fever in more or less wholesale fashion, but he may at any moment contaminate an unprotected milk or water supply with disastrous results.

The recognition of such cases is a simple task but laborious. It demands the closest co-operation between field staff and laboratory without which the whole effort is usually futile. For our purpose, two great foci of infection may be considered—the biliary tract and the pelvis of the kidney. Faecal carriers are more common but urinary carriers are most dangerous due to the rapid multiplication of organisms that occurs in the urine and the fact that less care is usually taken in the excretion or disposal of contaminated urine. Another factor which adds to the difficulty of spotting these cases in the intermittent excretion of bacilli which is a feature of a considerable number of carriers. Repeated efforts must be made if epidemiological findings point to infection of the carrier type and the first investigation fails to identify the spreader. An epidemiological study of the primary cases, particularly in rural or isolated areas will frequently point strongly to the source of infection and thus greatly reduce the effort necessary to collect and examine specimens of faeces and urine from a large number of persons.

The Certification of Causes of Death

H. Robertson, M.D.,C.P.H.,
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THE Division of Vital Statistics, lately, has been attempting to improve the registration of births and deaths in Nova Scotia, and to tabulate the statistical data obtained from such registrations. The Division Registrars who are responsible for the completeness of the personal particulars on the certificates have been contacted, and are co-operating, but too often they lay part of the blame of incomplete registration on the physician, and perhaps justly so.

It has been thought expedient at this time to direct the attention of the physicians to this subject.

Under the Vital Statistics Act, physicians are required:

1. To notify by card, within twenty-four hours, the Division Registrar of all deaths and births which they have attended.
2. To fill out and sign the medical certificate of cause of death when the certificate is presented to them by the Division Registrar or undertaker. This certificate must be presented by the undertaker before he can obtain from the Division Registrar a burial permit or order to remove a body.

The importance of birth and death registration is well known to physicians.

Death rates have long been used as an index to the health of a community, and as an index to the progress of Public Health programs. Health Officers from other Provinces and States are interested in our death rates from tuberculosis, maternal mortality, etc. The public is interested in the apparently rising death rate from cancer and cardio-vascular diseases. If we proudly boast about our low death rate from puerperal causes for 1937, which was the lowest of any Province in the Dominion, we are immediately challenged by being asked "are all our maternal deaths registered? And are they registered as such?"

In order to stand by our published death rate we must also be prepared to assure that we have a maximum degree of registration of deaths and it is the physician who is chiefly responsible for this registration.

The physician does not have to register births in Nova Scotia, but he must notify the Division Registrar of births he has attended, as in most cases this is the only means by which the latter knows that a birth has occurred. Two of our most important death rates, namely, maternal and infant mortality, are based on the number of deaths per one thousand live births, and any improvement in the registration of births will alone materially lower these two rates.

True death rates from these causes can only be secured by both complete birth and death registration. Besides notifying the Division Registrar of the birth the physician can perform a benefit to the child by insisting that the parents register the birth immediately.

In the past, if the death certificate lacked an adequate definition of the cause of death, or inadequate information, it was returned to the Division Registrar, who was obliged to secure the missing information from the physician. It is felt, however, that direct communication from the Department of Health to the doctor would be more advantageous to both parties concerned, hence since January 1, 1939, this procedure has been instituted.

The purpose of this paper is to offer suggestions for improvement in the manner of signing death certificates, so that they will be acceptable as statistical records, as well as fulfilling their other uses.

Death registration is made use of for its value as a source of information for purposes such as:—

1. Legal. It assists in the prevention and detection of crime.
2. Economic. It is invaluable in the settlement of life insurance and property inheritance.
3. Social. The statistics based on these records are invaluable aids in the study of public health and the effects of improvement in the prevention and treatment of various diseases, and in the lengthening of human life.

Too often the physician, when stating the cause of death, considers only the legal and economic use, with the result that the cause of death as stated is useless for statistical purposes. Too many certificates are received with the cause of death stated to be "natural causes", even in young persons. In these cases the physician simply means that this was not an accidental or homicidal death, and we are left ignorant as to the real cause of death.

Of course, in certain cases, a physician may hesitate to state the real cause of death, where it will affect the feelings of family or insurance payments, due to the number of persons who may have access to the certificate from the time it is signed by him until it is preserved in the vaults of the Division of Vital Statistics. The Province of Quebec is at present experimenting with a form of confidential certificate for cause of death, and in the small section in which it has been tried, interesting disclosures have been observed.

To secure uniformity in the classification of causes of death, the International List of Causes of Death is used. This list is revised every ten years by a Joint Committee of the International Institute of Statistics, and the Health Organization of the League of Nations. It is an attempt to facilitate comparisons of mortality statistics between different countries, and other geographical units. All physicians should be acquainted with this list and, if possible, the primary cause of death should fall in one of these nomenclatures.

The present certificate of death allows for the inclusion of contributory causes of death, if present. In many cases more than one cause of death is given, with no indication which is the primary cause, and which is the contributory cause of death. The selection of the primary cause then becomes the duty of the editor or coder of the cause of death at the Department of Public Health and in Ottawa. Certain rules are followed in this selection to obtain uniformity, but these are too complicated to discuss here. Some physicians go to the extreme by including the complete case history of the case on the death certificate.

