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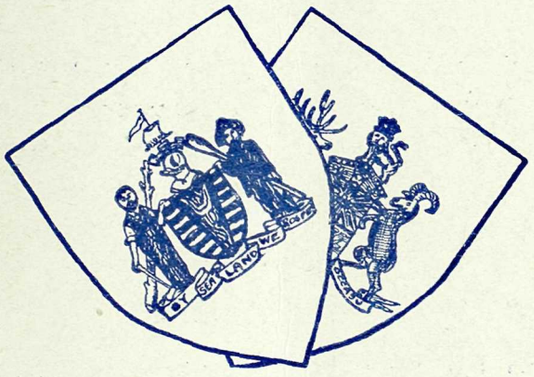
The BULLETIN
OF THE
VANCOUVER MEDICAL ASSOCIATION

Vol. XI. APRIL, 1935 No. 7



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THE VANCOUVER MEDICAL ASSOCIATION

BULLETIN

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Offices:
203 Medical Dental Building, Georgia Street, Vancouver, B. C.

Editorial Board:
DR. J. H. MACDERMOT
DR. M. McC. BAIRD DR. D. E. H. CLEVELAND
All communications to be addressed to the Editor at the above address

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Sickness and Benevolent Fund — THE PRESIDENT — THE TRUSTEES

THE American Medical Association is taking an aggressive stand regarding foods because of their close connection with the public health. This Committee has recently approved the following statement regarding pasteurization of milk. We quote "*Hygeia*," January, 1935, page 56.

DANGER IN RAW MILK

"Milk is an excellent medium for many dangerous bacteria as well as an excellent food for man.

"Disease germs may enter the milk directly from an ailing cow, be introduced by insects, or be transferred to the milk by the fingers or mouth-spray of persons having to do with the collection or transportation of milk.

"Once in the milk, some of the disease germs may multiply enormously. Extensive epidemics of typhoid, scarlatina, diphtheria, septic sore throat and other diseases are sometimes caused by contamination of milk supplies. Numerous cases of tuberculosis and undulant fever have been caused by raw milk.

"Even when great care is used in overseeing the health of the cattle and of the milkers and in maintaining the cleanliness of the dairy, there remain many possibilities of contamination.

"A milker may become overnight an unwitting carrier of some disease germ in his nose or throat; a typhoid carrier might be unknowingly employed in a most carefully conducted dairy."

PASTEURIZATION THE SAFEGUARD

"Since disease germs are readily destroyed by well established methods of pasteurization, all milk for direct human consumption or for use in ice cream, cheese or other milk products should be pasteurized according to officially approved methods.

"After pasteurization the milk should be so stored and protected that it will not be contaminated.

"Liquid pasteurized milk should be retailed in sealed bottles.

"The pasteurization of milk is a public health measure.

"The public should demand pasteurized milk for drinking and the use of pasteurized milk in milk products.

"The dairy trade should universally adopt pasteurization in the interest of public health.

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STATISTICS—FEBRUARY, 1935

Total Population (Estimated)	244,329
Japanese Population (Estimated)	8,037
Chinese Population (Estimated)	7,803
Hindu Population (Estimated)	276

	Number	Rate per 1,000 Population
Total Deaths	208	11.1
Japanese Deaths	6	9.7
Chinese Deaths	8	13.4
Deaths—Residents Only	197	10.5
Birth Registrations—		
Male, 179; Female, 142	321	17.1

INFANTILE MORTALITY—	February, 1935	February, 1934
Deaths under one year of age	8	7
Death rate—per 1,000 births	24.9	24.8
Stillbirths (not included in above)	7	11

CASES OF COMMUNICABLE DISEASES REPORTED IN THE CITY

	January, 1935		February, 1935		March 1st to 15th, 1935	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Smallpox	0	0	0	0	0	0
Scarlet Fever	45	0	57	0	14	0
Diphtheria	2	2	0	0	0	0
Chicken Pox	82	0	72	0	13	0
Measles	2	0	4	0	3	0
Rubella	2	0	4	0	1	0
Mumps	6	0	23	0	10	0
Whooping-cough	51	0	44	0	33	0
Typhoid Fever	0	0	0	0	0	0
Undulant Fever	0	0	0	0	0	0
Poliomyelitis	0	0	0	0	0	0
Tuberculosis	41	13	46	18	27	..
Meningitis (Epidemic)	0	0	0	0	0	0
Erysipelas	0	0	1	0	1	0
Encephalitis Lethargica	0	0	0	0	0	0
Paratyphoid	0	0	0	0	0	0

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VANCOUVER MEDICAL ASSOCIATION

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Programme of the 37th 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 Agenda.

General meetings will conform to the following order:

8:00 p.m.—Business as per Agenda.

9:00 p.m.—Paper of the evening.

1934.

October 2nd—GENERAL MEETING.

DR. G. F. AMYOT: "Infection, Its Spread and Control."

Discussion: DR. E. D. CARDER
DR. H. A. SPOHN.

October 16th—CLINICAL MEETING.

November 6th—GENERAL MEETING.

DR. C. E. BROWN: "Some Secretory Disturbances of the Stomach."

Discussion: DR. H. A. DESBRISAY.
DR. A. Y. MCNAIR.

November 20th—CLINICAL MEETING.

December 4th—GENERAL MEETING.

DR. A. B. SCHINBEIN: "Tumours of the Breast."

Discussion: DR. J. J. MASON
DR. B. J. HARRISON
DR. H. H. PITTS.

December 18th—CLINICAL MEETING.

1935.

January 8th—GENERAL MEETING.

DR. W. E. AINLEY: "The Relation of the Retina to Cardio-Vascular and Renal Disease."

Discussion: DR. W. D. KEITH
DR. WALLACE WILSON.

January 22nd—CLINICAL MEETING.

February 5th—GENERAL MEETING.

DR. MURRAY BLAIR: "Physiological Observations in Obstetrics."

Discussion: DR. W. S. BAIRD.

February 19th—CLINICAL MEETING.

March 5th—GENERAL MEETING.

THE OSLER LECTURE—DR. WALLACE WILSON.

March 19th—CLINICAL MEETING.

April 2nd—GENERAL MEETING.

DR. F. W. EMMONS: "The Surgery of the Presacral Nerve."

Discussion: DR. J. J. MASON
DR. F. TURNBULL.

April 16th—CLINICAL MEETING.

April 23rd—ANNUAL MEETING.

Summer School 1935

THE Summer School of the Vancouver Medical Association will be held this year on June 18th, 19th, 20th and 21st at the Hotel Vancouver. The committee has secured the following interesting and prominent speakers:

DR. J. W. BUDD—Pathologist at St. Vincent's Hospital, Los Angeles, will give lectures on the following four subjects: (1) Relationship between pathologist and clinician; (2) Foetal deaths due to aspiration of amniotic sac content; (3) Tumours of lymphoid tissue; (4) Endometriosis.

DR. WM. DOCK—Associate Professor of Medicine in Stanford University, San Francisco, will speak on the following subjects: (1) The significance of auscultatory findings in heart disease; (2) The actions and use of digitalis and quinidine; (3) Renal functions and types of renal failure; (4) Addisonian anaemia—a haemolytic anaemia due to failure of detoxification.

DR. VERNE HUNT—Clinical Professor of Surgery, University of Southern California, Los Angeles, is devoting two lectures to genito-urinary subjects and the balance of his lectures to gastro-intestinal surgery.

DR. CHARLES HUNTER—Professor of Medicine in the University of Manitoba, will give four lectures on subjects in Internal Medicine.

DR. E. PERRY McCULLAGH of the Cleveland Clinic, is speaking on the latest developments of clinical endocrinology.

DR. ARTHUR STEINDLER—Professor of Orthopaedic Surgery, University of Iowa, will speak on his specialty, whcih is always of great interest to the general practitioner.

Three speakers will give clinics, and in addition Davis and Geck will demonstrate movie-pictures of surgical procedure.

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EDITOR'S PAGE

Another Osler Lecture has come and gone, and the imposing row at the Head Table grows in length. The latest addition to its ranks, Dr. Wallace Wilson, fulfilled, in our opinion, all the requirements of an Osler lecturer, and we think that those who read his lecture, published in this issue, will agree with us. Resisting the facile temptations of monograph-writing, or the lazy man's refuge of compilation and highway robbery, he chose for the subject of the picture he drew, a section of medical history which, as he developed his theme, did all the things to his hearers that history, presented impartially, and heard without prejudice, should do.

It gave pleasure. We do not believe that this was Dr. Wilson's primary aim; but we do not see why one should be called upon to listen for a whole evening to a discourse which does not please, by its matter and manner of presentation. This lecture was a delight to hear. It was couched in clear, literary English; its style was pleasing, and it "listened well." Dr. Wilson was just allusive enough, and never pedantic, and he warmed the heart of one listener at least by pronouncing Latin in the Old Style, and not in the revolting mixture of Italian and Eastern European that is now regarded as the correct method. The speaker's manner of delivery gave the impression that he himself was enjoying the paper, and was intensely interested in his subject.

It was scholarly and shewed much more than a superficial knowledge of history, hastily acquired, as is a lawyer's, for the purposes of the moment. We have not forgotten the delightful contribution made by Dr. Wilson to the discussion of Dr. Appleby's paper on Henry VIII, when, called upon at a moment's notice to discuss a historical period, he shewed himself deeply and widely read on the whole subject, and amazed us all by the extent of his historical knowledge.

It stimulated us all. The study and proper presentation of history should, we feel, always have this effect. We do not agree with the sentiment attributed to the maker of a well-known automobile that "History is bunk." One can hardly believe that anyone who had ever read history could think this to be the case. History records human experience, and human failures and victories (perhaps chiefly the victories), and humanity, fundamentally, changes slowly. Reading or hearing read the history of the past of medicine, as of the past of other fields of human endeavour, one is impressed with the feeling that we are not so very much better, or so very much worse, than the men of old. We, with our basal metabolism machines, and our surgical theatres, packed to the brim with gadgets, and smelling to high heaven of odourless asepsis, are not so very different from our brothers of generations ago, who had in them the root of the matter, in that they tried and tested and used what they had, and got, with fresh air and pure water and massage, exercise, good food, and hygienic living, results not to be despised—sometimes results which put our modern efforts rather to shame. So to read history gives a perspective, and induces a humility, which are very salutary and good for us.

