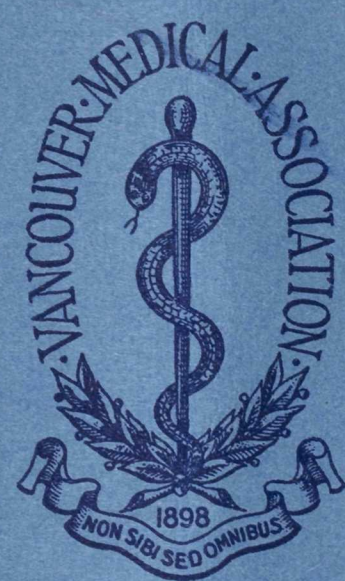
The BULLETIN
OF THE
VANCOUVER MEDICAL ASSOCIATION

Vol. XIV. NOVEMBER, 1937 No. 2



In This Issue:

NEWS AND NOTES

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THE VANCOUVER MEDICAL ASSOCIATION

BULLETIN

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VOL. XIV. NOVEMBER, 1937 No. 2

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VANCOUVER HEALTH DEPARTMENT

STATISTICS— SEPTEMBER, 1937

Total population—estimated	253,363
Japanese population—estimated	8,522
Chinese population—estimated	7,765
Hindu population—estimated	352

	Number	Rate per 1,000 Population
Total deaths	223	10.7
Japanese deaths	7	10.0
Chinese deaths	9	14.1
Deaths—residents only	191	9.2
BIRTH REGISTRATIONS—		
Male, 174; Female, 167	341	16.4

INFANTILE MORTALITY—	Sept., 1937	Sept., 1936
Deaths under one year of age	9	8
Death rate—per 1,000 births	26.4	23.5
Stillbirths (not included in above)	9	6

CASES OF COMMUNICABLE DISEASES REPORTED IN THE CITY

	Aug., 1937		Sept., 1937		October 1st to 15th, 1937	
Scarlet Fever	13	0	8	0	8	0
Diphtheria	0	0	2	0	0	0
Chicken Pox	12	0	67	0	99	0
Measles	3	0	4	0	3	0
Rubella	0	0	0	0	2	0
Mumps	11	0	13	0	11	0
Whooping Cough	2	0	2	0	2	0
Typhoid Fever	2	0	0	0	0	0
Undulant Fever	0	0	1	0	0	0
Poliomyelitis	0	0	3	0	0	0
Tuberculosis	37	8	29	16	17	--
Erysipelas	3	0	2	0	0	0

VENEREAL CASES REPORTED IN SEPTEMBER

	Vancouver Clinic	Victoria Clinic	Private Drs. in Province
Syphilis	40	3	98
Gonorrhœa	70	10	40

(Figures for Vancouver will be available next month.)

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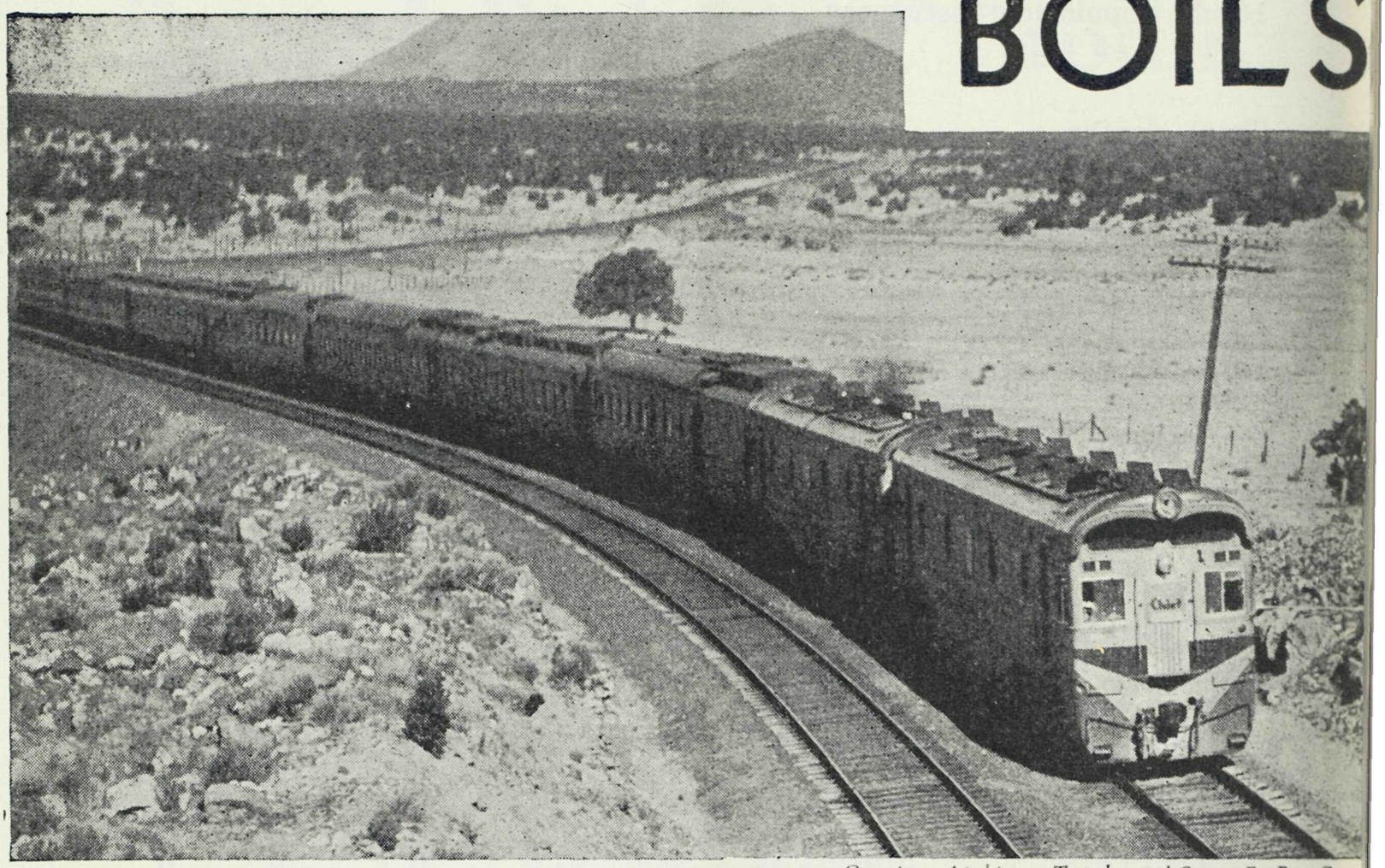

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Stannoxyl is the original preparation of chemically pure tin and tin oxide for the oral treatment of boils and styes. In 1917 this chemical combination was shown to be definitely antagonistic to staphylococcus.

Results are gratifying. Use of the old-time lance is avoided. Pain is relieved, inflammation checked, and there is no draining wound to spread infection, no ugly scar.

Soon after treatment is started healing begins and a healthy base is generally obtained in eight to ten days.

The *only* way to find out what Stannoxyl can accomplish is to try it in your next case of boils. Also effective for treating styes, or in chronic osteomyelitis due to staphylococcus.

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VANCOUVER MEDICAL ASSOCIATION

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Programme of the 40th Annual Session

GENERAL MEETINGS will be held on the first Tuesday of the month at 8 p.m.

CLINICAL MEETINGS will be held on the third Tuesday of the month at 8 p.m.

Place of meeting will appear on the Agenda.

General Meetings will conform to the following order:

8:00 p.m.—Business as per Agenda.

9:00 p.m.—Papers of the evening.

1937.

October 5th—GENERAL MEETING.

DR. H. A. SPOHN: "Conditioned Reflexes and Their Relation to Medical Practice."

Discussion: DR. G. A. DAVIDSON.
DR. ETHLYN TRAPP.

October 19th—CLINICAL MEETING.

November 2nd—GENERAL MEETING.

DR. W. N. KEMP: "Dietary Sources and Clinical Significance of the Vitamines."

Discussion: DR. W. W. SIMPSON.
DR. H. H. PITTS.

November 16th—CLINICAL MEETING.

December 7th—GENERAL MEETING.

DR. A. L. CREASE
DR. G. A. DAVIDSON
DR. S. STEWART MURRAY
DR. E. J. RYAN
} "Symposium on Mental Conditions."

December 21st—CLINICAL MEETING.

EDITOR'S PAGE

Every now and then, as we pass through this vale of tears, endeavouring to maintain an equilibrium of complacency and satisfaction with the *status quo*, some busybody comes along with a remark or a speech that, in the words of Stevenson, "stabs our spirit broad awake" and rudely disturbs our peace. Such, with appropriate apologies, was the Hon. Gordon Wismer, our Attorney-General, when he spoke in such a friendly way at the Annual Dinner of the B. C. Medical Association the other night. He raised the question once more of how far it is the duty of a learned profession, such as law or medicine, to utilise measures of publicity to acquaint the community which it is trying to serve with the value of its wares, and the necessity for their use to a greater extent than is now the case. He said frankly that in his opinion we were remiss in our duty—that we should engage in reasonable and honestly-conducted publicity; that the public is suffering from lack of knowledge of what we can give; that other inferior wares are being pushed, sometimes by unscrupulous people, and that the public is being victimised and exploited for gain by those whose motives are not worthy, and who have no real merit.

This is no new thing—but it is a re-statement of the case from a different angle. It deserves our careful consideration, because it was made by a man who is himself eminent in a profession. We have been told by newspaper editors that we should engage in publicity; every now and then some layman, in all good faith, takes us to task for what seems our oracular attitude, and our apparent habit of mystery; but it is not often that a man who really understands the professional feeling in the matter, and who knows why law and medicine are so slow to "advertise," takes the stand in favour of publicity and propaganda—and when he does, we may be sure there is something in what he says.

There is an instinctive feeling, and a very sound one, against publicity. We realise the danger of letting down the bars and allowing the individual to hawk his wares for public inspecion and sale. There is too much danger that the unworthy and the merely aggressive and, shall we say acquisitive, element would win, at the expense, not of other medical men, but ultimately of the public. Moreover, medicine is not an exact science, nor can it be measured out like sugar or cloth, and its evaluation is very difficult, even by the trained man; so that there is grave danger of serious misunderstanding. Again, we are, like law, a profession with very high ideals, and, as someone has said in a phrase we cannot at present verify, the best law is the least law: and this also applies to medicine. We do not want more sick people, we want less; we do not want more people to employ us, we want to lessen the number.

But, when all this is said and done, there is still a great deal that we should put before the public, and Mr. Wismer is perfectly right in this matter. What publicity we do employ is usually, owing to our inexperience and lack of a publicity sense, put in such a way as to alienate people rather than to attract them. We urge vaccination—but give no reasons, no figures, no arguments why the antis are talking through their hat. We embark on a campaign for lessening tuberculosis or venereal disease—and our success is exactly in proportion to the wisdom and clearness with which we explain what we are doing and why we are doing it; and all too frequently we fail very badly in this particular.

The day is past for the pontifical attitude in medicine, as in religion. The public, *i.e.*, the ordinary man, must see why he does a thing before he will agree to do it. He is educated, he reads, he thinks, to a far greater extent than ever before. He is extraordinarily sensitive to the effect of the written word—and too often our written words have an allergic effect on him, and

bring him out in an eruption. But he is also most amenable to reason, and after all, the cure for allergy is more of the same more wisely administered.

There is so much that we have to tell the public that is good and desirable and that would help them, and relieve our own burdens. It cannot be done by the occasional health official, or by half-baked newspaper interviews. The doing of it by medical men speaking before groups—Y.M.C.A., church, women's organisations, parent-teacher bodies—while excellent and helpful, is like trying to empty the sea with a spoon. It should be done as a definite effort and project by the whole profession through its organised associations. This will remove any suspicion of personal gain; it will add weight and authority, and it will enlist our best minds.