Following are some of the more common reasons why death certificates are returned to the physicians for further information, with suggestions for avoiding unnecessary querying.

Indefinite and Unspecified Causes—The list of indefinite or ambiguous causes is long. Many such causes would pass in ordinary conversation, but would be very difficult to classify under the International List of Causes of Death. One of the commonest errors is to give symptoms instead of specific diseases such as uremia, coma, paralysis, dropsy, convulsions, etc., or cancer (no mention of site); tumor (no mention of character or site); heart trouble (unspecified as whether endocarditis, coronary disease, etc.). Pneumonia should always be specified as to whether broncho- or lobar pneumonia. If broncho-pneumonia in a child it should be stated whether it has followed a contagious disease.

The physician, if he does not know the exact cause, should state what, in his opinion, was the probable cause of death. Children under 3 months of age will, if the cause of death is not stated or unknown, be classified as due to other diseases of early infancy. Adults over seventy years of age, if no cause or an unspecified cause is stated, will be classified as death due to senility. All others will be classed under 200 in the International List, if unspecified. Naturally many deaths under this classification tend to reflect upon the physicians and the vigilance of the Division of Vital Statistics.

Maternal Deaths—It will facilitate matters if it is stated on the death certificate whether the mother was delivered and when, together with the period of gestation. This avoids unnecessary time and labor in searching for a birth certificate, if any.

Prematurity as a Cause of Death—It is important to give the period of gestation. In all cases a search is made for the birth certificate on which the period of gestation is stated by the parents, and which in many cases is incorrect. The importance of this is to know whether to classify the death as such or as a stillbirth, as all children born alive under twenty-eight weeks gestation but who die within twenty-four hours of birth, are classed as stillbirths in Canada.

Accident—State how and when it occurred. An elderly person dying fro pneumonia following a fractured hip is classed primarily as an accidental death, if the accident occurred within six months of time of death. It is important to state whether it was an automobile or industrial accident, and in cases of drowning, whether from a boat.

Deaths following operations are always classed as due to the disease for which the operation was performed. It is important to answer the question re operation and autopsy whether they were performed or not.

Acute and Chronic Diseases—Always specify whether a disease is acute or chronic. This is especially applicable to diseases of the heart and kidneys.

Stillbirths—The number of stillbirths has not appreciably diminished during the past twenty years. It is important to know the cause of these, as they reflect, to a certain extent, on the prenatal care and skill in delivery in many cases. The period of gestation and whether operative delivery or not is important information which should appear on stillbirth death certificates.

Special stillbirth forms will soon be used, and it is expected that these will enable better reporting of causes of stillbirths.

Finally, if the Division Registrar should call you and ask for further information, treat him civilly, and if he cannot decipher your writing, be assured that two or more physicians in this office have previously made an attempt at it and failed.

Safe Water Supplies

R. Donald McKay,
Sanitary Engineer.

WATER supplies are usually divided into three classifications, according to source. Surface waters include lakes, rivers, and impounding reservoirs on small streams. Shallow ground waters include springs, dug wells, and a few other less common types, such as driven wells, and infiltration galleries, which might be termed dug wells in a horizontal position. Deep ground waters include all deep drilled wells, over-flowing and non-over-flowing.

Waters of the first two classifications are very seldom safe without treatment. They are subject to contamination in many different ways. Some of these include wash from polluted portions of the water-shed, casual direct pollution by animals or by humans, and in some cases, pollution by sewage outlets.

Deep ground waters are usually considered perfectly safe. A moment's reflection will show that this is not entirely correct. If the casing of a deep well is not absolutely tight, surface water, perhaps from a highly polluted source, may flow in and mingle with the ground water. Moreover, in regions whose geological structure is mainly limestone, the ground water itself may be far from pure. In such country, the bed rock may be honeycombed to enormous depths with caverns and underground rivers. When this is the case, the filtering action of the soil and rock, which is normally the reason for the good quality of ground waters, may be entirely lacking; and contamination may follow, for miles, a course as direct as if it were flowing in a sewer.

If none of these types is intrinsically safe, and few individual sources, what then constitutes a safe water supply? In general, only water receiving special treatment. In a few cases, long storage is relied upon to provide safety. In brief, the action is that the bacteria, harmful and otherwise, are removed from the water by sedimentation. May I refer here to the old superstition that running water purifies itself in seven miles? There is just enough truth in the old belief, to make it difficult to wean people away from it. Running water does purify itself; but while some streams might free themselves of pollution in a few hundred feet, others do not find one hundred miles sufficient. Running water does purify itself; but in general, standing water will do so much more quickly and completely.

There are two main methods of treating a water to make it safe. They are filtration and chemical treatment. Chemical treatment alone is frequently enough. Many chemicals have been used at times, but practice has almost universally standardized on chlorine.

Chlorine may be fed as a gas, as a gas in solution, or as a solid compound of chlorine in solution. The first method is not much used now. The second is the method in common use in cities and large towns. The chlorine gas is brought through a silver pipe, to a machine which mixes it with a small quantity of water; this solution is then injected into the water main. The machines are of many different types; some add chlorine at a constant rate; some add chlorine at varying rates, in proportion to the volume of water flowing at any

given time; and in two cities, Los Angeles and Montreal, the machines add chlorine at rates which vary, not only in proportion to the flow of water, but also in proportion to the changing quality of the water. The third method is in common use in smaller towns and villages. Some compound of chlorine, usually calcium hypochlorite or sodium hypochlorite, is mixed with water in a definite proportion. This solution is stored in an earthen-ware crock, from which it is pumped into the water main. With these machines, as with those described above, the amount of solution fed may be uniform, or may be varied automatically in proportion to the flow.