It gives perspective, because it gives a background and a depth to the picture. We are not merely looking at a flat plate of the present: the trial and error of the past gives us, if we are wise enough to see and learn the lesson, a sense of proportion, much to be desired in these days, when the rapid advance of material knowledge, and technical attainment, has become

identified in men's minds with true education, and is being regarded as wisdom *per se*.

And lastly it induces humility. "No doubt but ye are the people," says Kipling. Most of us today have no doubt about it at all. We become lost in admiration of our own achievements—and it is "wunnerful good for the prophet" to realise that other days produced other prophets as good as or better than himself, and to be reminded that we are just now, after wandering as a profession many years in the wilderness of superstition and crass ignorance, coming back to an appreciation of the need for simplicity and a proper humility, in the use of remedial measures, as opposed to the search for a magic formula that will make work and sweat unnecessary.

So we are grateful to Dr. Wilson for his lecture, and glad that we can read it, mark, learn and inwardly digest it, at our leisure, and to the exceeding profit of our medical souls.

KING GEORGE V SILVER JUBILEE CANCER FUND

This campaign, which is sponsored by the Governor General of Canada, was inaugurated March 1st, 1935, and closes May 6th, 1935. The money collected is to form the basis of a Cancer Foundation and the income is to be spent on cancer education and research. It has received the unanimous endorsation of the B. C. Medical Association Executive. An active cancer committee is at work and every effort is being made to work with other organizations to make the campaign a success.

In view of the fact that this campaign was launched with little or no time for formulation of plans, very little information regarding it has come through. It is desirable that the various District Societies, and health and lay organizations, should do what they can to make this campaign a success. However, it is well to bear in mind that to follow up this initial move, plans are being made for the carrying on of an intensive war against cancer, particularly in this province, and that something will materialize to provide adequate facilities for the study and control of cancer.

THE PROGNOSIS OF FRACTURES OF THE VERTEBRAE

By E. WALTER HALL, M.D.
Detroit, Michigan.

[This paper originally appeared in the *American Journal of Roentgenology and Radium Therapy*, Vol. 32, No. 5, November, 1934, and is quoted here with the consent of the Editor of the *Journal of Roentgenology and Radium Therapy* and at the request of the Medical Officers of the Workmen's Compensation Board. They point out to the Editor the alarming effect which the words "broken back" produce on the lay mind, and the all too frequent neurosis resulting. It would seem imperative that attending surgeons should keep constantly in mind that workmen frequently become obsessed with an exaggerated idea of the severityof their injuries and that the showing of x-ray films and the explanation of them to injured workmen, has been found to be bad practice and frequently delays their return to useful employment.—ED.]

The propriety of a roentgenologist discussing the prognosis of vertebral fractures may be open to question. He is, it is true, concerned with the case chiefly in a diagnostic capacity and is directly concerned with only the morphologic features of diagnosis. However, he is privileged to examine many

patients immediately after injury as well as after treatment and to observe the end-results of various methods of treatment by different surgeons. If he is alert to his opportunities he correlates roentgen observations with information obtained from the patient as well as from discussions with the clinician. Such observations form the basis for judgments which are impersonal and unbiased. The views expressed here are the result of such observations and of a special study of 155 consecutive cases of vertebral fracture.

Prognosis is at best an indefinite subject. Statements concerning prognosis must always be modified by provisos as to the nature of the insult, the status of the individual, the treatment, and the presence or absence of intercurrent factors. For the sake of definiteness we shall therefore limit this discussion to fractures of the spine which do not involve questions of paralysis or cord injury, or obvious predisposing diseases such as malignancy.

There exists both in the minds of the laity and of the physician, generally speaking, a very imperfect idea of what to expect from spinal fractures. Even in the literature, which up to the last few years dealt almost exclusively with fracture dislocations, these being the only ones usually recognised, there exists a wide variance of opinion. We are interested to know whether the prognosis of vertebral fractures can be put upon a more logical and reasonable basis, free from the old "broken back" tradition, with the mental element properly evaluated.

I. Fractures of the Vertebral Body.

Fractures of the vertebral body are of two main types, there being either fragmentation or bone condensation. Both types involve the upper surface of the body, and though in severe fractures fragmentation may extend to the caudal surface, we have found no case of simple compression in which the inferior surface or cartilage plate was injured. There may or may not be displacement of body fragments and when this occurs it is generally slight and usually anteriorly. As in fractures elsewhere, there is always some tearing of soft tissues with extravasation of blood and lymph. There may be fracture of the superior cartilage plates with possible escape of the nucleus pulposus. In our series about 10 per cent of the uncomplicated body fractures were multiple, though in multiple fractures there should be a strong suspicion of underlying pathological conditions. Space does not permit the discussion of all the complicating factors, so we pass on to a consideration of the eventualities of healing of a fractured vertebra. From the morphologic standpoint there are several possibilities, two or more of which may be evident in the study of the roentgenogram of a single healed fracture.

1. *Complete healing with no residual disturbance in structure or contour.* This is at present rare, in fact we have seen no case in which a good roentgenogram does not reveal a slight residual bone change. However, as the surgeons are now using earlier and more efficient reduction and immobilization, we expect to see many such cases in the future with early and complete restoration of function.

2. *Healing with slight deformity of the body and preservation of the integrity of the intervertebral discs.* This is, in our series, the most common type, comprising 39 per cent of the total. There is no important change in vertebral alignment, no evidence of degenerative change and no roentgen basis for symptoms or disturbed function. The large number in this group speaks well for the treatment methods of the attending surgeons.

3. *Healing with increased deformity but preservation of the cephalic disc.* This is the neglected case or the case treated without proper reduction.

We believe it is *seldom* due to *too* early removal of support. We are inclined to agree with Jimeno-Vidal that three to five months is sufficient for the healing of even cancellous bone and that further fixation is injurious rather than beneficial, though many men still use fixation for nine months to two or more years. Incidentally, if sufficient attention is paid to the general condition of the patient, with physiotherapy, exercise and a general "building-up" routine, the soft tissues should also be completely healed by the same time.

We may state in this connection that in our opinion the so-called Kummell's disease or rarefying osteitis without fracture which has attained a place in so much of our literature is merely due to the further compression of unrecognized fractures which are improperly treated. Certainly if so-called concussion or disturbance in blood supply were responsible for "rarefying osteitis," few compression fractures would have a chance for the satisfactory healing that usually occurs. We have never seen a case of this condition that seemed satisfactorily proved but such is the weight of tradition that every writer seems called upon to discuss it, though disparagingly. In considering prognosis of vertebral injuries "Kummell's disease" may therefore be disregarded.

These rather marked vertebral deformities with intact cartilage comprised only 10 per cent of our group. They are usually associated with ligamentous ossification.

4. *Healing with ankylosis.* In 23 per cent of the series there was formation of a bony bridge from the injured body to its cephalic neighbor. In two cases there was also bridging to the inferior vertebra. With bony ankylosis precluding motion there should be no pain at the fracture site. The spine should be even stronger though less mobile than before the injury, and as the spine is primarily a supporting structure and free mobility is not an important function except in the case of contortionists or acrobats, this should not be a basis for disability. Even in the cervical spine, where mobility is of more importance than elsewhere, many persons have gone through life unconscious of any limitation from congenital fusion of two vertebrae.

Some of these cases show a kyphos or moderate lateral angulation. Extreme angulation is unusual in uncomplicated cases. We believe slight variations in alignment are overrated as bases for disability. We have all seen "hunch-backs" doing heavy manual labor and there are many cases of scoliosis or kyphosis of considerable degree which are symptomless and do not incapacitate to an appreciable extent. The spine readily compensates for even such a marked deformity as an intercalation and this is usually discovered accidentally and not because of symptoms.

It has been stated that after production of new bone is complete the patient should be symptom-free. We believe this is an arbitrary, though perhaps workable, rule to apply in compensation cases. The production of new bone is not in all cases accompanied by symptoms; in our experience this is seldom the case. In our routine films preliminary to gastrointestinal studies we find many spines showing marked hyperostosis without apparent associated pain. The fracture patient may therefore be symptom-free long before reparative or irritative changes due to changing stress and strain are complete.

5. *Healing with disturbance in the cephalic disc.* In only 6 per cent of our series was the disc importantly narrowed or distorted. In no case was there complete destruction or complete absorption of cartilage. This would

be a plausible basis for symptoms providing there was motion, but in the majority of cases narrowing and irregularity of the disc was found to be associated with bony ankylosis which should render it symptomless.

In 20 per cent of the series, an unexpectedly large number, there was definite evidence of fracture of the superior cartilage plate with herniation of the nucleus pulposus into the injured body. This is often considered a basis for symptoms. When nucleus hernia was first resurrected it was hailed by many as a cause of back pain. Having now observed even multiple hernias in patients comparatively symptom-free and without history of trauma, we no longer give it an important place. In one-third of our cases there was a protecting bony ankylosis.

The question of pressure on the roots of the spinal nerves frequently arises as an eventuality of vertebral body fracture. One author refers to the frequency with which typical girdling pains or paræsthesia occur in cases of fracture of the processes or bodies. These symptoms, which are characteristic of pressure on a nerve, are peculiarly absent from the patients we have observed, and in consultation with others who see many fractured spines we obtain reports of a similar rarity. Unless cord or pressure symptoms are present early, we do not believe they are late sequelæ.

Only two cases of our series showed marked calcification and ossification in the paraspinous soft tissues. This would seem to indicate that products of injury such as hæmorrhage and œdema are early absorbed in nearly all instances and would also suggest early repair of the soft tissue damage.

The study of this series of vertebral body fractures leads us to conclude that in the majority of cases, namely those with little or no vertebral deformity, no narrowing of the discs, or with fixation by bony ankylosis, approximating 70 per cent of all our vertebral body fractures, the ultimate prognosis should be good both for recovery of function and freedom from symptoms. This percentage should be materially increased by the application of the newer treatment methods of Dunlop and Parker or Jimeno-Vidal, especially the latter. With excellent results, he has been using complete reduction in markd hyperextension, application of a cast in this position, and institution of physiotherapy and exercise so that patients are actually in better physical condition at the time of removal of the cast than previously. He limits the fixation period to from twelve to twenty weeks, depending on the severity of the trauma and unfavourable factors, and eliminates all supports on removal of the plaster. He states that a surgeon who gives his patient a brace after the plaster is removed does him an irreparable harm and makes a chronic invalid of him.