We must not be bound, and we think Mr. Wismer meant this, by a tradition which was very well in its day, when the doctor was *sui genesis*, when people "trembled with fear at his frown." Times change, and we with them, and we must evolve a system of educating the public in health. Where this has been done by organised medicine, amazing results have followed, as in Denmark, for example, in the matter of ante- and post-natal care, and, we understand, in Russia, in general medical matters, where much good has been the result. We should as a body study this question and deal with it, and we are grateful to our guest for bringing it to our notice.

NEWS AND NOTES

Dr. J. S. Conklin and Dr. W. D. Keith were unanimously elected to Life Membership in the Vancouver Medical Association at a recent meeting.

* * * *

Dr. A. B. Schinbein has left for the east. While he is away Dr. Schinbein will attend the meeting of the American College of Surgeons, to be held in Chicago, October 25-29.

* * * *

Dr. G. F. Strong has left for Ottawa to attend a meeting of the Executive Committee of the Canadian Medical Association.

* * * *

Dr. Roy Mustard has left for a vacation in the east. He will be away for several weeks.

* * * *

Dr. L. H. Leeson has left for the Eastern States. He will be away for three or four weeks.

* * * *

Dr. J. E. Harrison has left for England and the Continent, where he will do postgraduate work for several months.

* * * *

Dr. A. Leigh Hunt, who has recently returned from Montreal, where he has been doing postgraduate work for the past three years, will take over Dr. J. E. Harrison's practice while the latter is away in England.

* * * *

Dr. C. E. Davies, a previous member of the Vancouver Medical Association, has returned to Vancouver after having been in practice in New York for the past three years. Dr. Davies spent some time at the Manhattan Eye, Ear and Throat Hospital, following which he was associated with Dr. R. Tolmie Paton.

Dr. Alice J. McDonald has returned to the city from Toronto, and is now connected with the Physiotherapy Department at the Vancouver General Hospital. While in the east Dr. McDonald did postgraduate work in the Physiotherapy Department of the University of Toronto.

* * * *

We offer our heartiest congratulations to Dr. A. N. Beattie, who was married on October 16th to Miss Marjorie C. Laidlaw. Dr. and Mrs. Beattie will reside at Ioco.

Dr. H. H. Milburn and Dr. A. Y. McNair have returned from a most successful hunting trip up into the Cariboo.

* * * *

Dr. M. W. Thomas, who has been out of the city for some weeks, has been touring the interior of the Province on business matters pertaining to his office. He is now enjoying a well-earned holiday on Vancouver Island. We may expect some good fishing yarns on his return.

* * * *

Dr. Roy Huggard has left for the east. While away he will attend the meeting of the American College of Surgeons in Chicago, October 25-29.

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NOTICE

Owing to the low percentages paid on Relief Accounts for the months of January, February and March, 1937, an additional allowance is being made on accounts rendered during those months.

NORTH PACIFIC SURGICAL ASSOCIATION

The meeting of the North Pacific Surgical Association to be held on Friday, November 19th, at 8 p.m., in the Oval Room of the Hotel Vancouver, will be open to all medical men of the city, whether members of the North Pacific Surgical Association or not. The speaker at this meeting will be Dr. W. E. Gallie, Professor of Surgery at the University of Toronto. Those in charge of the meeting trust that as many medical men as possible will avail themselves of this opportunity to hear Dr. Gallie.

VANCOUVER MEDICAL ASSOCIATION

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LIBRARY CORNER

SULFANILAMIDE

The following references concerning the use of Sulfanilamide may be of interest:

Urinary Antisepsis, by H. W. E. Walther, M.D.—J.A.M.A., Sept. 25, 1937, p. 999.

Acute Hæmolytic Anæmia during Treatment with Sulfanilamide, by S. E. Kohn, M.D.—J.A.M.A., Sept. 25, 1937, p. 1105.

Toxic Optic Neuritis Resulting from Sulfanilamide, by Paul C. Bucy—J.A.M.A., Sept. 25, 1937, p. 1007.

Skin Eruptions in Patients Receiving Sulfanilamide, by J. J. Menville and J. J. Archinards—J.A.M.A., Sept. 25, 1937, p. 1008.

Development of a Cutaneous Eruption: M. H. Goodman, M.D., and Charles S. Levy, M.D.—J.A.M.A., Sept. 25, 1937, p. 1009.

Dermatitis from Sulfanilamide, by L. J. Frank, M.D.—J.A.M.A., Sept. 25, 1937, p. 1011.

Comparison of Mandelic Acid and Sulfanilamide as Urinary Antiseptics, by H. F. Helmholtz, M.D.—J.A.M.A., Sept. 25, 1937, p. 1039.

Sulphonamide in Treatment of Bacterium Coli Infections of the Urinary Tract, by M. Kenny, M.R.C.S., and others—Lancet, July 17, 1937, p. 199.

Agranulocytosis and Para-amino Benzine Sulphonamide, by C. J. Young, M.B.—Brit. Med. Jl., July 17, 1937, p. 105.

Prontosil in the Treatment of Erysipelas, by A. R. Snodgrass, M.D., and others—Brit. Med. Jl., July 17, 1937, p. 101.

CONDITIONED REFLEXES IN RELATION TO CLINICAL MEDICINE

Dr. A. Howard Spohn, *Vancouver.*

(Read before Vancouver Medical Association, October, 1937)

I appreciate the privilege of again addressing this Society. Tonight I have the honour of presenting, necessarily in a rather disjointed way, something of the work of a great teacher and scientist, who happens to be one of my dearest friends. Sojourning as he does in a far distant land, I may be forgiven for straying from the field of pædiatrics into more alluring adjoining scientific pastures to bring some of his messages from the physiologic laboratory to busy practitioners.

Krasnagorski, from his earliest medical days, was the protegé of Pavlov, that great teacher who followed his own admonitions and so lived physiologically to a ripe and intelligent old age. It might be excusable to say a word in passing of Pavlov. Shortly after graduation he was stationed at the large Imperial Medical Naval Academy in St. Petersburg, now Leningrad. After a short time he obtained permission to withdraw to a small laboratory, very little larger than our Provincial Laboratories on Hornby Street. Here he passed the remainder of his life, quietly working, thinking, observing and encouraging a small group of chosen associates. I had the privilege of visiting his laboratories, containing his original and unchanged animal hospital, his conditioned reflex apparatus as crude and perfect as on the day in 1901 that he pronounced it suitable for experimentation. Pavlov was the first physiologist to see the necessity for asepsis in experimental surgery in animals. He was a brilliant surgeon, but performed no operation in humans. He had the unique experience of being honoured both by the

Imperial and Soviet Governments, and I visited with Dr. Trapp the beautiful villa and fine laboratory erected for him by the U.S.S.R. about twenty-five miles from Leningrad. Here one sees, in brass letters, the motto he left to medical posterity. It reads: "Observation and Observation."

The object of this paper is to discuss briefly a few of the aspects of the physiology of the nervous system that have been elucidated through the conditioned and unconditioned reflex studies of Pavlov and Krasnagorski. As you know, I am neither a physiologist nor psychiatrist, and I am attempting only to draw attention to the interesting and important physiologic truths which these two men have given to medical science, and to suggest some of the advantages of a more extensive application of teachings which are more or less familiar to all of us.

In spite of all the adjuncts to making life more comfortable, the nervous system of the human race is today subjected to more shocks and excitations than ever before in the history of man. While science has blessed us with the many diversified benefits of electricity and chemistry, yet with these movements has come an increase in the *tempo* of life which gives no thought to physiologic fatigue. Also, inventions of useful and comforting agents have been accompanied by a myriad other agencies, such as the diabolical new instruments of warfare, motors capable of producing excessive speeds for ordinary accomplishments, factory machines with monotonously regular but greatly accelerated demands for accuracy and timing, to say nothing of the tremendous increase in noises of all kinds. In addition, the colossal upheaval in the business world, the tremendous unrest in the world through economic and political changes, have completed an array of circumstances which have ravaged the physiologic resources of even the most normal individual. The time is now overdue when much more attention must be paid to the physiology of the nervous system and greater knowledge be gained of the physiologic aspects of certain diseases.

It is an accepted fact that all the processes studied through physiology and psychopathology are nervous processes occurring in the higher parts of the central nervous system. It is necessary in modern psychology to endeavour to understand all the causal factors of normal and pathological behaviour and the adaptations that may be established or shattered through the activities of the different mental processes.

However, until fairly recent times the difficulties of studying and accurately recording the mental activities of the central nervous system were almost insurmountable because of inadequate methods of estimation.

In 1901 Pavlov started intensive investigation of the nervous system, and a new interpretation of the psychologic process of the nervous system was made possible through his conditioned reflex experiment with dogs. Krasnagorski continued to investigate and elaborate this work in children. Since 1907 Krasnagorski has untiringly investigated conditioned and unconditioned reflexes in normal and abnormal children, and in conjunction with this the effects of certain drugs on the central nervous system. From time to time, at the International Congress of Science, and through reports in Russia, England, America, and in Scandinavian countries, etc., he has kept the scientific world in touch with his experiments, and has made suggestions for the use of his teachings in the diagnosis and treatment of various nervous states. The results of his work have been carefully checked and confirmed by such men as Lillystrand and Bernhardt of Stockholm, Czerny of Germany, Adrian of Cambridge, England, and Schick and Byrnham of America. The study of children by Krasnagorski is still being vigorously pursued at his clinic in Leningrad. The endeavour of these men has been "to carry out the most complete analyses of the nervous processes of the brain, and so reveal the fundamental physiologic mechanisms and the dynamics of the cerebrum and its adjacent parts."

Pavlov used the term "conditioned reflexes" to designate the fundamental nervous phenomenon through which he developed his investigations of the brain. This phenomenon includes the process of "synthesis" or ability to connect different cells on the part of the cerebral cortex and was first formulated by physiologists as the "Law of Association." Conditioned reflexes are reactions which are more or less temporary, but may be permanent. They are learned by training or induced, or acquired in life. They are also individual, and variable according to external conditions. In these properties or characteristics they differ from unconditioned reflexes which are permanent, inborn reactions, belonging to the species and appearing under all conditions. As unconditioned reflexes there are, for example, such inborn actions as gastric and salivary secretions, relaxation of the pyloric valve, etc. The secretion of saliva is an unconditioned function, inborn or innate, and beyond the power of suppression by the individual. It is through the study and charting of the salivary and other reflexes that Pavlov and Krasnagorski were able to arrive at so many of their conclusions.

Early in the investigation experiments showed that the law of formation of the conditioned reflex remains true for all human beings. External agencies, such as red light, the metronome, skin stimulation, food reinforcement, can be used to establish conditioning, and these agencies from the outer world, and also innumerable impulses originating in the organ itself, acquire the power of eliciting any reflex activity, motor, secretory, emotional, etc., if they are made to coincide a certain number of times with the reflex activity. The mechanism of the conditioned reflex enables the child or individual to adapt himself to the surroundings of the outer world. The infant soon after birth begins, through conditioned reflexes, to suckle, to cry when hungry or uncomfortable, to snuggle up to his mother for warmth. In other words, through the establishment of reflexes he gradually adjusts himself to the outer world and later learns to carry on more or less independently. The idiot, on the other hand, while his innate or unconditioned reflexes exist, is unable to adjust himself because reflexes cannot be established in his defunct cortex. He remains, therefore, a mental bankrupt, dependent for living on the ministrations of others. The normal child, however, by means of incessant conditioning through external agencies or situations, establishes the power of precise and proper adjustments to ever-changing conditions.