The choice between these two types of machine is one of economy. Both are satisfactory. Those machines which feed a solution of chlorine gas in water are more expensive, but use chlorine in its cheapest form. Those which feed a solution of "hypo", are cheaper, but use a relatively expensive form of the chemical. In a large plant, therefore, the large first cost of the gas chlorinator is balanced by the savings in the use of a large volume of chlorine. In a small plant, the hypo machine is usually used, since the saving on a small amount of chlorine per year would not be great; in fact, in very small installations, the saving would not pay the difference between the two machines, even were hypochlorite twice its present price, and chlorine gas free.

Many years ago, it was learned that there were certain advantages in feeding ammonia together with chlorine. It is only very recently, however, that this has become common practice. The action of the chloramine formed is slower and more uniform than that of chlorine alone. Sometimes, though not always, the slower action is the advantage sought; this may occur where it is desired to have the action continue throughout the distribution system. Where the quality of the water fluctuates widely and rapidly, the slow, uniform action is highly desirable. Where it is necessary to feed very large doses of chlorine, such that a chlorinous taste might or would develop, ammonia may be fed with the chlorine, and the slower acting, but just as effective chloramine, will not cause a taste. This is true also in those waters in which some substances such as phenol, or the essential oils liberated by certain algae, are present; in these cases, the chlorine alone would react with the other substance to form taste-producing compounds, whereas the chloramine does not.

Filtration is accomplished by two main methods, slow sand filtration, and rapid sand, or mechanical, filtration. The former are somewhat more efficient; the latter are cheaper to build (though not to operate), and more versatile. The slow sand filter will usually remove from 98% to 100% of the bacteria present in the unfiltered, or "raw" water; the mechanical filter usually removes 95% to 98%.

In other respects, less important from the public health angle, the rapid sand process sometimes shows a greater efficiency than the other method. The slow sand type is very limited in the varieties of water which it can successfully and economically treat. The rapid sand type is very much less limited; and fortunately, the one kind of water which is hardest to treat with the latter, is that for which the former is best suited.

Usually treatment with chlorine supplements filtration. At one time, slow sand plants were relied upon to provide a practically sterile water, and this is occasionally done to-day. Because of its slightly lower efficiency in bacterial destruction or removal, the rapid sand filter is practically never relied upon to produce a safe water, without the supplementary use of chlorine.

An exception would be a plant treating a very turbid, but almost uncontaminated, water.

How shall we judge whether a water supply is safe? Many factors must be considered, but the most important are these: we must acquaint ourselves with all potential dangers to the source of the water, and attempt to evaluate their importance; we must acquaint ourselves with the treatment given, and efficiency; and we must watch closely the results of bacteriological examinations.

Time does not permit me to give a detailed explanation of the sanitary survey, nor of filter design and operation; but I would like to say a few words on the results of the laboratory examinations.

The standard generally followed, is that a water containing more than 2 B. Coli per 100 cc. be certified as unsafe. In terms of our five-tube, half-monthly samples, this means that the maximum allowable contamination is that represented by a report of "B. Coli present in one tube of five," every second half-month.

I am sometimes asked, "How is it that there was B. Coli in one of these tubes and not in the others, taken at the same time?" The answer is that the size of the samples is so chosen that there are usually more tubes in the sample than there are B. Coli in the quantity of water tested. If there is only one of these organisms in each 25 cc. of water, which is approximately the amount tested, then it is obvious that this one organism can appear in only one of the five divisions made of the sample, that is, "B. Coli present in one tube of five". If, however, there are five of the bacteria present in each sampling quantity, then it is probable that when the sample is divided into five portions, one of the organisms will be found in each of the five tubes. Thus, this method of sampling gives some idea of the amount of pollution present. It falls down when there are more than five B. Coli in each sample, since the presence of ten in each sample tube would still be reported as "B. Coli present in five tubes of five", as would have been the case with the previous example. This is not a serious flaw, however, as the water is unfit for use, long before the B. Coli count reaches "five out of five".

Perhaps the foregoing account has helped also, to show why all five tubes of the sample should be filled at the same time and place. Unless this procedure is followed, the quantitative value of the test is lost. If it seems desirable, as it sometimes does, to check on different parts of the system, a large sample container should be ordered from the laboratory.* A sample should be taken in one of these sterile bottles from each point involved.

One other point may be mentioned briefly. Such defects in a water as unpleasant taste or appearance, may not seem to be a problem of public health. They are, however, for this reason: they may cause people to use, for drinking purposes, an unsafe, but pleasant, private supply in place of a safe but unpleasant public supply.

One well-known manufacturer of chlorinators has adopted in his advertising, this slogan: "The only safe water is a chlorinated water." The degree of over-statement is negligible.

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*These containers are metal boxes, with an inside container, and a space between that and the outside wall, for icing the sample. The inside compartment contains eight 4-ounce sterile bottles.