There is much to be said for the last statement. Psychotherapy plays an immense part in the prognosis of spinal injuries. Like all other adults, patients who have had spinal injuries are subject to back pain, but naturally their back pains are attributed to their fracture. By the same token if a patient has back pain and a roentgenogram discloses a deformed vertebra, *that* is too often immediately held responsible. We would emphasize the fact that the patient who has had a fracture deserves as diligent a search for disturbances in nutrition and elimination, for focal infection or endocrine dyscrasia, as does the individual who has not had trauma.

In the case of the so-called delayed or recurrent symptoms not continuous with the period of early disability, one should be especially sareful to consider malingering, psychosis, or intercurrent cause of pain. The patient's complaints are therefore not to be taken too seriously. Unfortunately for statistical purposes the large majority of our series are compensa-

tion or public liability cases with monetary considerations affecting prognosis. About 5 per cent are free from such taint and also entirely able and symptom-free according to their own statement.

We have in our files records of a patient who sustained a vertebral body fracture, obtained an excellent result with fixation—in this case by an Albee graft—and did heavy work for several years thereafter. All this despite the fact that he had a moderate vertebral body deformity, a loss of the forward convexity of the lumbar curve and a marked reduction in the normal dorsal convexity with, of course, limitation of mobility due to the graft. This case also illustrates another point under discussion, for he recently complained of low back pain, which he attributed to the old healed fracture, and was re-examined. This study revealed no basis for symptoms from the fracture but did show typical lumbo-sacral disease with narrowed disc, lipping, and sclerosis.

Another case which illustrates a not uncommon type is that of a man who was examined for rather recent low back pain incident to injury. Roentgenograms did reveal transverse process fractures but in the course of the complete study which is our rule we also showed a wedged sixth thoracic segment. This was smooth in contour with intact discs, and had every appearance of compression fracture, the symptoms of which had been so slight that it remained undiscovered. Wedge-shaped bodies are frequently discovered in this area. They are often wrongly diagnosed as congenital, the diagnostician overlooking the fact that vertebrae do not develop in such a manner as to make simple anterior wedging possible. This represents a large group of cases who in pre-roentgen days had fractures, considered them as "sprained backs", were incapacitated for a few weeks, if at all, returned to heavy duty, and were much better off than many workmen who have had the benefits of modern roentgenography and poor psychotherapy. Disease such as epiphysitis during the period of growth is a frequent cause of narrowing of the anterior parts of bodies, but this is rarely if ever confined to a single segment.

Then there is the case of a physician who sustained a compression fracture in an automobile accident—no money involved. There was minimal deformity but there was definite rupture of the cartilage plate and herniation of the nucleus pulposus. Despite somewhat neurotic tendencies he is not in the least incapacitated. It took strong psychotherapy coupled with good surgical treatment to produce this result. Contrast this case with that of another patient who had a rather severe fracture in the lower cervical region, but obtained excellent healing with firm ankylosis, making the spine actually stronger than before and with no slightest possibility of displacement. After four years it is impossible to wean him from an orthopædic collar. Perhaps a few hundred dollars monthly disability insurance has some bearing on his "disability".

We believe it the duty of the orthopædists, industrial surgeons and roentgenologists to educate the public and the profession to the idea that uncomplicated fracture of a vertebra is not a hopeless and often not a serious accident judged from the standpoint of ultimate prognosis, and that the person who suffers a fracture of a spinal segment has as much right to expect a good result, symptom- and disability-free, as had his fracture been of the Colles or Pott type. We consider the prognosis of vertebral body fracture to be decidedly better than that of the os calcis, the head of the tibia and similar lesions, provided the psychic element is eliminated.

II. Prognosis of Transverse Process Fractures.

Our series of spinal fractures showed 39 per cent of the total number to involve the lumber transverse processes, proving that this is a common lesion, though occasional cases are still being reported as unusual. The idea of their rarity, repeated in one of our latest orthopædic volumes on the spine, is a heritage from pre-roentgen days when they went unrecognized and untreated. Our series showed about equal involvement of the right and left sides, and slightly more than half of the cases showed multiple fractures.

These fractures are, in our opinion, minor injuries. We consider the bone injury secondary in importance to the soft tissue injury and would govern the prognosis and treatment accordingly. The function of the processes is to serve as attachments for soft tissue structures and the prognosis is only that of torn soft tissues. Disability should be determined by the time necessary for the formation of fibrous tissue, and should be measured in weeks rather than months. The fibrous tissue formed is actually stronger than the elastic tissues it repairs. Whether the small fragments unite or not is a matter of small consequence. The prognosis is independent of the severity of the bone injury. Cases with wide separation and therefore with only fibrous union have no more symptoms than those cases with merely a subperiosteal crack. Forrester reports a case where all the lumbar processes were fractured and in which the patient returned to heavy work in thirteen weeks, having had only adhesive strapping, and a case of minor injury to one process immobilized by a cast with a disability of thirteen months. His advice is that the less treatment given the better for the patient and that no case should have plaster or braces, but merely adhesive strapping, and all should return to work within three months. While a body cast may at times be permissible in the treatment of severe injuries in which transverse processes are involved, since it provides greater fixation, it has, except in the hands of a very wise and tactful surgeon, a tendency to make the patient overrate his illness and have a longer disability. In most cases adhesive strapping is as effective as in rib fracture and it certainly is better for the mental attitude of the patient.

We believe the prognosis of transverse process fractures is better than that of rib fractures and as in the case of the vertebral body, if symptoms are unduly prolonged or delayed, malingering, psychoses, or general causes of back pain rather than the fracture itself should be blamed. The surgeon who treats a simple lesion by heroic measures may do irreparable harm to his patient.

Conclusions.

Fractures of the vertebral bodies and transverse processes have been overrated as bases for disability, largely due to poor psychotherapy and improper treatment.

Over-treatment has been responsible for more bad results than under-treatment.

A study of roentgenograms and clinical observations of a series of 155 cases of healed fracture reveals little morphologic or anatomical basis for disability in the great majority of the series.

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THE OSLER LECTURE

Concerning Goitre and the Background of Its Ancient History

This annual lectureship was established in honour of one who loved his fellow man, and in his day and generation his name led all the rest as the "Beloved Physician." Because of his large humanity, Osler was attracted to the History of Medicine. His enthusiasm over rare incunabula was aroused, not only because he was an incurable bibliophile, but also because they were to him those "wonderful books of our fathers of old," wherein he could learn how the physicians of forgotten days worked and struggled; what were the thoughts and ideas that inspired their work; and what the actual conditions under which they practiced their art.

That is the only way to approach the History of Medicine, as it is with the history of any other branch of human endeavour. If in studying the past we measure it with the yardstick of our own times; if we only search out those static monuments—the discovered and recorded facts—that outwardly mark the progress of medicine, we are wrong. When we sift, analyze and appreciate the ideas and ideals that were the driving forces behind the founders of our craft, when we understand something of their handicaps and the environment in which they worked, then, and only then, can we arrive at even an approximately correct view of the foundations on which the Art and Science of Medicine were built.

In this lecture you will find nothing original. To many it will smack of the lamp. May it be akin to Aladdin's, for my wish is that I may convey to you something more than a dull enumeration of the milestones along which the knowledge of goitre has travelled.

The condition known as goitre is probably as old as mankind, yet why was there no adequate anatomical description of the thyroid gland before that of Wharton in 1656? Why was it that cretinism was not definitely associated with goitre until Paracelsus made the relationship clear in the fifteenth century; that the thyroid was not shown to be a ductless gland until Cruvelhier did so in 1840; or that we had to wait till the first half of the nineteenth century before Parry, Gull and Von Basedow differentiated exophthalmic goitre?

The task I originally set myself was an attempt to answer these questions. It is an impossible one, for it includes the whole history of medicine. I can but crudely sketch in, a little here and a little there, that shadowy background against which stand out the early and slowly accumulated facts that have contributed to our present day knowledge of goitre.

In some æon of Prospero's "dark backward and abysm of time," man, crawling from the mud, for the first time "stood erect and scowling scanned the skies"; and we are told that this was in the Pliocene or Miocene period,

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two or possibly three million years ago. Of the ills that afflicted this ancient man in the springtime of our race we know nothing; but we must not forget that, as someone has said, if man has been reasonable only since yesterday he is dateless as an emotional and instinctive being, and in his long struggle upwards there was developed, not only his body as we know it now, with its intricate central nervous system and highly specialized ductless glands, but also his instincts and emotions.

Owing possibly to his accidental discovery of copper, man as a civilized being appeared in Egypt, Babylonia and Assyria about 6000 years ago. Although goitre was in all probability endemic then, as now, along the banks of the Nile, there is no mention of it, or the thyroid, in the five Egyptian medical papyri discovered to date. Medicine, in the first buoyant uprush of civilization in the Old Kingdom in Egypt, reached a considerable state of efficiency, especially on the surgical side, but the only anatomy was that of the embalmers and in its crudity it contributed little to the knowledge of the human body.

During the Middle and New Kingdoms, Egyptian medicine sank back upon that bed of magic and religion from which it had arisen, leaving behind only an elaborate organotherapy. The pharmacists of ancient Egypt must have been the forerunners of certain drug houses that in our own day flood the markets with shotgun polyglandular doses derived from so many parts of the animal body. It is true that today these products are put up in a more palatable form, but on the other hand the efficiency of many of them is lessened by the absence of those mystic incantations that were so helpful to their exhibition in the land of the Pharaohs.

While many of the organs and most of the excreta of many animals and man were used, no mention is made of the thyroid. A trace of that gland, however, must have been an ingredient of the powdered mummies that at one time were used, to such an extent that Osler's mentor, Sir Thomas Browne, wrote, "Mummy has become merchandise, Mizraim cures wounds, and Pharaoh is sold for balsams."