The cerebral hemispheres, being the highest part of the central nervous system, constitute the organ which accomplishes the most complex reflex activity. Besides positive functions, the cerebral hemispheres develop enormous inhibitory activity which exhibits all the characteristics of conditioned reflexes. These inhibitory reactions are like positive conditioned reflexes, temporary, acquired, changeable reactions representing the highest degree of adaptation. Cortical inhibitions manifest themselves in various forms, *e.g.*, extinction, differentiation, and delaying of the conditioned reflexes, and the formation of conditioned inhibitions such as sleep, hypnotic states, these last states being manifestations of the same nervous phenomenon. The mechanism of conditioned inhibition is a powerful regulator of the nervous activity of the child, and by means of this mechanism every conditioned activity may be stopped. Life is a series of conditioned activities successfully or unsuccessfully controlled by conditioned inhibitions. Unfortunately the inhibitions may be so severe as to blot out originality, freedom of self expression, normal co-ordination or initiative. During infancy and early childhood the parents, nurse, and others establish or impose endless conditioned inhibitions to regulate the behaviour of the child. Later, school, organized society, the State and the Church continue the conditioning of the inhibitory systems, and a personality of perhaps a mere cog in a wheel is created. Happy is the man whose conditioned inhibitions have been wisely induced, so that while master of his instincts and emotions he has not, in the process, had his self expression and enthusiasms stunted and warped.

Let us consider a conditioned reflex in relation to the salivary secretion. As an example: A man has never seen a grapefruit, and when put before him for the first time it evokes no gustatory sensation, pleasant or otherwise. It is to him a round, and perhaps uninteresting, yellow fruit. He partakes of the fruit and the taste is pleasing and very much to his liking. Not only will the acid taste, but also the pleasantness, increase his salivary flow, and a new conditioned reflex will be established. Now for years, and perhaps for life, the mere sight of a grapefruit when he is thirsty and hungry will set up an active salivary secretion. In other words, the sight of a grapefruit will make his mouth water. An external object (a grapefruit) has established a new conditioned reflex through the path of the sub-cortical salivary reflex tract. And so one might illustrate and analyze many familiar reflexes *ad infinitum*. One could, at this point, draw attention to the presence, especially in children and individuals of a psychic disposition, of a tendency towards unfortunate and unpleasant conditioned reflexes which may be extremely difficult to eradicate, or may even persist through life. Examples are: The individual who becomes faint and hysterical at the sight of a snake after being frightened or "conditioned" by his first encounter with such a reptile; or the uncontrolled attacks which appear with sudden noises in shellshocked individuals who have been "conditioned" in the war; another striking example was the case of a famous psychologist who throughout his life became ill at the sight of a mouse, after being conditioned by a mouse in early childhood. Frigidity, schizophrenia, hysteria, behaviour problems, inferiority complexes, etc., are often the result of conditioned reflexes improperly treated. Children frequently have persistent night terrors following an anæsthetic, after being conditioned by waiting for operative preparation, with the sight of instruments, and perhaps the sounds of other children coming out of an anæsthetic. Many people about to be operated upon are daily subjected to unnecessary psychic shocks in hospital. By means of the conditioned reflex the individual is connected with the outer world by innumerable living threads. How important, then, that in the young and in the physically and mentally ill, these reflexes should be of the proper character, and how tremendously important are the first educational conditioned reflexes used in treatment, and how fraught with possibilities when every change in the external media, even seemingly insignificant ones, are immediately reflected on a highly sensitive nervous receptor in the brain. Such reactions resemble the delicate light impressions conveyed through the microscopic lens of a modern camera to a super-sensitive colour film.

As a motor response Krasnagorski uses the tonic reflex of opening the mouth, and a grasp reflex, and as a salivary reflex the salivation from all the salivary glands. By this means he can study the effects of various stimuli —auditory, visual, thermal, taste, etc. Owing to the high reactivity of the brain and the extreme sensitiveness of the conditioned reflexes to causal stimuli, the physiologic investigation of the brain must be carried out under special conditions. Time will not permit a detailed account of the laboratory process, but it must meet the following requirements: (1) that the child must be isolated from all accidental stimuli; (2) complete quietness and comfort of the patient during the experiment; (3) perfect mechanizing of the experiment; (4) strict definite methods of conducting such an experiment.

Description of Apparatus and Lantern Slides

The methods used in the actual experiments and the apparatus are best understood by reference to the lantern slides, showing details of the mechanical devices and tracing charts. The experiments are carried on in two rooms; the inner room is a small sound-proof enclosure where the child lies comfortably on a couch, and is observed through a heavy plate-glass window. About the couch, or connected with the child, are arranged the various stimuli—skin stimulation, metronome, electrical buzzer, etc. Above

the child's mouth is a device with a trapdoor which releases into the mouth, at the proper moment, such food as candy, citrous fruit balls, cranberries, etc. On the wall in front of the child are arranged red or other lights for conditioning, the food being used to reinforce the conditioning reflex. Various stimuli, metronome, buzzer, etc., can be used either as reinforcements, or various other stimuli, such as skin stimulators, as inhibiting agents. In the child's mouth are placed light metal vacuum cups of various shapes, which can be adjusted comfortably over the orifices of the submaxillary or parotid glands. The saliva collects in the cups and is led out through rubber tubes, through the walls of the experimental chamber to the recording apparatus in the outer room occupied by the operator. The saliva, drop by drop, falls on a fine, narrow metal leaf, each drop making contact. This make and break is registered through a tracing needle on the paper roll of a revolving drum. The time in seconds is also recorded below, so that increase and decrease of salivary drops is accurately visualized. The jaw reflex is traced by a lead from the jaws to the revolving tracing sheet. Each application by the operator of various stimuli is also traced, so that the tracing in an experiment will show the time in seconds, the mouth and salivary reflex tracings in relation to the conditioned and unconditioned reflexes, and the application of stimuli for reinforcement or inhibition of conditioned reflexes. In this way conditioned and unconditioned reflexes can be charted and studied in all conditions, normal and otherwise, which have to do with the nervous processes of the brain. The action and dosage of drugs can also be estimated.

The temperature chart can also be related to the tracing made during any particular period of a disease, such as mumps, scarlet fever, typhoid fever, measles, etc. All the various connections, mechanical and electrical, make what appears at first sight a very complicated array of wires, levers and switches, but the technique has been so perfectly thought out and applied that each experiment can be exemplified under similar conditions and with unvarying precision. Besides the studies already indicated, the following have been investigated: Latent and refractory phases of conditioned reflexes, degrees of variability of vagus tonus, taste; various forms of epilepsy, endocrinal disturbances.

The discussion in this paper is general rather than particular, but it might be well to describe briefly the simplest form of conditioning. A child is selected for experimentation and care taken to explain that no pain or discomfort will be part of the test, and that pleasant food will at times be given through a mechanical device, hanging above the mouth. With the child resting comfortably the tubes and stimuli are quietly arranged. The child knows that food will be given during the experiment, but each time before this occurs a red light is flashed on the wall in front of the child, and a short time after the red light appears the food of a pleasant taste is dropped in the mouth. After a repetition of say 10 to 15 times the child associates the flashing of the red light as a signal that pleasant food is coming, or in other words, the red light has established a conditioned reflex. After this occurs the flashing of the red light at once produces an increase in the flow of saliva and also a jaw reflex—the giving of food reinforces both reflexes as shown by the acceleration in both saliva flow and jaw movements. With the reflex established, the red light alone is sufficient to start the conditions, but after repetitions without food reinforcement, the brain is taught that the red light does not now mean food and the reflex which was established is extinguished. Working from this simple conditioning all sorts of conditioning can be elaborated and studied from various physiologic angles and in various states.

The nervous system, then, may be looked upon as an organism in which reflexes of two kinds occur, namely: (1) conditioned or trained; and (2) unconditioned or inborn. The conditioned reflex is largely confined to the

cortical area but may also exist in the infra-cortical area. The cortical area is the area of government, the area of sorting out and examining and subdividing reflexes, the area also of radiation of impulse, the area of concentration, the area of inhibition, without which latter power we should be creatures of impulse and desire. The cortex is an organ of adaptation, and almost any individual can be damaged by unfavorable surroundings and impressions, with the establishment of unfavourable conditioned reflexes which may persist in some cases through many years. Pavlov at first considered conditioned reflexes as only temporary, but his work was only with dogs. However, Krasnagorski, working with children, has definitely established that the cortex does not forget, that is that conditioned connections may even be permanent, and if very intense persist for life. They can be, as in neuroses, inactivated or even eliminated by careful treatment. In normal individuals they may lie dormant and be re-established after years of dormancy. Consider the example of a musician whose musical cells have been properly conditioned by musical training. Through circumstances he may for years allow his conditioned reflexes to be in a dormant state through not playing. Howover, even after many years this musical reflex may be quite quickly re-established. This means that the trained musical cortical cells did not forget, but the conditioned reflex was only dormant or quiescent. It is evident that we have many cells which ordinarily are not exercised. Therefore the brain is capable, if protected from disease, of developing many new complexes or achievements. This power of new achievement exists under favourable circumstances even to old age. Pavlov until the last two years of his life continued to make valuable new scientific observations. At 83 he presided at, and read a paper before, the International Congress of Science. We need not cease to achieve at 50 or 60 years of life, or even at 70, if no gross pathological change exists.

Individuals may all be classified into the following types: (1) *Well-balanced normals.* These individuals have normal cortical reactions, that is, they have a sufficiently strong cortex to regulate their reflexes normally. They have a suitable balance between the cortex and sub-cortex, with the cortex governing. Such people may not attain the greatest heights in creative genius or in the arts, such as music and painting, but they do not tend to descend to the depths of despair and have inhibitory complexes under stress. They have such good cortical control that they can settle difficulties equitably, and have the faculties of being contented and able to accommodate themselves quickly to changing situations.

(2) *The sub-cortical type.* These individuals are normal but have strong impulses and instincts, are often hot-tempered, impetuous, usually artistic and at times very brilliant. They do not, however, regulate their reflexes well. Pavlov considered that he and Krasnagorski belonged to this class.

(3) *The cortical type.* These individuals are the potentially hypo-sensitive. They are coldly calculating, unemotional, and the cortex overcomes or inhibits most of the sub-cortical impulses. They are not artistic and are often devoid of natural feelings. Emotionally they are cortically inhibited individuals. They may be great organizers and, having few inhibitions, may become leaders. If their cortical inhibitions have been good they may be great statesmen, but if their cortical inhibitions have been bad dire results may follow.

(4) *The energetic hysterical type.* They have weak cortical control with an unstable sub-cortical development. In place of artistry they often show hysteria. These individuals may go gradually or quickly, if improperly conditioned, to pathologic change such as schizophrenia. Unfortunately the psychopathology of such individuals is sometimes not recognized soon enough.

All these types can be exemplified by conditioned reflex tracings. The so-called lie determinator is only a modern adaptation of the physiologic

teachings of the nervous reflex activity of Pavlov and Krasnagorski. It is necessary for teachers of children to give some consideration to the different types of their pupils.

At birth there are no conditioned synapses, all cells being "physiologically disconnected" in this respect. After birth the stimuli of surroundings, food, etc., immediately begin to create connections. While not advocating medical treatment in pyloric stenosis, one can, through an understanding of the conditioned and unconditioned reflex arc, appreciate success which has been obtained by some physicians with this treatment. The good results can be explained by the ability of certain drugs such as phenobarbital, acting chiefly through the sub-cortical areas, to prevent or disassociate conditioned synapses which occur so early in the course of the disease. With a well established, conditioned vomiting reflex, the hypertrophy of the muscle at the pyloric orifice increases very rapidly in a few weeks' time. It was interesting to learn from such an eminent pædiatrician as Professor Ylppo of Helsingfors that in two large children's hospitals under his guidance there had not been one operation for pyloric stenosis in two years. Their mortality compares favourably with results in clinics where early operation is performed.

The study of epidemic encephalitis and certain types of idiocy contributed greatly to the knowledge of the physiologic function of the infra- or sub-cortical regions. These are the parts of the nervous system where the most complex co-ordinations of innate or unconditioned reflexes are accomplished.