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THE Editors take great pleasure in devoting this edition to the proceedings of the last Annual Meeting of the Provincial Association of Medical Health Officers.

Health officers and their co-workers, the sanitary engineers, have great accomplishments to their credit the world over. Plague, cholera, yellow fever and epidemic dysentery have practically passed from the supervision of the authorities, at least in the temperate zones, because they no longer occur in these regions, or only occasionally a case appears and calls for specific action. A community in Nova Scotia feels itself disgraced if small-pox, diphtheria or typhoid appears. Tuberculosis is coming under control as our people co-operate with the Department of the Public Health as represented by our medical health officers and the associated nursing service. It is well recognized that the continuance of these services and the inauguration of new ones, as experience and knowledge indicate, will still further tend to raise the level of health at relatively low cost. It is to be hoped that our public health services will be maintained intact during this period of stress upon which we are surely entering.

Shocked by the havoc made by venereal disease—shocked because, at a time of great national danger, so many in our fighting forces were incapacitated—our public health authorities did establish treatment centres in the year 1922. Doubtless treatment permitted many gonorrhoeal cases to again expose themselves sooner than they otherwise would and, on the other hand, by rendering those, recently infected with syphilis, non-infective in the early stages probably fewer associates contracted this disease. Probably this assumption is fairly near the truth because you will find on enquiry that the most authoritative source is unable to encourage us in the belief that gonorrhoea is much less prevalent but does entertain the view that there is a definite decline in the incidence of syphilis. Our public health officials are entitled to our sympathy and understanding in any efforts they make in an attempt to handle this naughty, knotty, prickly problem. They have to face difficulties on every side, difficulties such as obstinacy, resistance to governmental reg-

ulations, stigma, sex, failure of physicians to report cases and the weakness of human nature generally.

A port so strategically situated as Halifax with its streets swarming with young, healthy, regularly paid men of the navy, army and air force along with those of the merchant marine will, and if any reliance can be placed on rumor, has become the happy hunting ground of many of those from the greater centres of iniquity, "who lieth in wait as for a prey, and increaseth the transgressors among men".

Our citizen soldiers have been carefully selected by our medical service, are officered in large part by the products of our universities and are the very men whom Canada needs not only to defend her liberties but to father her children. Although the vast majority are masters of themselves in virtue of the principles instilled into them in their early home life and strengthened by the teaching of their religion, yet there is that minority who have not been sensitized by the restraining influence of the moral law and lack all sense of community responsibility.

What can be done to protect our men "from the evil woman, from the flattery of the tongue of a strange woman", "for the lips of a strange woman drop as an honeycomb, and her mouth is smoother than oil"? Canadians as a whole, through such agencies as the Red Cross should make every effort to see that wherever troops are concentrated, provision is made for wholesome recreation and entertainment.

What is to be done to protect the residue who will expose themselves and many of whom will contract venereal diseases? A practitioner of large experience with venereal disease told me a few days ago that "gonorrhoea was looking up"—what do you think he meant? Furthermore, he told me that the amateur was the spreader of disease and had almost put the professional out of business. Is such to be regretted or hailed with delight? I am told that the experienced prostitute is a careful soul and quite sensitive on this question of disease—prompted no doubt by material more than by moral considerations. Do you think there is any truth in this? As an M. O. H. how would you tackle the problem of the amateur? I noticed by the newspaper that Flossie, Josephine and Annie were ordered by the magistrate to leave the city. Do you think that by chasing them out of Halifax into Dartmouth is a satisfactory solution?

Did you ever hear it said that these communicable diseases are the wages of sin? Assuming that there is a trace of sense in such an absurdity—may I ask who pays? Who suffers most—the recipient of the disease or the old and reliable tax payer? Who pays for the weeks or months of medical care—who keeps the diseased in either a military or civil hospital comfortable, warm and well fed? Dear reader, why should the goat and the ass be the only symbols of stupidity?

Do you think it would be desirable to have medical officers always available to give prompt aid to the weak brother? Although such would not be applying the principles of preventive medicine to the source it would be, in a secondary sense, in that the possibility of further spread would be nipped in the bud.

Do you believe that the control and extermination of communicable diseases to be a function, if not the function, of the Department of the Public Health? Do you believe that fornication will ever become a thing of the past —a something that future generations (if such there be) will look upon as a

curious if not an almost wholly inexplicable practice of some of their primitive forebears? Is it a function of a Department of the Public Health to divorce communicable disease from fornication? Do you think it a matter of sufficient importance to engage the united efforts of those entrusted with the health of His Majesty's Forces—local Boards of Health and Departments of the Public Health, both Provincial and Federal, or do you think it would be better to just jog along as we are doing, let those who will take their chances and when disease matures resort to curative measures and forget all about the practice of preventive medicine?

The late Sir William Osler wrote—"Physicians and the public have each solemn duties in this matter: the former to act as apostles of continence, especially with the bachelors who pretend to believe that their health needs the indulgence and will not marry, and to use every effort to prevent the disease being carried to others; the latter to let no scruples of delicacy or affected ignorance stand in the way of thorough public supervision. The opposition to this is natural: women feel it adding an unfair stigma to an already shameful load of injustice; decent people feel that legal recognition is legal palliation and defense, and there is the real danger shown by experience, that if it is once shielded by the law the weight of the police force will be thrown on the side of protecting instead of abating houses of ill-fame, as with bygone saloons, but with far more disastrous results. But any risk is preferable to those very shocking conditions, which make city brothels a stream of contamination to what should be the purest of homes."