During the New Kingdom Egypt was overrun by the Ethiopians of Abyssinia. Her medicine was entirely in the hands of the priests and quacks, and her civilization was slowly dying, when, fresh from his triumphant siege of Tyre, Alexander marched in at the head of his Macedonian horse and in 332 B.C. founded at the mouths of the Nile that city which was to be by far his most enduring monument. There followed then a Greek penetration of Egypt that was to last for a thousand years, until the advent of the Arabs in 640 A.D. When Alexander died in 323 B.C., Egypt fell to his general and half-brother, Ptolemy Soter, who as Ptolemy I founded in Alexandria that museum, which, with its library and medical school, was to be such a famous seat of learning. Curiously enough the nucleus of that celebrated library was possibly the library of Aristotle, who had died a year before Alexander. This great tutor of Alexander and Ptolemy was himself a Macedonian, and came from the little town of Stagyrius, which, under the modern name of Stavros, was visited by some of you during the War.

We will return to Egypt and Alexandria presently but it is necessary that we should first review something of the beginnings of Greek civilization and with it Greek medicine.

Within the last decade there have been discovered in Crete remains of a Greek civilization that dates back to 2000 B.C. and the earliest traces go back to the Neolithic age. Evidence exists of a very definite material civilization with strong monarchies from 1500 to 1000 B.C. Of these early

Greeks, or Pelasgii, who probably were of Aryan stock, and came down from the north, little is known. It is ascertained, however, that from 1100 to 700 B.C. was the period of the great Greek migrations, when they spread out and settled on the islands, and proceeding westward settled in Sicily and southern Italy, which was known as Magna Græcia, and as far west as Marseilles, where a strong Greek settlement sprang up.

Definite history of the states of Greece, including the Ionians along the coast of Asia Minor and the neighbouring islands, is continuous from the seventh century B.C. That of Sicily and the Magna Græcia in southern Italy is fragmentary till the end of the sixth century B.C. (Oman.)

That strip of seashore along the west coast of Asia Minor, running from Troy to Tarsus, or approximately Smyrna on the north to the peninsula of Halicarnassus on the south, was Greek as early as 1500 B.C. It was inhabited by the Ionian tribe, the most talented of all the Hellenes, and it was the birthplace of Greek intellectual civilization. There was born Science as we know it today, and there developed Greek medicine—that medicine that was still to be taught and practiced sixteen hundred years after the birth of Christ. Child of the union, not of magic and religion, but of philosophy and religion, it gradually grew to maturity until in the fifth century B.C. Hippocrates cut its last leading strings and it stood independent and free, grounded on observation, experiment and deduction. How early it was freed from magic may be judged when we realize that in the Iliad, which was composed at least 1000 B.C., there is no mention of medical incantations. "Weapons are drawn out of the bodies of wounded heroes, the flowing blood is staunched and the wounds are smeared with ointments; exhausted warriors are restored with wine, but there is not a single word about any kind of superstitious customs or spells." (Gomperz.)

By the ninth century B.C. these Greeks had adopted the "Cadmean" letters of the Phœnician alphabet and could write. By the seventh century B.C. they had obtained from the Egyptians the pith of the papyrus shrub from which an excellent writing material was made and "the circulation of thought was accelerated and the commerce of intellect enlarged." (Gomperz.)

On reading but a list of some of the contributions of these Greeks of Asia Minor to intellectual progress, we cannot but sympathize with those modern Greeks who in 1922, in a vain attempt to regain the cradle of their ancient intellectual greatness, were driven into the sea at Smyrna by the forces of Mustapha Kemal.

We cannot discuss the growth of Greek medicine up to the time of Hippocrates (460-375 B.C.). The school of the temples of Asklepios with their religious ceremonies and their incubation sleep can only be mentioned, and that of the early Ionian philosophers of physiologists both in Asia Minor and southern Italy will have to be passed over. One or two points, however, must be emphasized. It was realized by these early Greeks that there were certain morbid processes called diseases; that these diseases ran a certain course, not at times uninfluenced by climate and environment; and that the patient's mode of living must be changed if he was to recover. Having no bacteriology, chemistry or rational pathology, they could know nothing beyond this; and so they theorized to fill in the blanks in their knowledge, and to find a comprehensive scheme into which they could fit all things and all diseases. So Thales declared that "water" was the ultimate basis and origin of all things; Anaaximenes said "air" and Pythagoras "number." Empedocles of Sicily in the fifth century B.C. propounded the theory that

the basis of all things in the macrocosm, or world at large, was the four elements—fire, air, earth and water—with their primary qualities of warmth, coldness, moistness and dryness. Hippocrates accepted this and went further. He said that similarly in the microcosm, or world of man's body, there were also four elements, the cardinal fluids or humours—blood, phlegm, yellow bile and black bile—all possessing also the same primary qualities of warmth, dryness, coldness and moisture. Blood was produced by these primary qualities and contained the elements of the macrocosm in equal proportion. In the other three humours one element predominated: in phlegm, water; in yellow bile, fire; in black bile, earth.

Health to Hippocrates was the proper mixture of these humours or elements in the microcosm, or world of man's body, and two thousand years later an Englishman framed the theory in immortal lines: "And the elements so mixed in him that nature might stand up and say to all the world, this was a man." It followed also that a faulty mixture of the elements and a predominance of one or more of them, both as to quality and quantity, especially at certain times of the year, resulted in disease.

Hippocrates' theory of "spirits" must also be noted briefly. In the liver were formed blood and natural spirits which served the lower functions of the body; in the heart, heat and vital spirits which served the higher vital functions of the body, and in the brain, animal spirits, which, travelling by the hollow nerves, initiated the power of movement and sensation. Air or pneuma passed from the lungs *via* the pulmonary artery to the left ventricle, and helped not only to form vital spirits but also to keep that innate heat gendered in the heart from becoming excessive.

Such were the pathology and physiology of Hippocrates, and they have been discussed in some detail because it is necessary to bear in mind that they formed the groundwork of the practice of medicine up to and into the sixteenth century. Because of the later crystallizing influence of Galen, and particularly of his followers, they came to be considered infallible, and as dogma hindered advance in pathology, physiology, anatomy and the practice of medicine. Because they were the all-important considerations in approaching disease, we find one potent reason why knowledge concerning such a condition as goitre was slow in accumulating. Further on there will be more to say as to why these theories persisted as dogma and helped to sterilize progress in medicine. As an illustration here we may note in passing that even Harvey, after he had discovered the circulation of the blood in the early part of the seventeenth century, still believed with Hippocrates that the blood and the heart were driven by that "innate heat," which, placed in the heart by God, maintained life, and the evaporation of which meant the final dissolution of the body.

Produced in a period of intense intellectual activity in Greece, the Hippocratic writings or the *Corpus Hippocraticum*, of which the pathology and physiology were but a small fraction, probably represents the work of many men, all imbued with the master's ideals of science—observation, experiment and deduction—and, stimulated by them, medicine had capacity for progress and advance. One need only refer to the books on epidemics, epilepsy and prognosis, the bedside notes and the aphorisms, to realize how much sound rational medicine was neglected and forgotten by later generations.

Hippocrates had not been dead fifty years when Ptolemy I founded his school and induced many of these eager students and teachers from all over the fermenting Greek world to come to Alexandria. There rapidly arose that remarkable medical centre where flourished Herophilus and Erasistratus,

the great anatomists and surgeons; there for the first time dissections on human bodies were extensively carried out, and there for the first time was formulated an anatomy of the human body. This anatomy, however, was a collecting and observing of facts that were not brought into relation to medcial theory, but no further advance was made in human anatomy for the next 1500 years. The original writings of Herophilus and Erasistratus have all been lost but we know from Pliny, Celsus and Galen that they described the valves of the heart, the duodenum and many parts of the brain, that they saw the difference between motor and sensory nerves and attributed to the brain voluntary action and perception. In surgary they designed a special catheter, opened emypæmas, operated on goitres, performed laparotomies and even opened the abdomen and applied local treatment to the offending organ! This surgical and anatomical school flourished but a comparatively short time and even when Galen was a student there about 150 A.D. they had gone back to the dissection of animals, and he sadly remarks that he had only seen one human skeleton in Alexandria.

In these early days Greek medicine came to Rome. It had been trickling in before the third century B.C. At first Greek physicians were imported as slaves to work in the arena and gymnasia; then freemen began to appear and by the time of the death of the famous Asclepiades of Bithynia in Rome in the first century B.C., Greek medicine was well established in the Eternal City. There it definitely supplanted the native Latin medicine that was interwoven with religion and possessed a multitude of Deities, such as one for the womb, one for each stage of labor, etc., and the medicine of Asia Minor and Alexandria flourished in the heart of the Empire until after Galen's death. Asclepiades, who was a friend of Cicero, was a man of parts. He used to say that a physician's duty to his patient was to cure him "*tuto, cito, jucunde*"—safely, quickly, pleasantly—but that the cure was not always a pleasant one is vouched for by Martial. In those days in Rome the popular Greek physicians made their private rounds accompanied by a crowd of students. Following such a visit from his doctor, Martial exclaimed, "A hundred frozen hands were laid upon me. I *had* no temperature —now I have!"

Before touching on the great Galen and his work let us record the names of a wealthy Roman layman and an army surgeon. Aulus Cornelius Celsus lived in the golden age of the Emperors Augustus and Tiberius. He attempted in literary Latin an encyclopædia of all knowledge, and about 30 A.D. brought out his De re Medica, the only fragment of that ambitious work that has come down to us. It is important because it is a compilation of the work of the Alexandrians and valuable particularly on the surgical side. Dioscorides was an army surgeon under Nero. With his legion he travelled in many lands and there studied and described over six hundred plants and plant substances. He was the father of Materia Medica.