The facts about conditioned and unconditioned reflexes have been known for years. Perhaps the accuracy of determination and the wide application of studies and treatment of many functional and pathologic states is not so thoroughly appreciated. The reflex reactions in normal states have been thoroughly and definitely established and the reactions in functional and pathologic states have been the subject of much experimentation. Contrast charts in different conditions can now be carefully compared and deductions as to treatment, progress and prognosis can be accurately determined. Also, with the salivary secretion reflex determination, the most accurate deductions as to effect and dosage can be made with certain drugs acting on the central nervous system, such as alcohol, adrenalin, pilocarpin, etc. From Krasnagorski's work the following statements can be made: With 45% alcohol a dosage of 2½ cc. to 5 cc. is sufficient to produce in children definite reflex reactions. By this dose inhibiting reactions and depression of the cortical areas can be demonstrated, that is, there is a decrease of cortical and an increase of negative or sub-cortical control. The cortical areas are very susceptible to alcohol in children. As a stimulative drug up to 1.5 cc., after this it decreases cortical control and causes sub-cortical excitation and depression. The dose for cortical stimulation in infants has been estimated by Krasnagorski as 0.05 cc. of 45% alcohol per kilo of body weight. With such definite dosage now known, one can say quite definitely that the stimulative dose is so small and the depressive phase so quickly reached, that the use of alcohol as a stimulant in children is practically useless, and in doses usually employed is positively depressant and should be discontinued. In the social and therapeutic doses of adults, the cortical inhibition is so marked and the sub-cortical stimulation so increased, that the individual has the sensation of a stimulative but confused sub-cortical phase which is, however, physiologically depressant. While visiting at Pavlov's villa, I heard the story of the escape from confinement of a male ape. In passing through the laboratory he picked up a small bottle of alcohol, which he proceeded to drink after taking refuge in a tree. In a short time he began to grimace, gesture and make a great fellow of himself in the usual manner of a human inebriate. Finally, in attempting a balancing act, he toppled to the ground in a drunken stupor. Thus an ape that could not in a normal state be conditioned to compare cortically with humans, could, under the influence of alcohol, demon-

strate the sub-cortical excitations of the human under similar circumstances.

Scientific knowledge, to be of value in medicine, must have clinical applications. What use can one make of the knowledge gained through studies of conditioned reflexes? The benefits to be gained are startlingly extensive through a knowledge of the physiology of reflexes, and the weaknesses and fallacies of certain therapeutic agencies can be explained and understood in a clearer manner. It will be possible to mention only briefly a few of the states or conditions in which this physiology may be applied advantageously.

Sleep

Sleep is one of the states of hypo-excitability. Hess of Zurich, after experimentation, concluded there was a sleep centre, but his theory is not correct. He introduced fine electrodes into the sub-cortical areas of cats and with slight electrical currents the animals purred, licked themselves and went to sleep. If the current was interrupted the cats awoke. He concluded, therefore, that there was a sub-cortical sleep centre. This thory of sleep does not, however, explain the phenomenon satisfactorily and indicates that sleep is the result of stimulation of sub-cortical cells and is therefore a phenomenon of stimulation rather than one of cell relaxation and rest. Pavlov, Krasnagorski and others have proved it to be a cell rest period. Every cell, if exhausted, tries to defend itself by decreased excitability or activity; that is, there is a defense hypo-excitability to protect individuals from further fatigue and exhaustion. As soon as motor cells become tired, then defense inhibitory reactions begin. For example: closing the eyes stops optical stimuli and induces sleep. One cannot sleep when standing because immobilization and the cessation of stimuli is impossible. Quietness causes a decrease of acoustic stimuli, and with this diminution in stimuli the exhausted cells begin to decrease their excitability and the pre-sleep state begins. In this state there may be radiations of potential excitability which spread over the cortex, producing confused thoughts. For example, after hunting during the day, one might at night, in the pre-sleep state, think of ducks, game, etc., but in a muddled fashion, giving a confused jumble with thoughts vaguely or partially connected with the day's happenings. With approaching sleep, radiations in the sub-cortical areas proceed quickly, but as soon as contacts through the thalamus opticus are interrupted, sleep occurs; that is, sleep is a state of interruptions of connections between the brain and other organs and no one is conscious of the exact moment of sleep. In sleep, isolated, cortical processes occur and produce dreams which are indefinitely related at times to waking conditions. For example, in European countries where famine has been so prevalent, dreams of fat, butter and cream and other foods are frequent. Physiologically speaking, there are only two types of dreams: (1) Those of cortical origin occurring in cortical individuals after concentration during the waking hours. In such individuals intense thoughts may persist through sleep. Hence, probably, the idea of sleeping over problems. (2) Sub-cortical dreams, where extra-cortical excitations predominate. For example: people suffering from thirst will frequently dream of water; with famine, of fat, or other foods. Therefore it is best to use dream interpretations in a physiological sense. One should determine whether the dreams are cortical or sub-cortical and not attmpt to place too great significance on sub-cortical dreams. Naturally the people of sub-cortical type—that is, individuals with strong sub-cortical activity and relatively poor cortical control—will dream more often and have more varied confused dreams than individuals with well established cortcial inhibition. Further, those belonging to the hysterical type will indulge in all sorts of weird sub-cortical excitations. The sleep-walker is usually a normal sub-cortical type and his excitations can often be controlled by phenobarbital, a drug which influences chiefly the sub-cortical area.

This simple interpretation seems to eliminate much of the significance attached to dream interpretations by some psycho-analysts and should also

alleviate some of the dreads and fears of the functionally nervous patient. The physiological explanation of dreams and of sub-cortical excitations in fatigue, and in psychopathic states, places grave doubts on many of the original teachings of Freud. I understand from information received in Vienna that Freud in later years has greatly modified some of his early views.

Hypnotic State

In the hypnotic state the cerebral hemispheres are intensely inhibited except for very restricted areas, which remain as when awake, leaving an open pathway for stimuli which pierce or penetrate the conscious area because of the inhibition of other parts. The hypnotized individual, with a cleared line of communication reserved chiefly for the acoustic stimuli of the operator, becomes temporarily, through the extensive inhibition of the closed areas, completely in the power of the hypnotist. The restricted conscious area is therefore supremely susceptible for conditioning, and naturally any conditioned reflex will be more intensive and more prolonged after awakening than if established when fully conscious. This explains the much more prolonged and successful conditioning that takes place in the treatment of dipsomania, schizophrenia and other psychoses, if the treatment is carried out at first under hypnosis. Hypnosis has proved beneficial not only in dipsomania, but also in the elimination of conditioned nervous habits of the schizophrenic, the psychotic, and other nervous patients. In hypnosis the individual responds to quiet repeated stimulation, and, needless to say, the antics and hand passing of the stage hypnotist are on a par with the horseplay of the professional wrestler. In a hypnotic trance and in hysteria, stable conditioned reflexes may be established in the waking or alert areas of the brain, and the reactions arising persist as segregated process remaining outside the consciousness of the person. Such patients perform conditioned reflexes without knowing why they do so. In dipsomania the vomiting and nausea associated with the aroma of liquor is therefore more firmly conditioned and the disgust more inherent if established under hypnosis. The conditioning is therefore more successful and prolonged. Some of you may remember the account in *Time* of the woman who murdered her husband, and, after being accused and incarcerated, went into a hypnotic trance. She resisted all efforts of restoration to consciousness, but being of the hysterical sub-cortical type her small restricted conscious brain area was vulnerable to the acoustic stimulation of a physician trained in hypnotism, and he was soon able to bring her back to wakefulness.

Myxoedema

In children suffering from endocrinal disturbances, especially myxœdema, definite types of conditioned reflexes are found. As there is a definite curative hormone in myxœdema, improvement under treatment can be definitely co-related by reflex tracings. The insufficient production of the hormone thyroxin greatly influences not only cortical but infra-cortical reflexes. The conditioned secretory reflexes in myxœdema are greatly reduced and the motor reactions are also decreased, that is, they are weak, slow and inert. A great decrease of the excitability of the sub-cortical cells leads inevitably to the decrease in excitability of the corresponding cortical fields; or to speak in clinical terms, continued decreased excitability in the sub-cortical areas will inevitably lead, in untreated or insufficiently treated myxœdema, to degeneration in the cortical fields. The necessity of early diagnosis in myxœdema cannot be too vigorously urged and it should be remembered that two-thirds of the actual growth of the brain takes place during the first two years of life. How unfortunate, then, that myxœdema or even hypo-thyroidism of mild character should go unrecognized until the effect of treatment is definitely limited. There are in all goitre belts many untreated cases of mild hypo-thyroidism. In severe neglected cases of myxœdema the same characteristic changes of the cortical activity are found, as seen in congenital

idiocy, that is, slow establishment and decreased magnitude of reflexes, long latency, and after-effects of long duration. In normal children the curve rises rapidly after a short latent period, attains its maximum within the fraction of a second, then remains on the same level as long as the stimulation lasts. In myxœdema the motor response rises slowly, reaching its maximum only after 7 to 14 seconds or more. Thus, physiologically, by the Pavlov-Krasnagorski methods one can prove that insufficient supply of thyroxin leads to great impairment of the function of the associated mechanism of the cortex. Time will not permit a comparison of secretory activity tracings in myxœdema and hyper-thyroidism and the normal state.

In all cases of myxœdema showing clinical improvement, a corresponding improvement in the conditioned reflex activity occurred and treatment raised not only cortical but infra-cortical excitability, increasing both unconditioned and conditioned reflex activity. If, before treatment, the conditioned salivary reflexes was producing only 2 or 3 drops of saliva, after treatment 6 to 8 drops was produced.

An expert physiologist such as Krasnagorski could, in certain nervous derangements, diagnose conditions and probable progress under treatment through a study of the patient's reflex tracings. Therefore it is gradually becoming possible to employ, in certain conditions closely associated with the cerebrum, physiological reflex tracings in the same manner as a cardiologist would employ tracings in cardiac conditions.

Rickets

The physiologic study of the activity of the brain in rickets is of especial interest to pædiatricians. It has always been apparent that the rachitic child manifests certain clinical nervous manifestations and in very severe rickets I have seen mental backwardness diagnosed. In one case, I know of a rachitic child being temporarily committed to a mental institution. Through conditioned reflex studies the physiologic mental disturbances in the disease can be explained and understood in a much better way. As far back as 1913 it was demonstrated that the conditioned reflex activity is considerably disturbed in rickets. The chief changes noted are: (1) The establishment of conditioned responses proceeds very slowly, being produced after 150 or more trials, where normally the reflexes will be established with 20 or 30 trials. (2) After establishment the conditioned reflexes are unstable and disappear periodically, perhaps for days. (3) The motor reflexes have a characteristic long latency, that is, 3 or 4 seconds, which time becomes shorter only after long training. (4) The orienting reflex is greatly decreased in rachitic children and they react only slightly to new stimulations in their environment. This explains the long continued apathy of the rachitic child even after being transferred from a bad, unhealthy environment to a brighter, more stimulating one. Experimentally, rachitic patients show fatigue much earlier than normal children, and inhibitory fatigue states or fatigue defense reactions, soon become manifest. (5) The inhibitory functions of the cerebral hemispheres is greatly disturbed in rickets and the abolishing of reflexes in these patients, as in idiots, is slow, and the re-activation retarded; that is, the re-activity of the cortical cells is considerably retarded. (6) Rachitic children universally show muscle degeneration, and if the myotonia is extensive the conditioned reflexes, following impulses originating in muscles, as with electrical stimuli, are established with greater difficulty than impulses following other stimuli, as, for example, red light stimulation.