Do you think if these activities were placed under the direct supervision of the Department of the Public Health, rather than under that of the police, it would be a step in the right direction?

It is true these are just armchair musings and I must acknowledge that I would be in a state of confusion if I were suddenly burdened with the responsibility of protecting the thousands on our streets to-day. Would you be? If not, would you mind outlining your plan of campaign for the enemy is *Within* our gates *Now*.

H. W. S.

RADIO BROADCASTING

Beginning Wednesday, November 22nd, 7.45 o'clock, E.S.T., the Canadian Medical Association will continue a series of thirty-two broadcasts at the same time on the same day of the week. Dr. T. C. Routley, Secretary, has written this office stating that he would appreciate comments on the broadcasts from any members of the Association.—H. G. G.

Department of the Public Health

PROVINCE OF NOVA SCOTIA

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Kelley, H. E., Middleton (Mcpy. & Town).

ANTIGONISH COUNTY

Cameron, J. J., Antigonish (Mcpy).
MacKinnon, W. F., Antigonish.

CAPE BRETON COUNTY

Densmore, F. T., Dominion.
Fraser, R. H., New Waterford.
Francis, Bernard, Sydney Mines.
Sutherland, Harvey, Glace Bay.
McLeod, J. K., Sydney.
O'Neil, F., Sydney (County, South Side).
Murray, R. L., North Sydney.
Townsend, H. J., Louisbourg.
Gouthro, A. C., Little Bras d'Or Bridge, (Co. North Side).

COLCHESTER COUNTY

Eaton, F. F., Truro.
Havey, H. B., Stewiacke.
Johnston, T. R., Great Village (Mcpy).

CUMBERLAND COUNTY

Bliss, G. C. W., Amherst.
Gilroy, J. R., Oxford.
Hill, F. L., Parrsboro, (Mcpy).
Cochrane, D. M., River Hebert (Joggins)
Withrow, R. R., Springhill.
Stuart, C. E., Parrsboro.

DIGBY COUNTY

Belliveau, P. E., Meteghan, (Clare Mcpy).
DuVernet, Edward, Digby.
Rice, F. E., Sandy Cove, (Mcpy).

GUYSBORO COUNTY

Chisholm, D. N., Port Hawkesbury (Mulgrave).
Sodero, T. C. C., Guysboro (Mcpy).
Moore, E. F., Canso.
Monaghan, T. T., Sherbrooke (St. Mary's Mcpy).

HALIFAX COUNTY

Morton, A. R., Halifax.
Forrest, W. D., Halifax (Mcpy).
Payzant, H. A., Dartmouth.

HANTS COUNTY

Bissett, E. E., Windsor.
MacLellan, R. A., Rawdon Gold Mines (East Hants Mcpy).
Reid, A. R., Windsor, (West Hants Mcpy).
Shankel, F. R., Windsor, (Hantsport).

INVERNESS COUNTY

Chisholm, D. N., Port Hawkesbury.
Grant, T. E., Port Hood.
Proudfoot, J. A., Inverness.
McNeil, A. J., Mabou, (Mcpy).

KINGS COUNTY

Bishop, B. S., Kentville.
Bethune, R. O., Berwick, (Mcpy).
de Witt, C. E. A., Wolfville.
Moreash, R. A., Berwick.

LUNENBURG COUNTY

Marcus, S., Bridgewater (Mcpy).
Donkin, C. A., Bridgewater.
Donaldson, G. D., Mahone Bay.
Zinck, R. C., Lunenburg.
Zwicker, D. W. N., Chester, (Chester Mcpy).

PICTOU COUNTY

Blackett, A. E., New Glasgow.
Chisholm, H. D., Springville, (Mcpy).
Bagnall, P. O., Westville.
Crummey, C. B., Trenton.
Dunn, G. A., Pictou.
Parker, V. H. T., Stellarton.

QUEENS COUNTY

Ford, T. R., Liverpool.
Smith, J. W., Liverpool, (Mcpy).

RICHMOND COUNTY

Deveau, G. R., Arichat, (Mcpy).

SHELBURNE COUNTY

Corbett, J. R., Clark's Harbour.
Fuller, L. O., Shelburne, (Mcpy).
Dinsmore, J. D., Port Clyde, (Barrington Mcpy).
Lockwood, T. C., Lockeport.
Churchill, L. P., Shelburne. (Mcpy).

VICTORIA COUNTY

MacMillan, C. L., Baddeck, (Mcpy).

YARMOUTH COUNTY

Hawkins, Z., South Ohio, (Yarmouth Mcpy).
Caldwell, R. M., Yarmouth.
Lebbetter, T. A., Yarmouth, (Wedgeport).
LeBlanc, J. E., West Pubnico, (Argyle Mcpy).

Those physicians wishing to make use of the free diagnostic services offered by the Public Health Laboratory, will please address material to Dr. D. J. MacKenzie, Public Health Laboratory, Pathological Institute, Morris Street, Halifax. This free service has reference to the examination of such specimens as will assist in the diagnosis and control of communicable diseases: including Kahn test, Widal test, blood culture, cerebro spinal fluid, gonococci and sputa smears, bacteriological examination of pleural fluid, urine and faeces for tubercle or typhoid, water and milk analysis.

