Vol. V. AUGUST, 1929 No. 11

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of the

Vancouver Medical Association

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Head Injuries

Laboratory Bulletin

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THE VANCOUVER MEDICAL ASSOCIATION

BULLETIN

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EDITOR'S PAGE

That for all round excellence, without any weak spots, the session of the Summer School just closed was the best yet, is the opinion everywhere expressed by those fortunate enough to be present. The attendance ,it is true, fell a little below high-water mark, chiefly because the impending meeting of the American Medical Association at Portland, Ore., reduced materially the size of the Washington State contingent. Otherwise it was normal or slightly increased. British Columbia, outside Vancouver and vicinity still fails to attend in anything like adequate numbers. Whatever the cause and it is probably the relatively simple one of the inability of the out-of-town practitioner to leave his work without making arrangements which, if made, will serve for a longer vacation than the four days of the School, it forces the Committee to consider chiefly what form of instruction is most useful to the City man and to consult *his* wishes. Thus the departure from or modification of the original idea of the School, which was to foster and present local clinicians and local clinics, is being justified by circumstances. Local clinicians require more than local audiences and if extra-urban support is not forthcoming in sufficient amount the purpose of the School must perforce be changed.

If a revival along the original lines is contemplated it must be less intensive, more prolonged, embracing more demonstrations and more teaching: Laboratory technique, X-ray technique, surgical technique, with clinics less on the rare and unusual and more on the newer views of older things. In other words a definite post-graduate course of two or three weeks must be arranged. There is, it is obvious, no reason why both forms of instruction should not be undertaken, not necessarily concurrently. The clinical material is here, laboratory provision is here, clinical ability is here, nothing is wanting but the will to do.

The arrangements for the meeting were satisfactory and the programme was worked through with that smoothness and celerity we are coming to take for granted. Do not let us forget the amount of forethought and downright hard work which the Committee had to provide and expend. It is indeed creditable to the City that year by year men are found willing to do this gratuitous and perhaps thankless (certainly unthanked) work.

We trust that our guests, lecturers and audience alike, enjoyed themselves apart from their official duties. We can only judge from appearances and judging thus we should say they did. Part of the pleasure and more than part of the profit of the meeting comes from the informal talk in the intervals of rest or at all events intervals between the lectures. The duration of the meeting and the informality of the proceedings is long and marked enough to make acquaintance possible. We shall print a fair share of the proceedings of which an instalment appears in this issue.

DIABETIC IDENTIFICATION CARD

From the Journal of the American Medical Association of June 29th we abstract the idea of an identification card for diabetics. As these unfortunate sufferers are liable to attacks leading to loss of consciousness from two causes: In one case having too much sugar in the blood, in the other too little, one can easily see how useful such a concise record might be if found on the person of the individual. The following is the form suggested:

DIABETIC CARD

Name .....

Address .....

Telephone .....

Family Doctor ..... Tel. .....

Diabetes Specialist ..... Tel. .....

Diet: Carbo..... Gm., Prot..... Gm., Fat..... Gm., ... Cal. .....

Insulin: A.M. ..... units, M. ..... units, P.M. ..... units

(This card is carried so that in case of emergency or accident the patient may receive the proper attention quickly and mistakes may be avoided).

NOTICE

BLISTER FLUID

In order to continue some studies commenced several years ago and on which new light has been shed recently, Dr C. S. McKee will appreciate fresh fluid from blisters (a few drops will do) due to any cause. Dr. McKee or Dr. Coleman are prepared to call for such material at any hour of the day.

* * *

NEWS AND NOTES

We have heard and written so much about the acute hospital bed shortage in the City that for a change we are pleased to announce a real increase of twenty beds. A fully equipped modern hospital unit will be one of the features of the new Medical and Dental Building. Miss Bennett and Miss Jamieson, who are the originators of this enterprise, are both well known to the medical men in the City as they have been in charge of the Operating Rooms of the Vancouver General Hospital for a considerable time. Miss Bennett is a graduate of the Vancouver General Hospital and Miss Jamieson graduated from the Montreal General.

Vancouver will be the third city in Canada to have a fully equipped hospital unit housed in a medical office building. Montreal and Toronto have such hospitals which are very successful. The hospital in our City will have private an dsemi-private rooms and wards, all of which face

south an dare sunny and very airy. There are two operating rooms which face north and are equipped with every modern improvement and with the new scialytic lights. An electric sterilizer will be installed and supplies of sterilized dressings etc. will be available at all times. The kitchen in the centre of the hospital is fitted with electric stoves and with an exhaust fan to convey the odours out of the hospital.

The nursing will be done entirely by Graduates and there will be a twenty-four hour service. An orderly will be in attendance. The hospital is fully equipped to deal with all types of surgical cases, and eye, ear, nose and throat cases, and medical cases for observation and diagnosis.