Thus in a severe rickets one can demonstrate features similar, but of less severity and significance, than those seen in idiocy and myxœdema. However, the cortical disturbances in rickets are not permanent and as soon as the patients start to recover, these deteriorating changes improve and then, with care, disappear entirely. One can understand the mental backwardness that

might manifest itself in latent rickets persisting up to 8 or 9 years. This is a condition practically unseen in this country but has been described by Professor Findlay as being present in the slum children of Glasgow, where the bad food, bad environment and inclement climate all predispose towards the rachitic diathesis. The study of the cortical reactions of the rachitic child demonstrate a close connection between the general chemical make-up of the organism and the physiologic activity of the brain. This last statement seems to me of tremendous importance. From the intensive reflex study made by Krasnagorski in rickets, where one also knows the metabolic chemical changes, perhaps may come a more definite knowledge of the chemical changes, and associated physiologic disturbances in such nervous manifestations as neuræsthenia, various fatigue manifestations, and menopausal disturbances. With this knowledge one could anticipate more successful and intelligent treatment for these baffling conditions.

Bed Wetting

Krasnagorski's treatment for bed wetting is an ingenious combination of physiology and conditioned reflex training. The treatment consists of using the common knowledge that salt retains water in the tissues, and the establishment of a dry conditioning process.

The child is allowed a total fluid intake of between 30 to 40 ounces. Salt to taste is allowed in the first two meals. The last large fluid intake of milk or other fluid is given at 3:30 or 4 p.m., and then a dry and salt-free supper is given at 5:30 or 6 p.m. As the last fluid was given at 4 p.m. and was without salt, about 75% of the fluid intake will be eliminated in about 4½ hours. The child should then have voided most of his available water excretion by 8:30 p.m. At this time he is given one dram of salt in cottage cheese, or peanut butter, or an equivalent amount in salt meat sandwich. He voids and goes to bed, and usually within a week or ten days is pleased with his progress towards recovery. I have tried this treatment many times with success. It must be followed very carefully in every detail.

Masturbation

Masturbation in young children is a conditioned nervous reflex. As is well known, especially by pædiatricians, it is frequently seen as early as 6 months and chiefly in female children. Within the last few months I met with the following experience in my private practice. A girl of 9 years had her tonsils removed, and at this time it was discovered she had a vaginal discharge; the parts also showed signs of manipulation and scratching. The mother then told me that the sister of 11 years of age had been masturbating for some time. She had taught her sister of 9 years, and they both had taught a younger sister of 3 years. The mother was a nervous reticent woman, and had hesitated to tell me that when getting ready for bed the three children retired to the bathroom, locked the door, and proceeded to masturbate together. A conditioned habit which took one week to become established in two of the children will take much longer to be successfully eradicated. The habit will stop when cortical inhibition is established through gradual and sympathetic conditioning. One way to prolong the habit is to inflict physical punishment. The patient then usually develops a fear complex with other sub-cortical excitations which are temporarily relieved by a performance of the act.

Fatigue and Hysterical States

In hysteria the cerebral cortex is inclined to be in a segregated state with some areas active and some inactive. It is, on the whole, an inhibitory neurosis, and the patients cannot perform the work they could under ordinary conditions, or tasks that offer no difficulties to the normal individual. It is therefore essential to avoid conditions such as fatigue, which disturb cortical control and precipitate hysteria. Intense over-stimulation or monotonous

stimulations such as the continued blowing of a fog-horn may, in hysterical people, produce hypnotic and other psycho-pathologic states of long duration. Hysterical blindness, aphasia, paraplegia, and certain sexual disturbances are too well known to need further comment. It is important to remember that there is often, after hysteria, prolonged psycho-pathology. In general the treatment consists of rest, quietness, vitamines and general therapeutic measures, employing very weak stimuli. In psychoses the physician often leaves the tedious reconditioning too much in the hands of attendants who do not understand physiology, with the result that the patient may suffer from fatigue and nervous defense excitations as the result of therapy intended to produce the opposite effect.

Sufficient attention is not given to proper conditioning of nervous or hysterical children. Often one does not appreciate the delicate sensitiveness to external stimuli and the great reduction in concentrating power that comes with fatigue, hysteria and functional nervous states, etc. Great care must be exercised in creating a suitable atmosphere for educational work in hysterical children and in the reconditioning of the problem child. Time prevents a discussion of the similarity in physiology and reflex tracings in such conditions as over-fatigue, hysteria and various inhibitory states in malnutrition children. One should be aware of the toll demanded of the nervous system in childhood and adult life through indifference to early physiologic teachings. There is, I think, in the education of normal children, a tendency to commence too soon the inhibitory conditionings of education. The age period from 3 to 8 years is most interesting, because during this time the normal child develops not only initiative, orientation and some independence, but also brings into play those subtle qualities of creative genius and charm which go so far in later life to develop individuality if they are not blighted and suppressed by monotonous and often unsympathetic routine. One is not for the moment taking into consideration the dullard, the apathetic, the problem or mentally backward child. I hope also I fully appreciate the many difficulties of our early educational system and the necessity of providing educationally the greatest good to the greatest number of taxpayers. Still, giving all sides due consideration, would it not be well to consider more the importance of preventing the psychic shocks and physical defects and fatigue states that are precipitated through the regular and exacting requirements of education at too early an age? Certainly in most cases physical and cortical control and power would be greater at 15 years of age if children were admitted to school at 7 years instead of at 6 years, or, as now permitted in Vancouver, a few months before the sixth birthday. After fairly careful observations made in Vancouver during many years, one can state that excellent posture is not present in 10% of all children coming to clinics, nor in 15% of all children coming from the best homes in our city. Poor posture means some degree of malnutrition or improper muscular development. In either case, physical fatigue is easily produced, and physical fatigue goes hand in hand with mental inertia and fatigue defense cortical inhibitions, which dull the keenness of endeavour and the zest for knowledge. Certainly also that nation which guards the mental, psychic and physical requirements of its young children will have fewer misfits and neurotics and more men of individuality.

In many cases early education might very advantageously be limited to the opportunity of expression by drawing (not spoiled by routine methods and instruction), by modelling, also without specific instruction, by simple forms of dancing or by singing. The idea in such education is not to create artists, but to permit early self-expression which will enable children to express their own inner thoughts and desires and thus be able to employ their leisure more or less independently without the use of numerous toys, radios, phonographs and other stimuli so dear to the hearts of many Canadian and American mothers. During this early period of life the child's innate thoughts should be developed through expression, not through repressive routine. Cer-

tainly the ideas and methods of others are too frequently imposed on children at too early an age. If our children could gain confidence and preserve individuality through early self-expression, they would be able in adult life to face the future with more equanimity. If anyone is interested in this type of training I would recommend a study of the methods employed by Professor Czeck in his art classes in Vienna.

Speaking generally, it is appalling to note the lack of interest in proper reflex conditioning in hospitals and the disregard for dangerous conditioning which goes on in hospitals and clinics for the treatment of functional nervous disorders. Such simple errors during the first few days of treatment as the ordering of numerous laboratory tests, repeated examinations by members of the house staff, continuous unnecessary noise, observation by the patient of the nervous conditioned habits of other patients, frequently establish bad conditioned reflexes which in the adult patient may take years of tedious treatment to eradicate. Early treatment should, if it does nothing else, protect the individual from added dangerous sub-cortical excitations during the time when cortical control is so thoroughly inhibited. The depth and durations of improper reflexes established at this stage is comparable with the length and intensity of reflexes established under hypnosis. Often in acute cases it is necessary to protect the nervous system by profound narcosis for several days. The observations of Professor Weir Mitchell are as sound today as when first pronounced. The alleviation of unnecessary fears and the elimination of unnecessary noises are two things that could be given greater consideration in all hospitals. Many of our institutions show either an ignorance of, or a disregard for, the knowledge of the physiology of the central nervous system evolved by Pavlov and Krasnagorski. While appreciating the extremely valuable work done in large clinics and the many limitations imposed by necessity, one wonders at the expense and elaboration of technical appliances which often go hand in hand with conditions which greatly disturb the dynamic equilibrium of the central nervous system of the patient. Most hospitals and medical offices, modern and otherwise, seem to have been constructed with very adequate facilities for the prevention of noise conditioning, and should there be any Doubting Thomases in this audience, I would suggest that they try the experiment of sojourning for a few days in the ward of a public hospital. I would venture the opinion that their respect for conditioned reflexes will, in most cases, be awakened. The treatment of functional nervous cases in large noisy clinics and the average time devoted to individual cases in psycho-analytic and child behaviour clinics also indicates an insufficient respect for the dangers of psycho-pathology.

Fatigue and Neurosis

One of the most important causes of cortical neuroses is fatigue or exhaustion of the cortical cells. When the cortical cells become tired they defend themselves by inhibitions, ceasing to respond to stimulation. Sometimes for days, even weeks, the stimulation of such cells (say by school work and routine) will produce inhibitory effects. This explains the very wrong conclusions sometimes given about nervous fatigued school children. It is obvious that that examinations, I.Q. and other tests, taking during the inhibitory fatigue period, would be very unfair estimates of the child's real mental ability.

Another fundamental cause of cortical neurosis is the conflict between excitory and inhibitory processes. The conflict arises when the child has to inhibit quickly some intense conditioned or unconditioned activities, as when a nervous child (trying to keep quiet when he has a conditioned nervous twitching) is questioned in classes and put under the test of examinations.

The physiology of conflicts and conditions under which they arise should be well known by both the physician and all who participate in the education

of the child. By careless development of inhibitory habits and an incorrect or too casual estimate of the intensity of excitations, one risks the development of disturbances of depth and duration. It may seem that I have dwelt rather long on some safeguards that are apparent. However, every week every pædiatrician sees children with conflicts and other manifestations. In certain types of children definite neuroses show as early as the second year of life. What will be the nervous future of these children if improperly treated? Another danger seems to exist. There is at least some danger that in the absorption of many ideas and influences from other nations we may crowd out some of those well-balanced cortical reflexes which are characteristic of the best people of the British Isles. If one who is past mid-life might be allowed to reminisce, I might suggest that if we employed our leisure time more in the English fashion, if we were content to proceed more leisurely but perhaps more effectively in our more serious endeavours, perhaps we should, say in fifty years, set an example to the world as the most self-reliant, commonsense young nation in the world. Many Europeans think that people in North America do not allow themselves the time to become philosophers.

Before concluding, may I apologize for presenting certain physiologic truths without accompanying laboratory data. Time, of course, prevented this. May I also apologize for hopping from neuroses to rickets—from myxœdema to masturbation. My excuse is that I wished to intimate that these teachings have many applications, and that they may even fit in with a more perfect philosophy of life.

One cannot in a short period begin to mention the many interesting clinical applications brought out by Krasnagorski in his painstaking laborious investigations during the last thirty years. A consideration of this work will, however, give the physician a much better physiologic background with which to study and successfully treat his patients. It will also enable medical science to eliminate some antiquated treatments, discard some faulty hereditary beliefs, and will create a greater sympathy and understanding between the patient and his physician. It may even enable the physician to protect himself against some of his own bad conditioning.

TRAUMATIC ENUCLEATION OF FIBROMA

Case Report by Dr. H. R. L. Davis

The patient, a woman of 64, had had a small tumour on the palmar surface of the middle phalanx of the left index for many years. It was just mesial to the flexor tendors and not attached to the overlying skin.

On September 14th, 1937, the finger got pinched between the rollers of an electric wringer and the tumour was extruded through an opening in the overlying skin, being perfectly free from the tissue. It came out like a pea from a pod. Examination shortly afterwards showed an opening ⅞″ long, slightly curved and immediately over the previous site of the tumour. The edges were drawn together, a dry dressing applied and healing by first intention was complete in a week.

The pathologist's report furnished by Dr. H. H. Pitts is as follows:

"*Macroscopic examination*: Specimen consists of an ovoid well circumscribed, firm tumour mass, 1.2x0.7x0.8 cm. On section it presents a firm, fairly homogeneous, greyish-pink, fibrotic appearing cut surface.