Cladius Galen was born in the city of Pergamum in Asia Minor in 130 A.D. He studied medicine at Pergamum, Smyrna and Alexandria, practiced in Rome, and, carrying on the work and teachings of Hippocrates, dominated medicine up to and even after Harvey. In his experimental work he went much further than Hippocrates. He was convinced that the search for facts and their verification was the basis of progress in medicine. He conducted extensive researches on muscles and nerves and did good work on bones and joints, but his anatomy was that of pigs and Barbary apes, and his medicine was based on the pathology and physiology of Hippocrates. He was too much given to producing a ready explanation for anything that

he could not understand, and so evolved a systematic theory of medicine as a whole that was often based on false premises. Succeeding generations neglected the example of his wonderful experimental work and his practice of searching for facts, and accepted *in toto* his animal anatomy and his system of medicine. The writings and examples of the Alexandrian human anatomists had been lost even in Galen's time, so anatomy stood still till Mundinius (1316) and the hard shell of the Galenical system remained unscratched into the sixteenth century. For do we not read that in the year 1559—mark you, sixteen years after the publication of the De Fabrica Corporis Humani of Vesalius and in the reign of Elizabeth—a certain Dr. Geynes "was cited before the London College of Physicians for impugning the infallibility of Galen: on his acknowledgement of his error and humble recantation signed with his own hand he was received into the College." In Shakespeare's "Henry IV," written about 1598, Falstaff discusses apoplexy and quotes the final authority: "This apoplexy is, as I take it, a kind of lethargy, a kind of sleeping in the blood, a whoreson tingling . . . I have read the cause of his effects in Galen." Not till we come down to such writings as Moliere's "Le Malade Imaginaire," first acted in 1673, do we find public ridicule of the theories of Hippocrates and Galen.

At the outset of this lecture it was asked why knowledge concerning goitre progressed so slowly down the centuries. We may now ask what advances in the knowledge of goitre were made from the birth of Hippocrates, 460 B.C., to the death of Galen, 200 A.D.

In the writings of these early Greeks it is difficult for us to differentiate goitre from enlarged lymphatic glands, dermoids, branchial cysts and other swellings of the neck. All these swellings are by one writer called "bronchocœles" and by another "strumæ," but that they did recognize goitre appears clear not only from the statements they occasionally made but also from definite references to their work by later encyclopædists.

In the Hippocratic Corpus first collected by the Alexandrian librarians goitre is discussed, but it cannot be clearly separated from other swellings of the neck. It may have been considered only a deformity, but Hippocrates attributes to the water coming from snow and ice a great influence in the production of certain diseases, among them goitre. Aristotle, that giant intellect, that "master of those who know" (Dante), flourishing in the time between the death of Hippocrates and the founding of the Alexandrian School, and he gives a good description of the anatomy of the neck in animals, especially of the trachea and its rings, but does not mention the thyroid or goitre.

As we have noted, the original writings of the Alexandrians were destroyed or lost, but some of their teaching has been preserved in the eight books of Celsus written about 30 A.D.

Celsus attempts a classification of the tumours of the neck. He defines bronchocœle as "a tumour under the skin between the skin and the larynx which is fleshy only or may contain a honey-like substance, sometimes even containing small bones and hairs mixed together." And he continues, "When these tumours are to be operated on, a straight incision is made in the middle of the neck, fluid if present is drained off, and if the tumour is solid it is to be pulled out of the wound with the hand and treated with liniments, or still better removed with a scalpel with its covering and the wound treated with vinegar and salt."

Curiously enough, Vitruvius, the great Augustan architect, who was a contemporary of Celsus, in discussing aqueducts and potable waters, notes

the character of those waters that produce goitres, and in a line of Juvenal, who lived towards the end of the first century A.D., we are told of the common occurrence of bronchocœele, or, as the Romans called it, "*tumour gutturis,*" in the Alps. Galen himself does not refer specifically to goitre but he does issue a warning against cutting the recurrent laryngeal nerves and refers to the pressure of tumours on the windpipe as one cause of aphonia.

This is all I have been able to find concerning goitre up to 200 A.D., and it can be seen that, except as will be shown more clearly further on, on the surgical side the ancients made no great advances in the subject. In medicine they were much more interested in the ceaseless struggle of the humours and in the never-ending ebb and flow of the various "spirits" within man's body than they were in any swellings on its surface. In anatomy, dissection, except for that brief period in Alexandria, was by prejudice everywhere restricted to animals, and pathology and physiology were rudimentary. Nevertheless up to the end of Galen's life the Greeks had continued to make knowledge, and medicine was an active process.

In the first few centuries following the death of the great Pergamene medicine steadily deteriorated, science advanced with more and more faltering footsteps and finally the human intellect itself almost ceased to produce. (Singer.) Several factors were responsible for this virtual death of medicine and science in the West. Here the decline of Antiquity had set in even Galen's day; war and famine racked the people; in the period 170-270 A.D. the Empire was scourged by two severe and lasting plagues; in 396 the Goths overran part of Greece and in 410 Alaric entered and sacked Rome. For the next three-quarters of a century civilized Europe was submerged by successive waves of barbarians from the north and in 476 the Western Empire was finally extinguished and the barbarian Odoacer mounted the throne of Italy.

Amid such surroundings Greek medicine could not flourish, and much of the best of it took refuge in that capital of the Eastern Empire built in the years 325-330 by Constantine on the site of Greek Byzantium. There, while it did not grow and expand, it was nevertheless protected and preserved and 1000 years later, by a long and devious route, it came back to the West.

Following the Crucifixion, Christianity had spread steadily throughout the Roman world, and the periodic persecutions of the Emperors from Nero onwards to Diocletian had hampered but had not retarded its growth. In Britain in 306, at the imperial palace at York, Constantine was elevated by his soldiers to the throne of the Cæsars, and under the first of the Christian Emperors the stream of Christianity flowed with an accelerated motion. Constantine was at one time anxious apparently to make Christianity the state religion, and in 313 issued an edict recognizing it as a lawful religion, but the ancient gods of the Romans were still too potent an influence in the lives of a large section of his subjects.

By 390, however, the time was ripe, and on a certain day in that year the then Emperor Theodosius met his assembled Senate and proposed the question whether the worship of Jupiter or that of Christ should be the religion of the Romans. On a regular division of the Senate Jupiter was condemned and degraded and in the next five years there happened probably the only example of the total extirpation of any ancient and popular superstition. (Gibbon.) The temples of the gods, their images and statues, were destroyed throughout the Empire.

This was followed by another curious example of the varied psychology

of the mind of man. The wholesale and partially compulsory transition from Paganism to Christianity was too sudden, and pure monotheism did not yet satisfy, so in the Christian religion an impetus was given to the worship of saints and relics, and there is an interesting canvas in Venice where the figure of the great Earth Goddess surrounded by bottles of wine and the varied produce of the soil has been replaced by a figure of the Virgin Mary. But the tragic years of the barbarian invasions and wars continued. Many of the important seats of learning were destroyed. What was left of Greek medicine and science that did not fly eastwards to Constantinople and Asia sought refuge in the monasteries, there also to remain largely quiescent but still preserved for the future of mankind. By 400 A.D. the twilight of the classical period had passed away, and the night of the Dark Ages had fallen upon Europe.

These were the times in which man thought that the end of the world was at hand. It behooved him, therefore, to think of his eternal soul and to search for that salvation that would have it from a ready and a waiting hell. In this storm-tossed world the Church stood fast and survived, and was the only rock that man could cling to. She kept aglow the lamp of learning and she gave direction to the passionate yearnings of mankind. But in order that she might survive and guide man along the way of life the Church had to be strong and dogmatic; and so she brooked no interference and tolerated no innovations, and becoming the arbiter of knowledge she demanded that science conform to the Scriptures. Faith supplanted reason in the natural as well as the supernatural worlds.

Why should man worry about his body in times like these? It was but the frail inconsequential earthly habitation of the living soul. The soul's salvation and the future life were all that mattered and to these he devoted all his time and all his energies. Any time spent on the gross body was only waste time, and so the baths and ablutions of the Romans fell into disuse. "Does your skin roughen without baths?" asked Jerome. "Who is once washed by the blood of Christ need not wash again," and so the Christian went dirty. In his castles and walled towns, the enlightened hygiene and sanitation of the Romans found no place and it became possible that we can read of the verminous condition of such a man as Thomas a Becket and that we can understand why no cold baths were indulged in in England until the custom was introduced in the middle of the eighteenth century by returning West India sugar planters and the "Nabobs" of the East India Company.

Here again was no place for the science of the Greeks, and except in such isolated centres as Constantinople, Salerno, Bologna and Montpelier the Greek language itself died out. Latin was the language of the Church and in later ages when science was reborn it was her language also, even into the eighteenth century, and it was not until well into that century that Cullen in Edinburgh made the momentous break and commenced lecturing to his students in English. Further, in these fateful times the writings of Hippocrates, Aristotle and Galen became known only through tradition, and even the art of writing itself almost disappeared outside the monasteries.

To the men of these Ages of Faith, blindly feeling their way in perilous times, anatomy, pathology and physiology did not exist. They developed an ascetic contempt of the body, and why worry about "a swelling in the neck between the skin and the larynx"? To attempt natural experiments was a frittering away of fleeting time and "nature is too base," said St.

Anselm, "for us to argue from it to God." (Allbutt.) So science as we know it, and with it Greek medicine, disappeared from Europe.

But the gross body continued to be frail; illness, disease, pestilence and death continued to assail it, and man still sought the physician: and what had the physician to offer? During the decline of Antiquity and on into the Dark Ages the practice of medicine passed more and more from the hands of the lay physicians into those of the monks and priests, and the reason for this was two-fold. In these times when everything was chaos, and no help seemed forthcoming from an earthly source, man turned more and more to the Church for help in physical as well as spiritual suffering. It was remembered that Christ, the Head of the Church, had healed the body as well as the soul, and the sick gradually commenced going to the churches, particularly to the shrines of Saints and Relics, and some were healed and miracles were performed. As the number of the attendant sick at the churches increased and as some of them were of little faith, the clergy were forced to set apart special rooms for their care. The clergy commenced treating the sick and through study in their libraries and their gardens they became physicians. In the sixth century Cassiodorus, who had established a number of monasteries, thus addressed his monks: "Learn to know the properties of herbs and the blending of drugs, but set all your hopes upon the Lord who preserves life without end. If the language of the Greeks is unknown to you you have the herb-book of Dioscorides who has described and depicted the herbs of the field with astonishing accuracy. Afterwards read Hippocrates and Galen in Latin translation—as well as a variety of other treatises upon the healing art which I have brought together in my library and have bequeathed to you." When we realize that in the year 1395 the medical faculty of Paris possessed only nine medical works, and that by 1465 they only possessed twelve (Neuburger), we can perhaps appreciate what must have been the plight of the lay physician in western Europe up to 1000 A.D. All he possessed was a few debased and corrupted Latin versions of Galen, lists of symptoms and lists of antidotes. While the patient was only treated by the book, wherever he went, nevertheless in the libraries of the monasteries there was some of the science of the Greeks and because of it the monks were the better physicians.