In connection with Cancer Control, tumor tissues are examined free. These should be addressed to Dr. R. P. Smith, Pathological Institute, Morris Street, Halifax.

All orders for Vaccines and sera are to be sent to the Department of the Public Health Metropole Building, Halifax.

Report on Tissues sectioned and examined at the Provincial Pathological Laboratory, from November 1st., to December 1st., 1939.

During the month, 242 tissues were sectioned and examined, which with 41 tissues from 10 autopsies, makes a total of 283 tissues for the month.

Tumours, simple	27	
Tumours, malignant	34	
Tumours, suspicious of malignancy	6	
Other conditions	175	
Tissues from 10 autopsies	41	
		— 283

Province of Nova Scotia Division of Vital Statistics

Provisional Monthly Report—October 1939

	October 1939				Sept., 1939
	Total	Male	Female	Rate	Rate
No. of live births	983	493	490	21.1	23.4
No. of stillbirths	33	18	15	32.5**	32.1**
No. of deaths	439	242	197	9.4	9.3
No. of deaths under 1 year of age	47	24	23	47.8*	55.9*
No. of deaths from puerperal causes	3	...	3	3.1*	4.7*

Causes of Death	Int. List No.	October, 1939				Sept., 1939
		Total	Male	Female	Rate	Rate
Measles	....	..	..	..	.....	.....
Scarlet Fever	....	..	..	..	.....	.....
Whooping Cough	9	5	2	3	10.7	22.2
Diphtheria	....	..	..	..	.....	.....
Influenza	11	6	4	2	12.9	15.5
Dysentery (bacillary)	13	1	..	1	.....	.....
Pulmonary Tuberculosis	23	24	11	13	51.6	64.4
Other forms of Tuberculosis	24-32	1	1	..	2.1	15.5
Cancer and other Malignant tumors	45-53	49	29	20	105.3	139.9
Cerebral hemorrhage, thrombosis and embolism	82a 82b	15	8	7	32.2	15.5
Diseases of the Heart	90-95	83	50	33	176.2	177.6
Diseases of the Arteries	96, 97 99, 102	60	31	29	128.9	59.9
Pneumonia (all forms)	107-109	13	8	5	27.9	33.3
Diarrhea and Enteritis under 2 yrs. of age	119	2	1	1	2.0*	9.5*
Nephritis	130-132	20	12	8	43.0	35.5
Diseases of Early Infancy	158-161	23	12	11	23.4*	23.7*
Accident	176-195	24	16	8	51.6	53.3

* Rate expressed as number of deaths per 1000 live births.
**Rate expressed as number of stillbirths per 1000 total births.

Provisional Monthly Report of Births and Deaths October, 1939.

	BIRTHS									DEATHS																
	Total Births	Live Births					Still Births			Total	All Causes		Maternal	Under 1 year of Age	Whooping Cough	Influenza	Pulmonary Tbc.	Other forms of Tbc.	Cancer	Cere. hem. Embolism Thrombosis	Heart Disease	Disease of the Arteries	Pneumonia All Forms	Diarrhea under 2 years	Nephritis	Diseases of Infancy	Accident
		Total	Legitimate		Illegitimate		Total																			
			M.	F	M.	F.		M.	F.		M.	F.															
Nova Scotia	1016	983	462	466	31	24	33	18	15	439	242	197	3	47	5	6	24	1	49	15	83	60	13	..	20	23	24
Annapolis	32	31	18	13	..	..	1	1	..	9	5	4	..	..	..	..	..	..	1	..	4	..	..	..	..	..	1
Antigonish	28	28	19	9	..	..	..	..	..	16	11	5	..	..	..	..	3	..	2	1	2	..	..	..	2	..	1
Cape Breton	189	180	78	93	6	3	9	4	5	68	37	31	..	8	1	..	4	..	12	4	14	4	2	..	2	4	1
Colchester	41	36	16	19	..	1	5	..	5	23	12	11	..	..	..	1	..	..	1	1	2	3	2	..	..	..	4
Cumberland	76	70	30	37	..	3	6	5	1	43	25	18	1	5	..	..	..	..	1	4	5	12	..	..	1	4	3
Digby	43	42	23	17	1	1	1	1	..	18	9	9	..	5	..	..	..	..	4	..	4	2	1	..	1	3	..
Guysboro	28	28	9	18	..	1	..	..	..	11	5	6	..	2	..	..	..	..	..	..	2	2	1	..	3	..	..
Halifax	206	203	95	92	13	3	3	3	..	69	38	31	1	9	1	..	5	..	6	3	14	10	2	..	1	4	4
Hants	23	23	9	12	1	1	..	..	..	11	5	6	..	1	..	..	1	..	..	..	3	2	2	..	..	1	..
Inverness	24	24	14	10	..	..	..	..	..	15	10	5	1	1	..	..	1	..	3	1	1	..	..	..	1	1	1
Kings	46	45	20	22	3	..	1	..	1	24	15	9	..	2	1	..	5	..	4	..	4	2	1	..	1	..	1
Lunenburg	62	61	32	24	3	2	1	..	1	30	19	11	..	3	..	1	1	..	5	..	9	1	..	..	1	1	2
Pictou	66	64	28	31	1	4	2	1	1	29	16	13	..	..	..	..	2	..	1	..	5	9	1	..	2	..	2
Queens	22	21	13	7	..	1	1	1	..	14	8	6	..	2	..	..	1	..	..	..	5	2	..	..	2	2	..
Richmond	39	36	17	18	..	1	3	2	1	13	6	7	..	1	2	1	1	..	2	..	2	2	..	..	1	..	2
Shelburne	30	30	16	11	1	2	..	..	..	13	5	8	..	4	..	1	..	..	1	..	1	2	1	..	1	2	..
Victoria	20	20	6	11	2	1	..	..	..	3	1	2	..	..	..	1	..	..	1	1	..	..	..	..	..	..	..
Yarmouth	41	41	19	22	..	..	..	..	..	30	15	15	..	4	..	1	..	1	5	..	6	7	..	..	1	1	..