Miscroscopic examination: Sections through the tumour mass show it to consist of very dense, almost hyaline, quite mature fibrous connective tissue, with here and there very fine calcarious deposits. There is no evidence of any malignant process in any of the sections examined.

"*Diagnosis*: Fibroma durum of finger."

DEODORANT PADS

DANIEL MCLELLAN, M.D., C.M., B.A., *Vancouver, B. C.*

Down through the ages, Medicine and surgery have advanced all along the line, except in one salient, viz.: the elimination of offensive odours. From the time that the caveman hunted the woolly rhinoceros and beat his enemy with a club, human flesh has been heir to suppurating and gangrenous wounds with their consequent malodours, stinks and stenches. Primitive man accepted this as part of his lot. He either endured, ignored, or enjoyed "bad smells."

But that was in the dawn of human intelligence—according to scientists, millions of years ago. There is nothing in that to wonder at. The marvel is that in the year A.D. 1937, in spite of our almost perfect surgical technique, our hospital wards and sick rooms in the home still reek with the stench of gangrenous and suppurating wounds. What surgeon is not familiar with the stink of B. Coli pus from a ruptured appendix, or the nauseating odour of osteomyelitis.

Efforts to combat offensive odours have usually been in the direction of substituting a more pleasant odour for an offensive one—for example, the burning of incense—or in overwhelming one odour with another. Very often the last state is worse than the first. Perhaps the most nauseating and cloying smell of all is a perfume superimposed on a disagreeable odour.

That these efforts have been fruitless is prove nby the fact that doctors, nurses and attendants still work in the midst of these sickening smells and that sensitive patients often suffer more from offensive odours than they do from actual pain. Substitution of one odour for another is *not* the solution. the answer is *abolition.*

The substance which will do that very thing was on earth probably before man arrived. THAT IS PEAT.

There are a great many kinds of peat, but the one applicable here is that produced from sphagnum moss. The use of sphagnum moss for wounds is said to date back to the ancient Egyptians. The British Columbia Coast Indians used it in making diapers for their babies, and it is claimed that it is still in use by the Alaskan Indians for that purpose.It was used in first-aid dressings in the Russo-Japanese war and as surgical dressings during the Great War.

This, however, was the actual moss, which, being long-fibred, soft and fluffy, lending itself readily to the making of pads, was considered a good substitute for cotton, which was scarce. It was gathered by hand, carefully selected, sorted and dried by those who wished to "do their bit" in the war that way. At the close of the war, when cotton was again available, its use for that purpose ceased.

It is now found that the screened peat which is the product of sphagnum moss, when properly enclosed in cellucotton and ganze, makes an ideal surgical dressing. That peot is a powerful absorbent and deodorant there can be no doubt. There may, however, be some question as to how it acts that way. It has the power of absorbing from 15 to 20 times its own weight in liquids, according to the degree of hydration, and although odourless itself, is probably the best natural deodorant in existence.

The following is the explanation which has been given:

The leaves and stems of sphagnum moss are made up of roundish or oval cells. In one end of each cell there is a minute pore through which the liquid is drawn by capillary action into the cell. Every schoolboy knows that a small phial filled with water, though turned upside down, will not empty itself. So the cells when filled, by the same capillary action retain the liquid. Foul-smelling discharges, when thus drawn into the cells, are imprisoned there.

This theory seeds to be borne out by the fact that to date there is no known method of forced drying of peat that will not destroy or impair its absorbent and deodorant qualities. It is piled up in airy sheds and allowed to dry in the air, and it takes two years to do it. Whether there is any chemical action, the writer cannot at present state, but it is believed the action is largely mechanical.

It would be a mistake to assume that any peat at all will do for this purpose. Chicken-raisers scatter peat about the floors of the henhouses, because not only is it a suitable litter for the hens to scratch in, but it was found that the henhouse remained sweet and clean for weeks on end without changing the peat. It is to this circumstance, or rather to an extension of this thought, that we owe the fact that deodorant pads are now available for hospital use.

However, the peat here used is not the crude material such as is used in henhouses. It is carefully selected, dehydrated, and refined. British Columbia peat is probably the finest in the world for this purpose. Samples have been obtained from many parts of North America, but none of these samples even remotely approach the quality of British Columbia peat for use in surgical dressings.

As it would be difficult to measure smells mathematically, personal reaction must be taken as our guide. The results obtained in cases tried out in the Vancouver General and St. Paul's Hospitals, and in private homes, were nothing short of amazing. Two cases, of many which could be given, will suffice to illustrate.

Case 1: A young boy, with a sloughing sarcoma of the arm, was being dressed every two hours. Four-gauze soaked in permanganate of potash solution was applied to the wound, while the larger dressings were impregnated with charcoal, in spite of which it could be smelt out in the adjoining hall. The stench was so nauseating that the boy often could not take his food; he vomited instead. When the deodorant pads were instituted, dressings were changed once in twenty-four hours, and in one instance were actually left on forty-eight hours. Not only was the boy freed from the pain of frequent dressings, which in his case was great, but the room was so free from odour that one morning on entering the room—a two-bed ward—the other patient was found sitting at the foot of the boy's bed reading a magazine.

Case 2: Empyema with rib resection; a two-bed ward, one bed empty. No attempt will be made to describe the odour. This was made a test case, the Assistant Superintendent of the hospital kindly consenting to witness whatever change might occur after the application of the deodorant pads. Before any change was made, he entered the room and readily agreed with the two internes present as to the general density of the atmosphere. Then the deodorant pads were applied. The next day he again entered the room, walking slowly towards the bed, endeavouring to get the odour as he went. It was not until he actually bent over the patient that he could detect any smell whatever. As a hospital man his first reaction was"We can now put a patient in that other bed."

While an endeavour has been made to more or less standardize the pads most in demand, they can be made of any size or shape to suit particular cases. They can be sterilized in the autoclave in the same way as any other dressing.

In applying the pads a few layers of moist gauze are placed next the wound, and the deodorant pad or pads *directly* over that. As the peat acts by capillary action the moist gauze "starts the lick." The wrong way is to pile on several ordinary pads and then the deodorant pad over all. It cannot get at the job that way. The pad should extend beyond all the wound edges,

and the more closely the edges are applied the better, as the odours are caught in trying to escape through the pad. It will often be found more economical to apply a smaller-sized deodorant pad first, and then a larger-sized deodorant pad over that.

Ointments of any kind desired may be applied to the wound; there is no interference. In osteomyelitis cases, after the wound is packed with vaselined gauze, deodorant pads made especially for that purpose are applied lengthwise and so as to surround the limb, the cast being applied over all. These pads are so constructed that a greater part of the peat contained can be placed wherever desired.

Although we so often hear the expression, "Doctor, spare no expense," it is nevertheless true that cost is a factor that must be considered. It is therefore necessary to state that in cases of profuse discharges, whether accompanied by very offensive odours or not, by using the deodorant peat pads a saving of 50 per cent and over can often be effected.

ANNUAL MEETING OF No. 4 DISTRICT OF BRITISH COLUMBIA MEDICAL ASSOCIATION

The annual meeting of the No. 4 Division of the British Columbia Medical Association was held in Revelstoke on October 4th. The attendance was rather small, and those who were unable to come may well regret it. Doctors Jones, Hamilton and Watson made every effort to give us a good time and they succeeded admirably.

Golf was the attraction for those who arrived on Sunday, and the course is a treat, if somewhat tricky. Monday morning everyone motored up the Big Bend highway to Goldstream for lunch. Dr. W. B. McKechnie had many interesting tales to tell of his trips up the highway many years ago, when he had to travel on horseback.

In the afternoon Dr. P. A. McLennan presented a paper on "Fractures Involving the Upper Extremities," and Dr. Lee Smith spoke on "The Urological Problems of the General Practitioner." Both papers were interesting and instructive, and we are grateful to these men for coming so far and giving us their time.

Those present were: Dr. M. W. Thomas; Drs. Irving, Willoughby and McNamee, of Kamloops; Dr. Alan Buck, Salmon Arm; Dr. W. B. McKechnie, Armstrong; Dr. Harvey, Vernon; Dr. Tyerman, Nakusp; Drs. Jones, Hamilton and Watson, Revelstoke; Drs. Henderson and Willits, Kelowna.

Following cocktails at the home of Dr. and Mrs. Hamilton, a banquet was held in the King Edward Hotel. After dinner the business meeting was held. It was decided by vote that the next meeting be held in Kelowna and that Dr. J. S. Henderson be the President and the representative of this District to the British Columbia Medical Association. Dr. R. E. Willits was elected Secretary and reported to the BULLETIN. Dr. Thomas then addressed the meeting, emphasizing the united front shown by the medical men in matters of medical economics.

The evening's entertainment drew to a close around the piano at the home of Dr. and Mrs. Jones, where everyone voted Revelstoke "tops."

—REBA E. WILLITS, *Reporter for No. 4 District.*

GREATER VANCOUVER HEALTH LEAGUE

Under the sponsorship of the Greater Vancouver Health League, an Institute on "Sex and Living" will be held in the Medical-Dental Auditorium, November 22-26.

Tickets will be $1.50 for the full series of lectures, and will *not* be transferable.

The lecturer, Nadina R. Kavinoky, M.D., was a delegate to the Pan-Pacific Women's Conference held in Vancouver in July of this year. Dr. Kavinoky is an Honorary Life Member of the Los Angeles County and California State Medical Associations. She is supervisor of numerous Mothers' Clinics of Los Angeles County, under the County Health Officer, and is a very public-spirited practitioner.

Further particulars will be forthcoming shortly.

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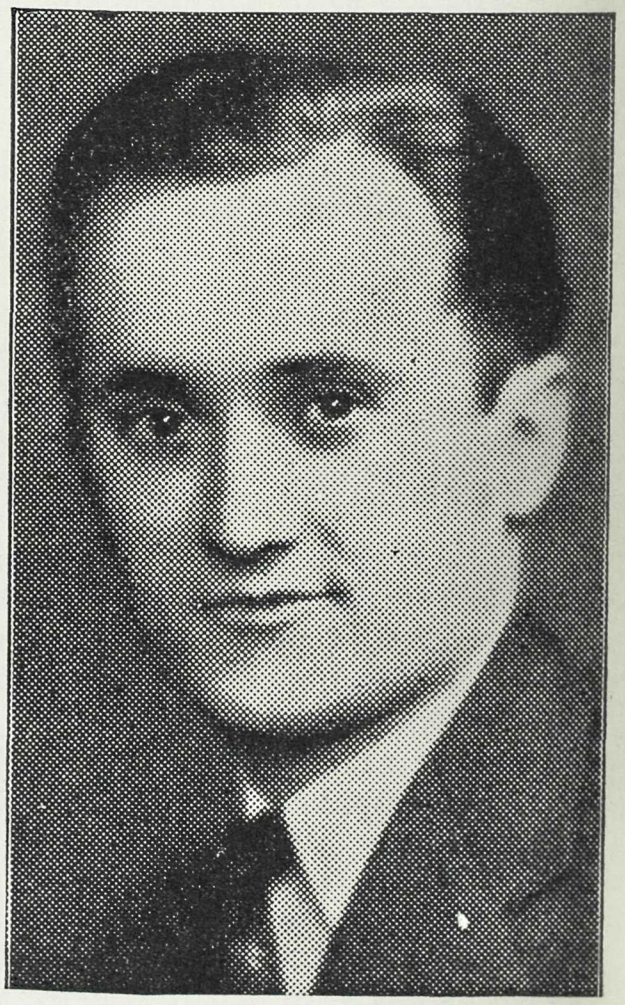