Some of the prescriptions used in these centuries were wonderful to contemplate. Many of them were an attempt to follow out, according to the light of the prescriber, Galen's dictum "*contraria contrariis curantur,*" but the value of most of them was estimated according to the number and rarity of the ingredients. The Theriacum was a particularly well known one. It was used for at least seventeen distinct conditions and contained sixty-six distinct ingredients. To those who had been poisoned or bitten by a venomous snake the prescription read, "To be taken twice daily for seven years"!

You will not be surprised when I tell you that from the time of Galen's death in 200 A.D. to the tenth century I have been able to find only two or three men who refer to goitre and these come not from Europe but are Greeks from Asia; men who through Constantinople and the East still had some contact with the original ancient writings.

When the Western Empire fell, world power shifted eastward and took on an oriental cast. Constantine's seven-hilled city on the Bosphorus drew like a lode-stone on the neighbouring shores of Asia and that city for the beautification of which Greece and Asia were so heavily mulcted; that city that through the Dark and Middle Ages was the safe repository of so many

of the ancient manuscripts of Greek medicine and science, became the centre of a new Eastern World and the Byzantine period was ushered in. Intellectually this Eastern Empire was basically Greek. Through the succeeding centuries its sphere of influence became more and more restricted to Constantinople and its environments, but the language of its Court and its Church continued to be the language of Aristophanes and Euripides. The men to be noted were among the best representatives of Byzantine medicine but their writings did not reach Europe until after the tenth century.

Aetius of Amida in Mesopotamia lived in the sixth century. He studied in Alexandria, practised in Constantinople and in his writings drew largely on the old masters. He tells us nothing new, but following Celsus describes bronchocœle as a definite form of tumour involving the gland in front of the trachea.

Alexander of Tralles in Lydia came of a clever family and one of his brothers was the architect of St. Sophia. According to Allbutt he was the greatest physician from the time of Galen to the revival of learning. His only reference to goitre is a statement concerning the large fleshy tumour of the neck found among people of certain mountainous countries.

Paulus Aeginitæ or Paul of Aegina, a rocky island in the Saronic Gulf, practiced as a surgeon and obstetrician in Alexandria in the seventh century and upheld the best traditions of that school in his surgical work. In his writings he was an encyclopædist and compiled because he said doctors would not read the long-winded treatises of the ancients. He appears to have distinguished between strumæ or adenitis of the sides of the neck and a struma or goitre in the centre of the neck. He says that strumæ develop in part of the neck or in many parts at the same time, or some in one side or in both, and he continues, "Some of them are painful to the touch, are aggravated by the application of medicines, are malignant even like those forms that are called by some *carcinodas*, and it is noted that such are not to be cured by treatment by the hand (surgery). But such as are mild to the touch may be operated on in the following manner. The superficial tissue and skin being divided by a straight incision, and the surrounding tissues being separated, the margins of the wound are drawn apart with hooks, the membranes are to be stripped away and the blood vessels treated as we have described in treating of angiologia; the tumor is to be released and removed little by little. Also the bigger strumæ being lifted out with hooks and suspended, the membranes everywhere surrounding them are to be separated and the tumour removed. With the utmost care we should see to it that neither the arteries which are called the "carotids" nor the recurrent nerves are injured. If some vessel interferes with the work it is to be bound about with a cord, or cut through the middle unless it be too large. Now when we have reached the narrow base of the struma the one to the right is first to be cut off and then with the index finger deep down in the wound we are to try to find out if there are strumæ close by which in the same manner are to be turned out. But if we believe there is any great vessel, or even many, deep down in the struma we are not to cut it away from its base, but it is to be bound about with a cord and at a point above any danger excise it freely, and then with medicines applied on linen the cure is to be attempted. If it is to be cut off we must draw the edges together so that they are everywhere in contact and if there be a superfluity of tissues fasten them together with pins. But if there be too much flap after the removal of the struma we bring it together in the shape of a myrtle leaf and sew it with sutures and inject healing or stimulating medicines."

The above operation may apply either to an adenectomy or a thyroidectomy and it is recorded by Paul of a procedure undertaken in the halcyon days of Greek surgery, about 2000 years before Theodore Kocher undertook his thyroidectomies in the city of Berne. Osler in 1915, in speaking of these surgeons of the Alexandrian and Græco-Roman periods, said: "Only to this generation of experimental surgeons such as Eck, Ballance, Matas, J. B. Murphy, Halstead, Carrel and Guthrie could the best of the Greeks go to school.

I give you one more note on goitre from the dark centuries, and this time from a clerical source. Bishop Emmebert in the seventeenth century delivered an anathema on persons who had despoiled a tomb, "May your offspring be all cripples and your women goitrous." (Hirsch.)

So we see that up to 200 A.D. the Greeks had recognized goitre, they had associated it with certain waters and certain districts and they had made very considerable progress in its surgery. From 200 to 1000 nothing new appears. It is still the work of the Greeks; the surgery is explained in more detail by Paul but nothing new added.

The Dark Ages may be said to end about 1000 A.D. and we pass into mediæval times which are, according to Singer, to be divided into two periods; that of Arab infiltration from 1000 to 11-1120, and that of the time of the rise of the mediæval universities or the scholastic period between 11-1200 to 1543. It is due to the Arabs that, when things were darkest in Europe, there arose the first intellectual stirrings that were in later times to quicken into active life and we must grant them a passing word.

On June 8th, 632, at Medina in Arabia, died Mahomet, Defender of the Faith, at the age of sixty-three years. One hundred and fifty years later his successors had conquered Persia, Syria, Egypt, Africa and Spain, and the Crescent ruled from India to the Atlantic Ocean. (Gibbon.) During the next one hundred and fifty years throughout the Arabian world there was another buoyant uprush of civilization and a burst of intellectual activity that assimilated and added to much of the science and medicine of the ancient Greeks.

In the times of the barbarian invasions of Europe many Greeks carrying old manuscripts containing the writings of Hippocrates, Aristotle and Galen had fled eastward beyond Constantinople, and in Syria particularly these Greek manuscripts were translated by eager Syrians and Jews into their native languages. To these translations the incoming Arab fell heir, and they, with others obtained in Alexandria, were soon re-translated into Arabic, and in this form they came back to Europe via Spain. In Spain in the eleventh century there were great Arab intellectual centres at Cordova, Toledo and Seville, and in Andalusia alone there were reputed to be seventy public libraries. Here crowds of active translators, often again Syrians and Jews, translated these Arab versions back into Latin and finally men were found capable of changing them back from the Latin into their native Greek. Not only were the works of Hippocrates, Aristotle, Galen, Aetius, Paul of Aegina, etc., translated into Latin, but also the works of the Arabs themselves—the works of Rhazes, the "Canon" of Avicenna the Persian, the "Commentary" of Averroes, etc.

Thus did Greek medicine first come back to Europe, losing much in its passage through various languages, coming back tinged with orientalism and encumbered with the dialectics and astrology of the Arabs, yet back it came and its arrival was later on to be an incentive to a renewed study of

Greek that would enable men to come into intimate contact with the original writings.

The Arabs did not make many original contributions to medicine. It is true Rhazes gave good first-hand descriptions of some diseases, especially measles and smallpox, but Avicenna's "Canon" was Hippocrates and Galen from an Arabian standpoint, and Averroes' "Commentary" was on Aristotle and was more philosophy than medicine. They did make definite contributions to the Materia Medica, adding to the plant drugs of Galen and Dioscorides and introducing some of the metals, but in anatomy there were even averse to dissecting animals and their gift to surgery was to separate it from and degrade it far below medicine.

We cannot look for any new contributions from the Arabs concerning goitre nor do we find them. Avicenna (980-1036) describes a growth in the front of the neck and in describing the operation for its removal warns against injury to the recurrent nerves lest the voice be lost. Albucasius, the great Arab surgeon, may have attempted the operation himself, but it is the old operation of the ancient Greeks passed on to the Arabs by Paul of Aegina.

In the year that Columbus discovered America, Ferdinand and Isabella finally reconquered Granada, and the Arab as a nation went back to Asia and Africa, but his influence in architecture, mathematics, astronomy, chemistry and medicine remained.

During the seven hundred years the Arabs were in Spain, the climb upwards to civilization of the Barbarians—Goths, Visigoths, Franks and Lombards—in the rest of Europe was slow, and it is said that they took 1000 years to make the intellectual advances that the Arabs accomplished in less than a century. Hesitatingly these heathen accepted Christianity, but in the eighth century the tempo of their conversions was greatly accelerated by the sword of Charlemagne, and in 800 the Roman Empire that had died at the hand of Odoacer in 476 was reborn as the Holy Roman Empire at the command of the great Carlovingian. By 876 all Europe was Christian in name, except the Spain of the Arabs. As early as the fourth century traces of feudalism are to be found in Europe and from the tenth to the thirteenth centuries the political aspect of the West was thoroughly feudal. (Adams.)

The Europe of the eleventh century, then, was a Europe dominated by two great authorities, that of the Church and that of feudalism, and at that time they were both strong deterrents to intellectual freedom and progress. The Church as the keeper of the reigning Vision of Truth could allow no meddling with that Vision, and the great feudal system held the lives of men within a circumscribed and a narrow orbit. In such conditions some learned men were produced but few original thinkers. Whatever received the sanction of authority became a fixed belief, and the learned might explain it but not criticize.

Now, however, there began to occur a remarkable series of historical events that were to have a profound effect on the moral, political and intellectual life of the West. From the end of the eleventh century to the end of the thirteenth, that is, during a period of about 200 years, Europe was swept by eight great waves of the Crusaders which rolled eastwards to Asia Minor and the Levant. To comprehend the psychology of the Crusades, one must understand something of the spiritual life of the people at that time. To the Church they were now passionately attached and the heavy hand of her authority was not only accepted but welcomed by all classes. To her they earnestly turned for guidance, for their Vision of Hell was acute, and the urge to save their souls was great. And so the great princes and

nobles obeyed the commands of the Church, or obtained her blessing and started for Jerusalem, and their retainers went with them, and chivalry was in flower; and it was a great adventure. But do not let us forget that these men were very much in earnest and if a crusade was an adventure it was also a pilgrimage, during which past sins could be expiated and future treasures stored up in Heaven. The men who returned brought back a new sense of freedom and a knowledge that the intellectual life and cultural civilization of the Mahommedans was greater than theirs.