Note: These figures are based on the Birth and Death certificates received by the Division of Vital Statistics, Halifax, N. S., up to and including November 10, 1939 and represent the number *registered* with the Division Registrars during the month of October, 1939.

Personal Interest Notes

DR. J. D. GRIFFIN of Toronto, Associate Medical Director of the National Committee of the Canadian Mental Hygiene Society, addressed the annual meeting of the Nova Scotia Society for Mental Hygiene at the Lord Nelson Hotel on November 27th. Dr. Griffin dealt chiefly with the mental hygiene aspect of war activities.

Attended by approximately thirty doctors the fall session of the Western Nova Scotia Medical Society was held in the Grand Hotel on November 16th. Larger part of the session, which took the form of a dinner-business session, was given over to the honour of Dr. H. H. Banks of Barrington Passage, who is celebrating his fiftieth year in the continuous practise of medicine. Dr. Banks graduated from Harvard University in 1889 and has been practising medicine continuously in Barrington Passage since that time. He was presented with a silver tray by the Society in commemoration of his Golden Jubilee in the medical profession. The presentation was made by Dr. G. W. T. Farish of Yarmouth who is now in his fifty-third year of continuous practise as a doctor. Also speaking following the presentation was Dr. C. A. Webster of Yarmouth, who also is celebrating his fifty-third year of continuous practise.

These three medical practitioners combine a total of 156 years of active service in their respective communities to their credit. This is believed to mark a record unequalled in Eastern Canada.

The society president, Dr. G. V. Burton of Yarmouth, presided at the session. Speeches during the evening were made by Dr. H. G. Grant, Dean of the Dalhousie Medical School, Halifax. Dr. Farish and Dr. Webster of Yarmouth, and Dr. Banks of Barrington Passage, also spoke.

Dr. A. B. Campbell of Bear River, vice-president of the Medical Society of Nova Scotia, brought the felicitations of the parent organization, as did Dr. H. E. Kelley of Middleton, president of the Valley Medical Society, for his Society.

Telegrams of regret at being unable to attend were tabled from Dr. Joseph Pratt of Boston, Dr. H. K. MacDonald, President of the Medical Society of Nova Scotia, the Hon. F. R. Davis, Provincial Minister of Public Health. A congratulatory telegram was received from Dr. C. A. Donkin, President of the Lunenburg-Queens Medical Society. Dr. T. A. Lebbetter of Yarmouth gave an interesting paper on certain phases of heart disease.

Doctors who attended the session included: L. P. Churchill, Shelburne; J. A. Donahue, Barrington Passage; J. E. LeBlanc, West Pubnico; H. J. Melanson, Weymouth; G. V. Burton, T. A. Lebbetter, G. W. T. Farish, C. A. Webster, C. K. Fuller, W. Phinney, D. F. Macdonald, R. M. Caldwell, S. W. Williamson, L. M. Morton, and J. S. Robertson of Yarmouth: E. A. Brassett, Little Brook; H. J. Pothier, Weymouth; P. E. Belliveau, Meteghan; W. C. O'Brien, Wedgeport; G. R. Mahaney, Granville Ferry; G. K. Smith, Hantsport; A. L. McLean, T. B. Acker, Halifax; and H. E. Kelley, Middleton.

Dr. W. W. Bennett, Dalhousie '33, who formerly practised at New Germany, has purchased the property of Dr. F. R. Davis at Bridgewater and will practise his profession there. Dr. Bennett has recently returned from a year's post graduate study in England.

Dr. Allister L. Cunningham, who formerly practised at Glace Bay, has taken over the practice of Dr. W. W. Bennett at New Germany.

Dr. E. P. Hopgood, assistant medical director of the Nova Scotia Hospital, recently addressed the Rotary Club at Wolfville on the subject of mental diseases.

The BULLETIN extends congratulations to Dr. and Mrs. L. A. Rosere of Brooklyn, Hants County, on the birth of a son on November 18th.

Socialized Health Centre Formed at Johnstown, N. S.

In an attempt to solve a serious rural problem the people of Johnstown, Big Pond, Richmond County, and neighbouring districts, have banded together to provide themselves with medical service on a community basis. Three hundred heads of families have formed themselves into "The Johnstown Socialized Health Association" at a membership fee of $5.00 a year. Dr. Daniel MacDonald, veteran North Sydney practitioner, is co-operating in putting the plan into operation, and has accepted the post of community doctor.