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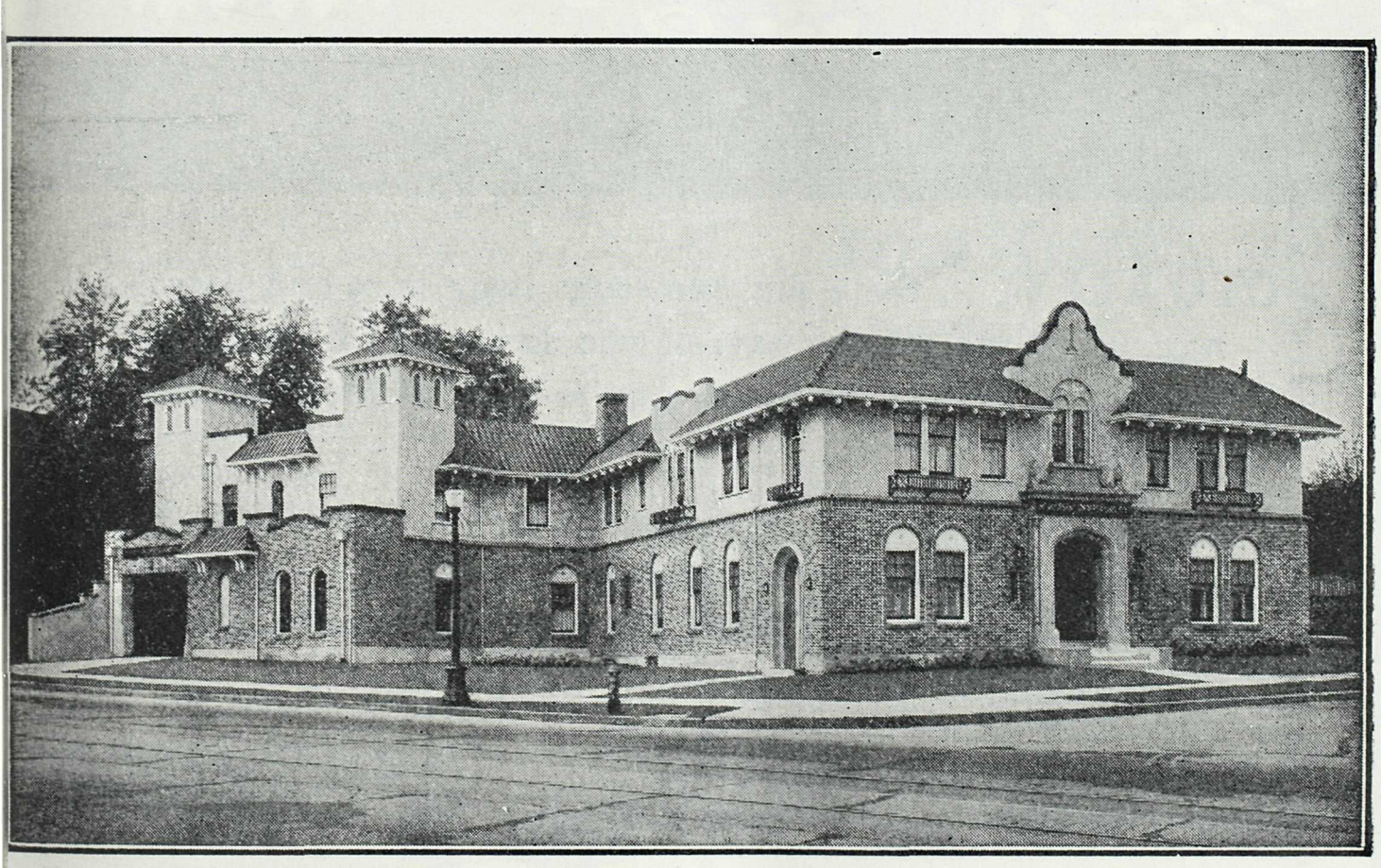

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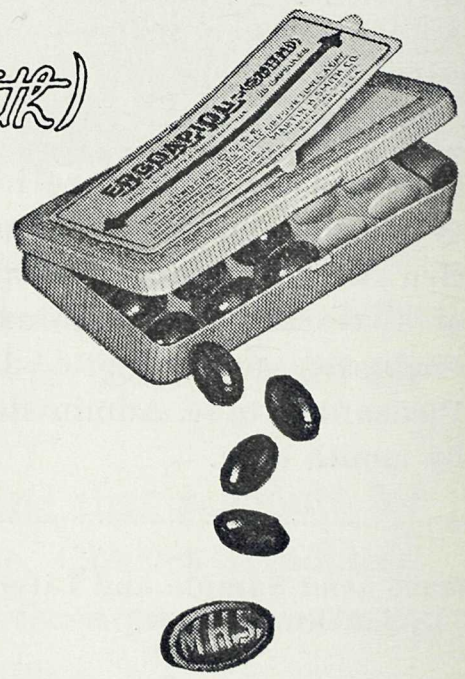

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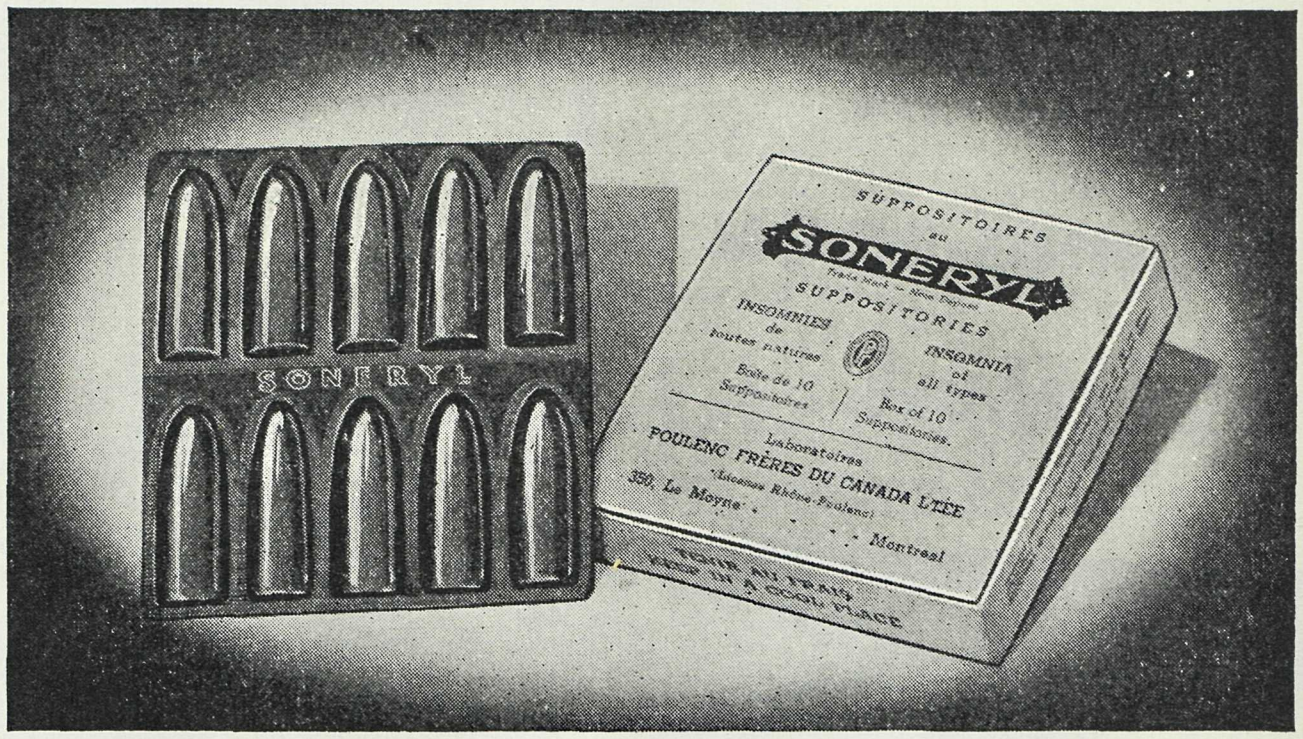

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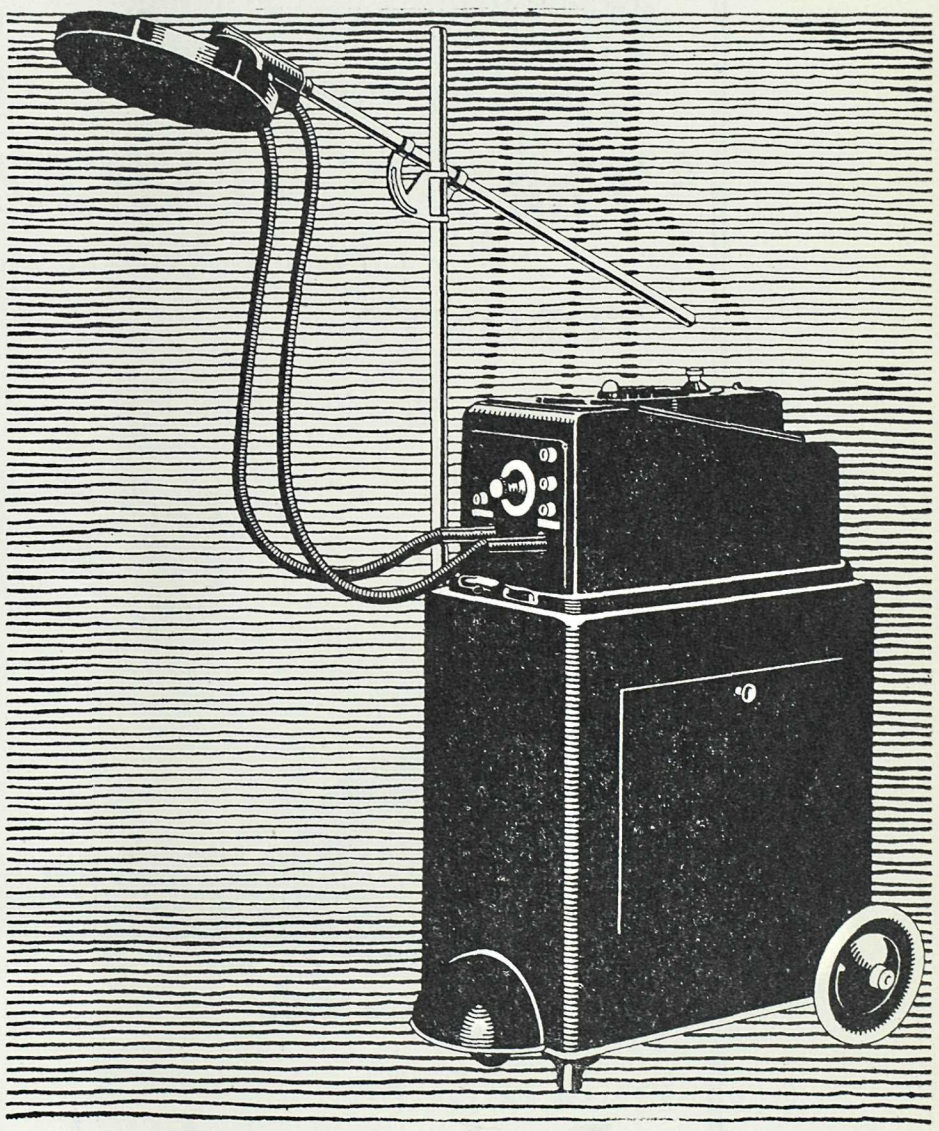