The fourth Crusade as a Crusade was a failure and a tragedy. Organized by the Franks and Venetians, it was at the last moment turned into a great commercial enterprise. Sailing from Venice, it laid siege to Constantinople, and the heathen Mahommedans lining the Asiatic shores of the Bosphorus were greeted with the unedifying spectacle of the adherents of the Latin and Greek Churches at each others' throats. This was in the year 1204 and the Latins took Constantinople, pillaged it and remained in possession for sixty years. During that period many of the Greek intellectuals went back to Europe, some of the stored ancient manuscripts were transported to Italy, and so by another stream the learning of the Greeks came back to the West. The final act that gave back to Europe all the stored-up learning of the Greeks in Constantinople came in 1453. In that year, on a fateful day in May, Mahomet the Second burst through the gate of St. Romanus, and the Eastern, or Greek Empire, ceased to exist. All the Greek scholars now fled to Italy. The Turk cared nothing for the learning of the infidel, and ships from the Golden Horn transported the priceless manuscripts to Europe; and in Italy the Universities were soon absorbing the uncontaminated and unadulterated learning of the Ancients. Thither flocked students from every part of Europe and among them Thomas Linacre, founder of the London College of Physicians—the revival of learning was under way. (Chaplin.)

And what of medicine during these Mediæval Ages? Of this but little can be said, for we are drawing away from the "Ancient Background," are approaching the birth of modern times, and my task should be ended. Medicine made little real progress in Mediæval times. In the years 1130 to 1139 several edicts were issued forbidding the clergy to practice medicine and gradually the laity once more had a monopoly of the care of the sick. The influence of Arabian medicine and the Arab translators in Spain, the effect of the contacts of the Crusades with Constantinople and the East, the release of the ancient manuscripts from Constantinople, all threw men once more back on the medicine of the Greeks and they were eagerly read and followed. As has been noted, these were the ages of authority, and the authority of the written word prevented independent observation and experiment. At this time arose the Mediæval Universities and in their medical schools was taught the medicine of Hippocrates, of Galen and of Avicenna. Only the names of the great schools of Salerno, Montpelier and Bologna can be mentioned, but of their anatomy a word must be said because it is germane to our subject.

"Exactly when, after many centuries interval, human dissection was once more undertaken, cannot precisely be determined; we only know that in Italy at the commencement of the fourteenth century those fundamental conditions already existed which made possible anatomical demonstrations upon the bodies of criminals for purposes of instruction." (Neuburger.) The first authentic autopsy was undertaken by William of Saliceto in Bologna in 1302 in an attempt to ascertain the cause of death in a young

man suspected of being poisoned. In 1316 Mundinius published his book on anatomy, but there is no evidence that he himself ever dissected, and he has nothing new. It is still the anatomy of Avicenna and Galen, and the perpetuation of the fallacies of the ancients prevented progress. Mundinius and his followers did a great deal for anatomy in re-creating an interest in the subject; but they refused to believe what their own eyes told them, and continued to read into the human body the anatomy of the pig, and were satisfied to go no further. Here is one short example of the lack of initiative. After a very crude description of some of the largest veins, a writer continues: "Enough has now been said about the more important and better-known veins, but there are also in the human body infinite numbers of veins which are unknown except to God alone, to whom nothing is unknown." (Quoted by Dempster from Corner.)

In the fifteenth and sixteenth centuries the revolt against the authority of the written word as the sole guide to knowledge definitely set in. At the beginning of the sixteenth century Carpi asserted he had dissected one hundred corpses, and in 1543 Vesalius, as the fruits of his own personal dissections, published his *De Fabrica Corporis Humani*. Professor of Anatomy at Padua, the great Belgian taught what he actually saw and found for himself, and Galen was once and for all dethroned as the sole and ultimate guide in anatomy. Fallopius and Fabricius, successors to Vesalius, at Padua carried on the work of the great dissenter, and, completing the foundations for the scientific study of anatomy, made it possible for Wharton in 1656 to give us the first adequate anatomical description of the thyroid gland.

During those ages of authority, those ages when the energies of the scholars were expended on the interpretation of the written word, little progress was made in medicine and anatomy, and none in the knowledge of goitre, but we begin to see references to it in the writings of men outside the medical profession. Marco Polo in the thirteenth century described people in Yarkand and the central Asian plateau as having "swellings in the legs and tumours in the throats occasioned by the quality of the water they drink." From the year 1508 to the year 1512 Michelangelo, standing on a scaffold in extreme lordosis, worked at his frescoes on the ceiling of the Sistine Chapel. During that time he wrote a sonnet to a friend which contained these words:

"I've grown a goitre living in this den,
As cats from stagnant streams in Lombardy
Or in what other lands they hap to be,
Which drives the belly close beneath the chin."

Leonardo da Vinci, in the fifteenth century, has numerous rough sketches of goitrous individuals, and one painting of a woman who has exophthalmos and a swelling in the neck.

On the medical side there are only a few references. Roger of Salerno, in the late twelfth century, following Paul of Aegina, described the operation and detailed more than one method of resection, but he differentiated in a rough way only between goitre and enlarged cervical glands. He, however, used ashes of burnt sponge and seaweed for treatment. Fabricius of Aquapendente, who was born in 1537, was the teacher of the English Harvey, and followed Fallopius in the chair of anatomy at Padua, wrote: "In the neck four kinds of diseases are treated by manual operation; these are the quinsy, the goitre, the enlarged glands and the wry neck. We will speak

of all commencing with goitre. This tumour according to Celsus occurs in the neck between the skin and the trachea. The Greeks call it 'bronchocœle' . . . being of the class of abscess according to Celsus, the material of which is contained in a follicule, bag or tunic, which is sometimes an imperceptible flesh, sometimes a humour comparable to honey, or to water, sometimes as if one had mixed hairs with little bones." He refers to the fact that operation is advised by Celsus and Paul of Aegina but refers to Paul's operation as one for glands even though he notes that Paul advises careful dissection to avoid the recurrent nerves. There is no doubt that Fabricius refers to goitre, for he notes its great frequency in the Swiss Alps. "Such tumours exist in a certain part of Bergamum (Cisalpine Gaul), where almost all the men as well as the women carry these large, mobile, soft and pendent tumours in front of the neck, and they carry them all their lives, without pain and almost without any derangement in all their functions, saying that they come from the water of the country as if the water being impure (?) had some antipathy or property against these glands . . . There is no need to cure these tumours since they do not disturb the patients at all." (Quoted by Brown.)

The Luther and the great iconoclast of mediæval medicine was Philippus Aureolus Theophrastus Bombastus ab Hohenheim, called Paracelsus, and in 1527, before the town hall of Basle, he publicly burnt the works of Galen and Avicenna, saying he was greater than they. As a result of a study of the Salzburg region he noted the incidence of cretinism and endemic goitre. Felix Platter, professor of medicine in Basle, in the last half of the sixteenth century, gives a short but vivid description of the deaf and dumb, dwarfish and imbecile beings so common in the Canton of Valais, of which he was a native (Panebaker). It is said that Eustachius, professor of anatomy in Rome, discovered and described the isthmus of the thyroid about 1565. Finally in 1656 Thomas Wharton in his "Adenographia" published in London gave an adequate description of the gland, and for the first time used in connection with it the Greek word "thyreodea" signifying a shield. But alas for his physiology, for he, with Bartholini and Malpighi, was of the opinion that the thyroid exuded a glutinous juice into the larynx and trachea to lubricate the arytenoid cartilages and the mucous membrane of the trachea.

Mr. President, I have finished. For too long I have tried your patience, but if in so doing I have re-awakened your interest I am well satisfied. I have pictured tonight something, not of the romance but of the tragedy of medicine. I have tried imperfectly to show how Greek medicine is the basis of all that is scientific and right in the medicine of today. But succeeding generations of men, forgetting those first principles of observation, experiment, and deduction, laid down by the fathers of medicine, fastened on to the ancient theories of pathology and physiology and made of them a dogma that went to sterilize progress for almost 2000 years. How that progress was retarded I have tried to show in the specific example of goitre. Another cause for the stagnation of medicine was the condition of civilization in Europe. On the dark and stormy stage that was the Middle Ages man played out his part, and into the very fabric of that part was woven medicine, and you cannot isolate it. Today from the lofty eminence of the twentieth century we can look back and see great progress in our knowledge of goitre since the beginning of the Modern Period that we date from 1543, but let us not forget those men who first struggled with the problem in Asia Minor and

Alexandria; let us not forget the men of the Mediæval Ages who passed on to us the legacy of Greece; and let us not forget that we still have some distance to go. In spite of the accumulated knowledge in physiology and chemistry all is not yet known about the thyroid as an endocrine gland; surgery is not a scientific treatment for toxic goitre; and Hippocrates has not yet been proved wrong when he attributed to the water from snow and ice the condition called "bronchocœle."

SUMMER SCHOOL, 1935

On page 140 of this issue you will find the names of the speakers at the forthcoming Summer School which will be held in the Oval Room of the Hotel Vancouver on Tuesday, Wednesday, Thursday and Friday, June 18th, 19th, 20th and 21st. We shall be publishing the full time table of the lectures in the next issue.