Initiative in the matter was taken several months ago by the parish priest, Rev. G. J. MacLean. A sick call to the parish often meant a drive, for the doctor, of forty miles or more, and, lacking means, the people usually felt that professional care was a luxury they could not afford.

A canvass of the two parishes was made, as well as of the districts of Framboise, Loch Lomond, and Fourchu, in the "rear", where there are practically no Roman Catholics. The response was excellent. In time the difficulties which arose were ironed out, and on November 1, 1939, the "Socialized Health Association" was functioning. Dr. MacDonald has been busy from the outset.

The association was formed "to promote the general health of the communities named below and of any others that might later be approved by the board of directors, and to provide for the regular medical and surgical services by a competent physician, with such hospital, nursing, and health services as might be deemed advisable by the board of directors."

Membership is open to all families complying with the requirements of the board within the area set forth, and consisting at present of the districts of Soldier's Cove, Red Islands, Johnstown, Loch Lomond, Enon, Framboise, Fourchu, Big Pond and East Bay, and any adjacent districts considered by the board as being feasible to serve.

The board of directors shall consist of at least five and not more than fifteen, of which the parish priest of Johnstown is, ex officio, chairman. All ministers in the districts served shall be members of the board, by virtue of their office. Present members of the board include: Rev. G. J. MacLean, P.P., chairman of the board; Duncan MacPherson, B.A., Big Pond, vice president; Archie MacCuish, Loch Lomond, secretary-treasurer; James Johnston, Johnstown; William James, Soldier's Cove; Neil MacDonald, Fram-

boise; Norman J. MacDonald, Enon; Rod M. Campbell, East Bay; D. E. MacLean, Fourchu.

The full fee, which members of the association pay, is $5.00 a year. This entitles the subscriber to one free visit by the doctor to his home, and to free consultations at the doctor's office. Second and subsequent visits made to a subscriber's home will be at the rate of $2.00, plus 10c. a mile for the distance one way. A reduction in the price of drugs, and in the usual fee for surgical operations may be expected. An effort will be made to obtain a reduction in hospital charges for subscribers. The doctor will attend to maternity cases for a flat fee of $10.00, plus the usual mileage rates.

OBITUARY

The BULLETIN extends its sympathy to Dr. H. L. Scammell of Halifax on the death of his mother, Mrs. John L. Scammell of Pictou, on November 26th.

The BULLETIN also extends its sympathy to Dr. R. A. MacLellan of Rawdon Gold Mines, on the death of his wife, Lydia MacLellan, on November 26th.

A Doctor's Story

We're hastening to print this story because one of the people concerned, a doctor, is probably planning to use it in a book.

One night the doctor's telephone rang, wakening him from a fitful post-operative slumber. It was one of his regular patients, a young man now in a wild state of alarm. "My wife, doctor!" he shouted. "It's her appendix. You'd better come quick!" The doctor sighed and told the young man to go back to bed. "Give her some bicarb or ginger ale, and I'll look in on her tomorrow," he said. "She hasn't got appendicitis."

The husband became even wilder, insisting that she did too have appendicitis. "Well, she can't have!" the doctor shouted, "I took her appendix out three years ago, and I never heard of anybody having two appendixes." "Ever hear of anybody having two wives?" the young man asked bitterly. The doctor went around right away, and it was a good thing he did because the second wife had appendicitis all right.—*The New Yorker.*

It Can Happen Here

Example of severe rickets in a sunny clime.

LEST WE FORGET—we who are of the vitamin D era—severe rickets is not yet eradicated, and moderate and mild rickets are still prevalent. Here is a white child, supposedly well fed, if judged by weight alone, a farm child apparently living out of doors a good deal. This boy was reared in a section having a latitude between 37° and 42°, where the average amount of fall and winter sunshine is *greater than that in the major portion of Canada*. And yet such stigmata of rickets as *genu varum* and the quadratic head are plain evidence that rickets does occur under these conditions.

How much more likely, then, that rickets will develop among city-bred children who live under a smokepall for a large part of each year. True, vitamin D is more or less routinely prescribed nowadays for infants. But is the antiricketic routinely administered in the home? Does the child refuse it? Is it given in some unstandardized form, purchased from a false sense of economy because the physician did not specify the kind?

A uniformly potent source of vitamin D such as Oleum Percomorphum, administered regularly in proper dosage, can do more than protect against the gross visible deformities of rickets. It may prevent hidden but nonetheless serious malformations of the chest and the pelvis and will aid in promoting good dentition. Because the dosage is measured in *drops*, Oleum Percomorphum is well taken and well tolerated by infants and growing children. Rigid bioassays assure a uniform potency —100 times the vitamins A and D content of cod liver oil*. Oleum Percomorphum, moreover, is a natural product in which the vitamins are in the same ratio as in cod liver oil*.

Oleum Percomorphum offers not less than 60,000 vitamin A units and 8,500 vitamin D units (International) per gram. Supplied in 10 and 50 c. c. brown bottles, also in 10-drop soluble gelatin capsules, each offering not less than 13,300 vitamin A units and 1,850 vitamin D units, in boxes of 25 and 100.

*U.S.P. Minimum Standard

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