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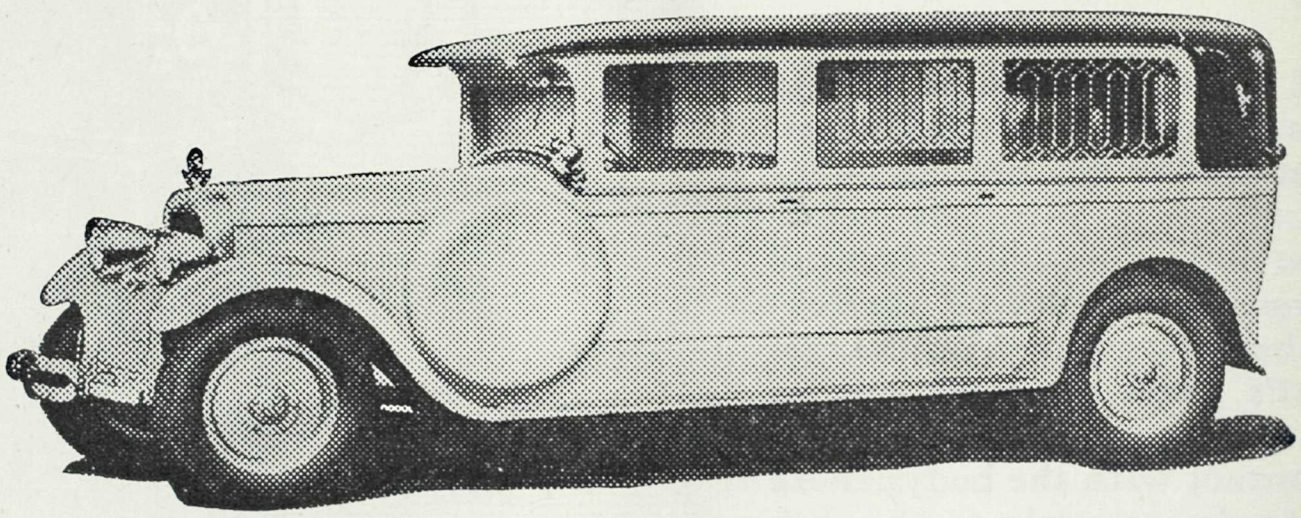

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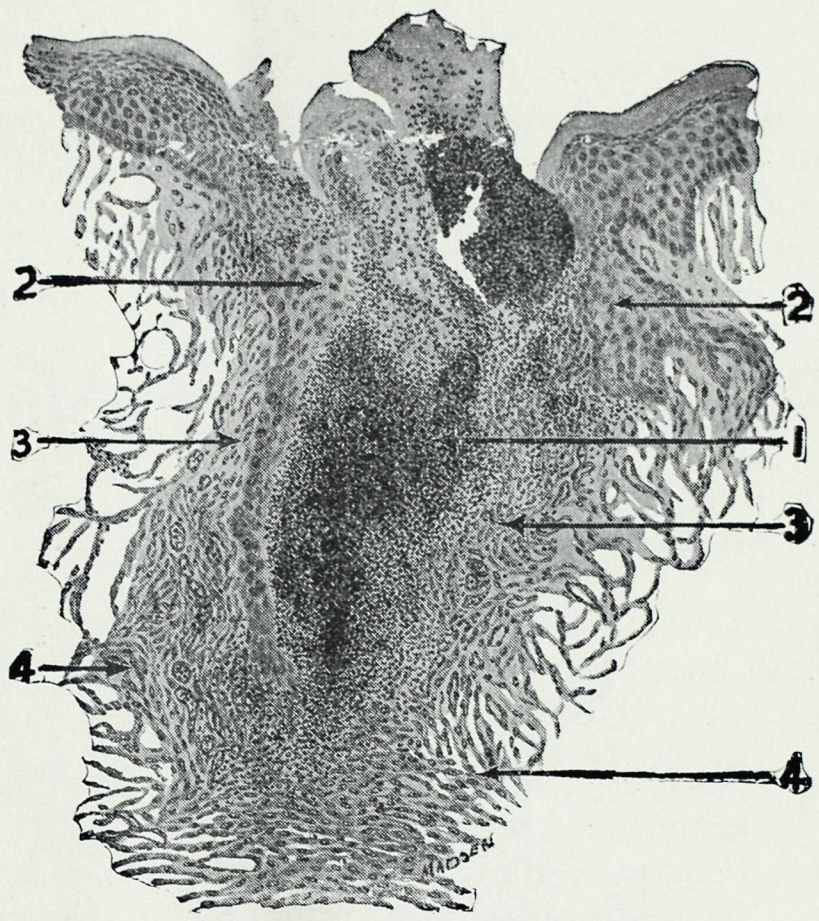

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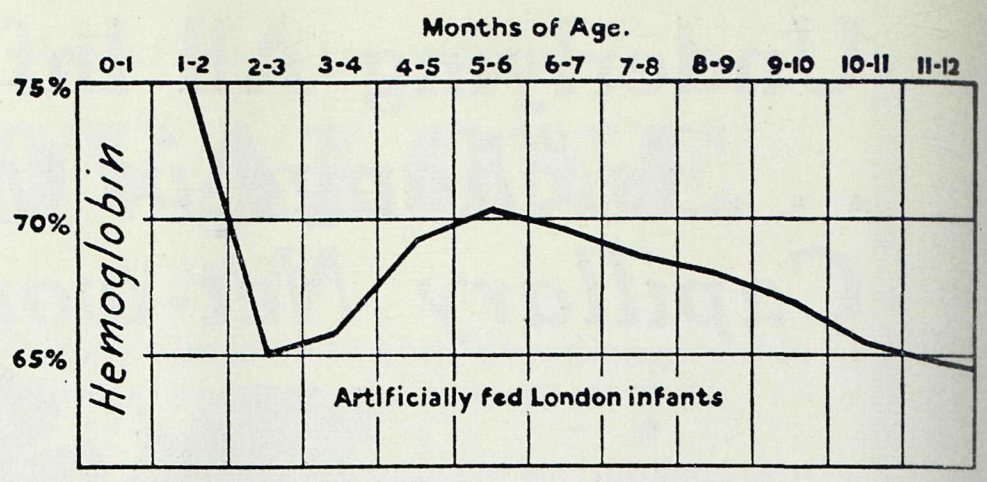
Nutritional Anemia in Infants



The accompanying chart of the hemoglobin level in the blood of infants is based on more than 1,000 clinical cases studied by Mackay. The sharp drop in hemoglobin during the early months of life has also been reported by a number of other authorities. It is noteworthy that this fall in hemoglobin has been found to parallel closely that of diminishing iron reserve in the infant's liver. The usual milk formula of infants in early life further contributes to this anemia because milk is notably low in iron. It is now possible, however, to increase significantly the iron intake of bottle-fed infants from birth by feeding Dextri-Maltose With Vitamin B in the milk formula. After the third month Pablum as the first solid food offers substantial amounts of iron for both breast- and bottle-fed babies.

Reasons for Early Pablum Feedings

1. The iron stored in the infant's liver at birth is rapidly depleted during the first months of life. (Mackay,[1] Elvehjem.[2])

2. During this period the infant's diet contains very little iron—1.44 mg. per day from the average bottle formulae of 20 ounces, or possibly 1.7 mg. per day from 28 ounces of breast milk. (Holt.[3])

For these reasons, and also because of the low hemoglobin values so frequent among pregnant and nursing mothers (Coons,[4] Galloway[5]), the pediatric trend is constantly toward the addition of iron-containing foods at an earlier age, as early as the third or fourth month. (Blatt,[6] Glazier,[7] Lynch[8]).

The Choice of the Iron-Containing Food

1. Many foods reputed to be high in iron actually add very few milligrams to the diet because much of the iron is lost in cooking or because the amount fed is necessarily small or because the food has a high percentage of water. Strained spinach, for instance, contains only 1 to 1.4 mg. of iron per 100 gm. (Bridges.[9])

2. To be effective, food iron should be in soluble form. Some foods fairly high in total iron are low in soluble iron. (Summerfeldt.[10])

3. **Pablum is high both in total iron (30 mg. per 100 gm.) and soluble iron (7.8 mg. per 100 gm.) and can be fed in significant amounts without digestive upsets as early as the third month, before the initial store of iron in the liver is depleted. Pablum also forms an iron-valuable addition to the diet of pregnant and nursing mothers.**

Pablum (Mead's Cereal thoroughly cooked and dried) consists of wheatmeal, oatmeal, cornmeal, wheat embryo, brewers' yeast, alfalfa leaf, beef bone, iron salt and sodium chloride.

[1-10] Bibliography on request.

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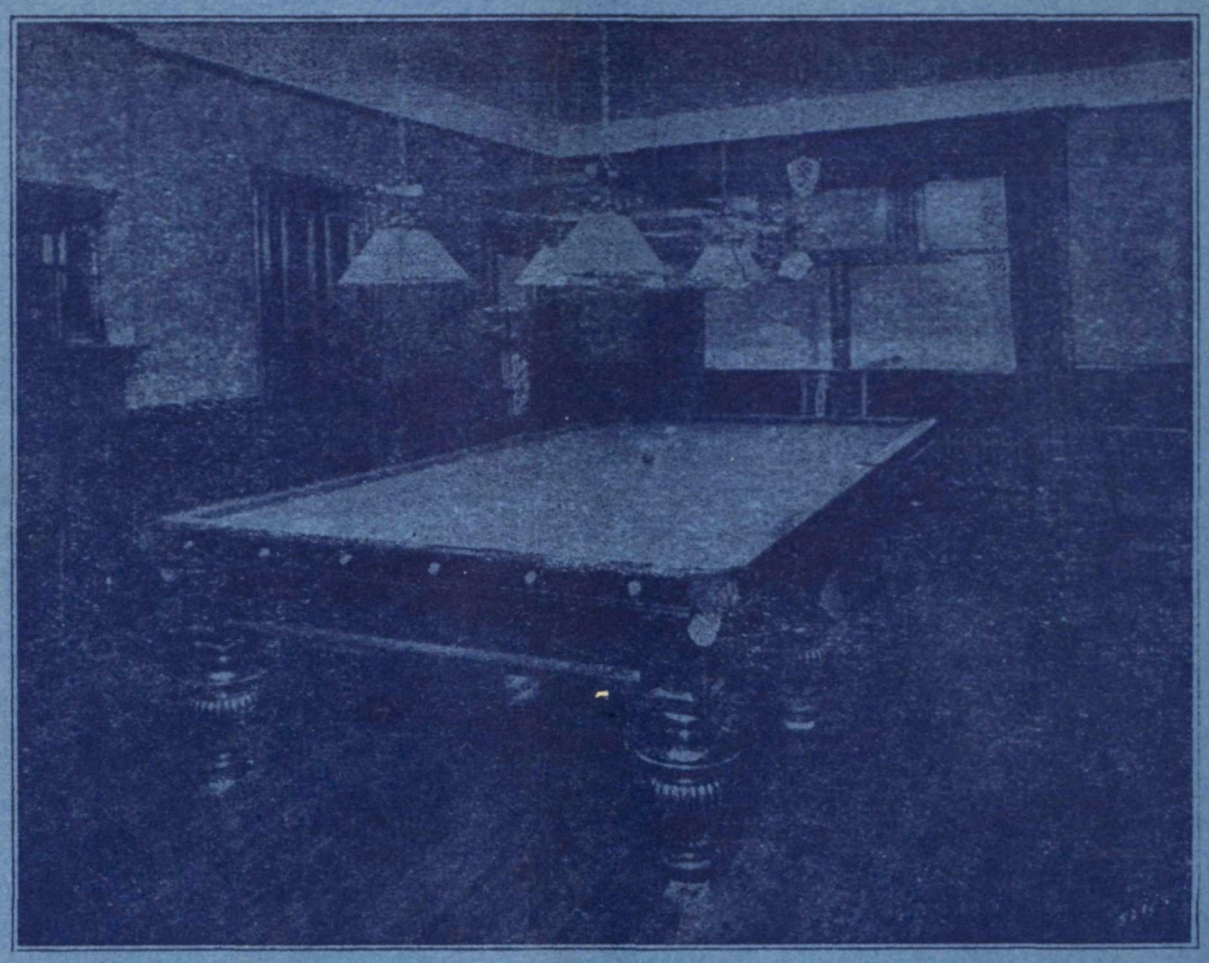

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