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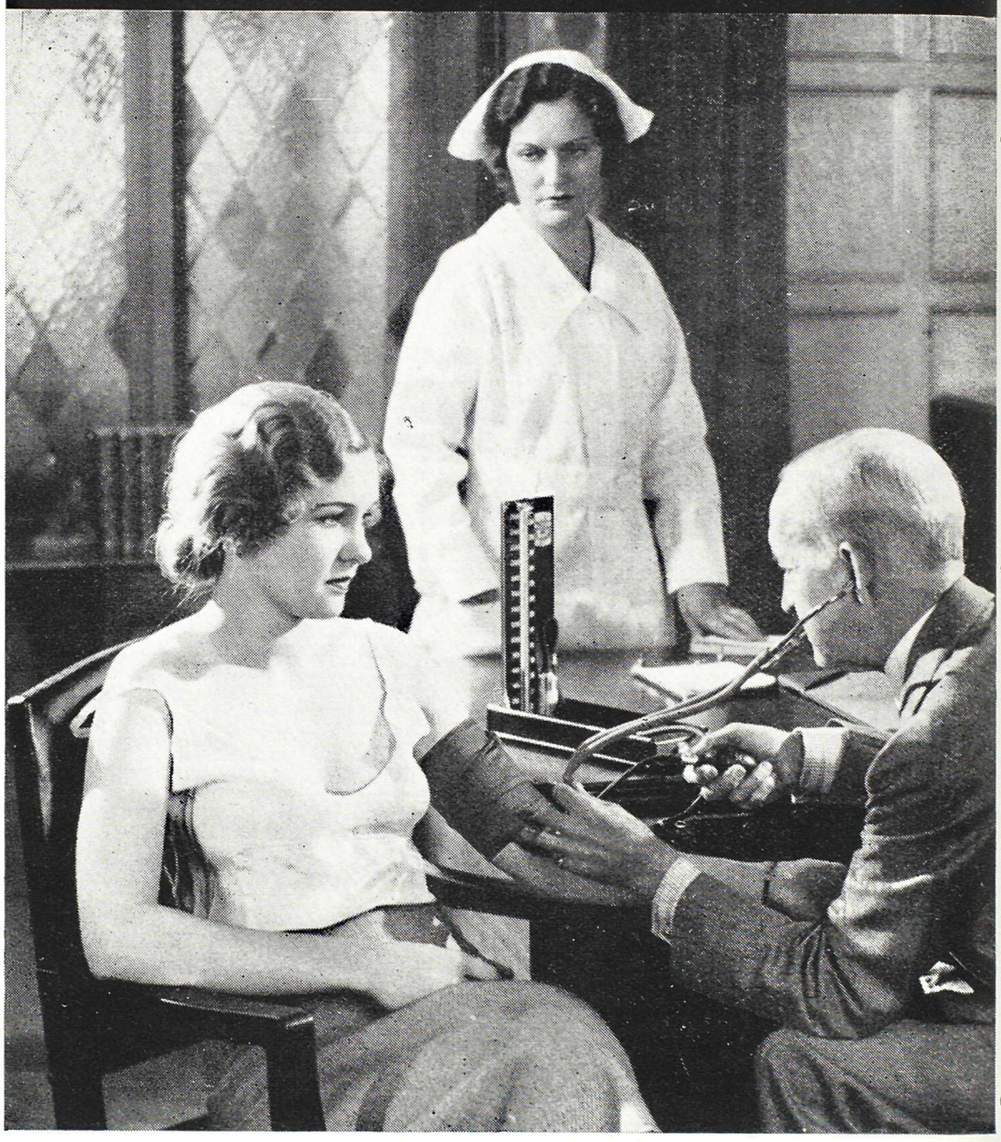

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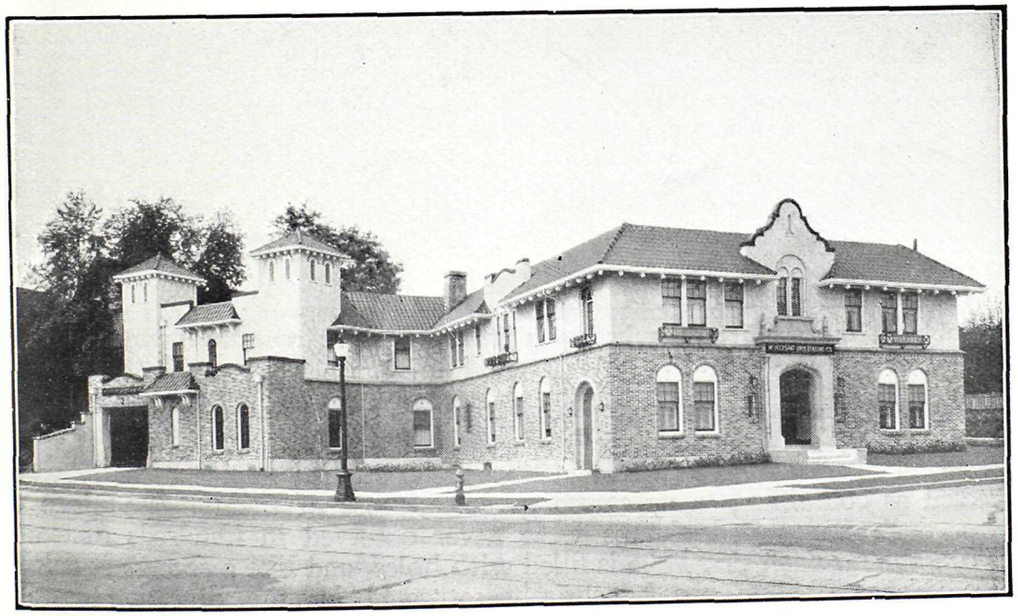

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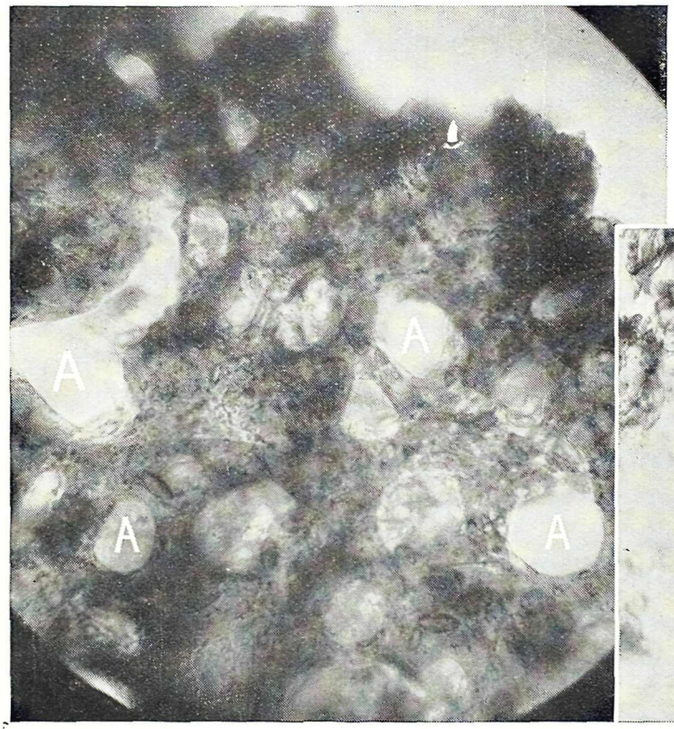

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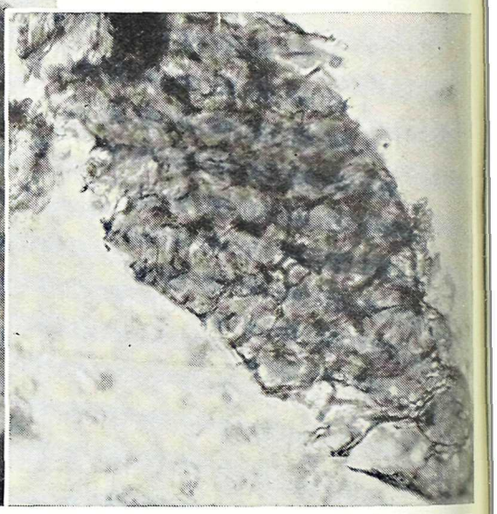

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Large photomicrograph: Pablum mixed with cold water—portion of large flake. Pablum flakes are honeycombed with "pores" (note light areas A) which allow ready absorption of digestive fluids. *Inset:* Farina cooked ½ hour—clump of cereal including starch granules. Note density of clump and lack of porosity. Many starch granules, such as are present in raw cereal, remain unchanged in form.

FIFTEEN cereals (both cooked and uncooked) studied microscopically were revealed as containing many starch granules, most of them massed into dense clumps. Such unruptured clumps were never observed in hundreds of examinations of Pablum. Each tiny flake is filled with holes, and like a sponge it drinks up liquids. Hence Pablum can be entirely saturated by the digestive secretions. Besides being thoroughly cooked and readily digestible, Pablum supplies essential vitamins and minerals, especially vitamins A, B, E, and G, and calcium, phosphorus, iron and copper. It is a palatable cereal consisting of wheatmeal, oatmeal, cornmeal, wheat embryo, alfalfa leaf, beef bone, brewers' yeast, and salt.

Ross and Burrill, Journal of Pediatrics, May 1934. Reprint sent on request of physicians.

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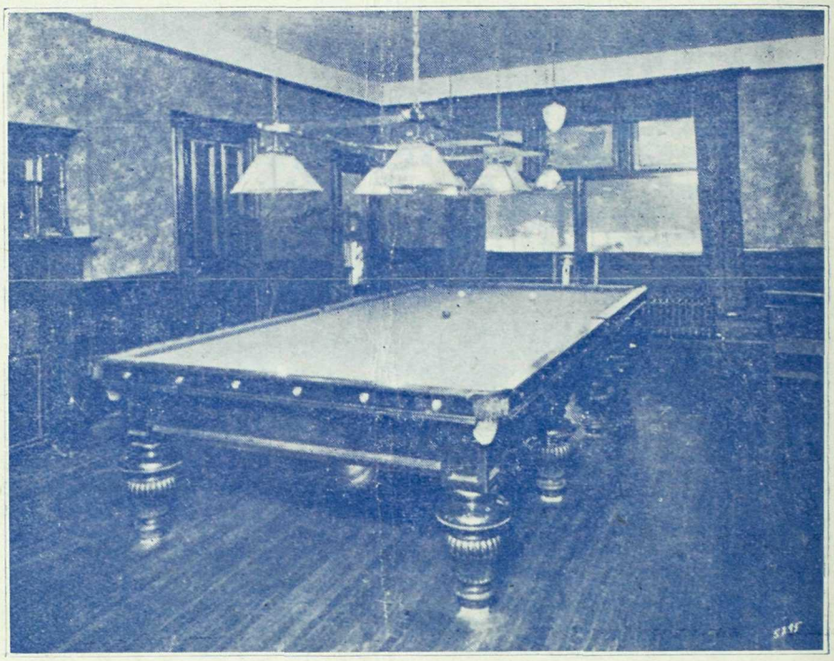

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