The rates will compare favourably with other hospitals in the City and cards will be mailed to the profession very soon. It is expected the hospital will be ready to receive patients early in August, and we take this opportunity of wishing Miss Bennett and Miss Jamieson every success in such a strenuous undertaking.

Cases will be accepted from all practitioners and service is not confined to medical men in the building. One of the elevators is specially constructed to convey stretcher cases to and from the hospital which is situated on the third floor.

* * *

It is hoped that the move to new quarters will not interfere with the activities of the Library for more than a day or two.

* * *

A number of Vancouver men attended the Annual Meeting of the American Medical Association at Portland in the second week of July. Among them were: Drs. C. E. Brown, Wallace Wilson, Colin Graham, G. F. Strong, H. A. Spohn, A. W. Hunter, G. A. Petrie, C. H. Vrooman, R. E. Page and D. M. Meekison. They report that the registration was around 3,000, chiefly from California, Oregon and Washington. There were not many outstanding Eastern men, and the scientific programme was so extensive that it was impossible to take in more than the fringe.

* * *

Dr. J. P. Bilodeau who formerly practised in Vancouver and for the last few years has been in Bellingham is enjoying a vacation on Orcas Island. He returns to Vancouver on July 28th and will be associated in practice with Dr. C. F. Covernton. We are glad to welcome Dr. Bilodeau back to practice in Vancouver though he has never missed attending our Annual Dinner during the time he has practised in Bellingham.

* * *

NEWS FROM THE GENERAL HOSPITAL

With the opening of the Private Ward Pavilion recently, the Hospital has practically brought to completion a part of its building programme which has involved a great deal of planning and effort. Modern in every respect in its layout and equipment, this building supplies a type of accommodation and service has not been attempted previously

in Vancouver. Situated at some distance from the main group of buildings, it is practically a self-contained unit and includes separate X-ray, physiotherapy and metabolism laboratories. A fully equipped operating suite is provided on the top floor. A feature of the operation of this building is the central tray service whereby the diets are completed for each patient under the check of a dietitian, before they leave the kitchen in the basement, and are carried by automatic elevator direct to each floor.

The Board of Directors has recently given notice of a revision of its by-laws as they affect the organization of the attending medical staff, and of its appointment of the following senior members, the first named have been subsequently elected as chairman of the department:

MEDICINE:

General—	Drs. B. D. Gillies, Wallace Wilson, F. N. Robertson, C. H. Vrooman.
Neurology—	Dr. F. Brodie.
Psychiatry—	Dr. J. G. McKay
Dermatology—	Dr. T. R. B. Nelles
Tuberculosis—	Drs. Morris and Barker.
General—	Drs. P. A. McLennan, A. B. Shinbein, G. E. Seldon.
Urology—	Dr. A. W. Hunter.
Orthopaedics—	Dr. F. P. Patterson.
Proctology—	Dr. J. A. Sutherland.
OBSTETRICS AND GYNAECOLOGY—	Drs. W. B. Burnett and J. J. Mason.
PEDIATRICS—	Drs. E. D. Carder and C. F. Covernton.
EYE, EAR, NOSE AND THROAT—	Drs. G. C. Draeseke, W. E. Ainley, F. W. Brydone-Jack and J. A. Smith.

* * *

In continuous occupation for more than twenty years, the wards in the main building are undergoing a much needed renovation which has necessarily been extended to many renewals of plumbing and the whole re-wiring of parts of the electrical system. A matter of considerable expense, this work is opportune at the present time when ward accommodation has been released by transfer to other buildings; in fact, it is doubtful what other chance would have permitted its accomplishment. By fall, it is anticipated that the renovations, which are being carried out by the mechanical staff, will have completely restored the old building to its full capacity for heavy service.

We are very sorry to announce the resignation of Miss K. W. Ellis, R.N., who has held the position of Superintendent of Nurses in the Vancouver General Hospital since 1921. During her very successful tenure of appointment, Miss Ellis has met many changing situations created by an ever increasing number of hospital days and coincidental additions to the activities of the Training School. Before leaving at the end of June to attend the International Congress of Nurses at Montreal, Miss Ellis was the recipient of a number of presentations which included

one from the Directors and Officers of the hospital. She will travel abroad during the summer and it is our earnest wish that she may find rest and pleasure in the relaxation of laying aside for a while the manifold responsibilities which she has shouldered so well since she came to Vancouver.

Owing, perhaps, to the very widespread notice given of its requirements, the Vancouver General Hospital has secured a larger number of internes than has been possible for some years previously. It is still desired to add further to their numbers, the new staff organization carrying with it plans for ward attendance which will utilize the services of many internes. The present interne staff is:

Dr. H. S. Stalker	U. of Manitoba, 1928
Dr. Murray Baird	Oxford, 1924
Dr. N. B. Hall	McGill, 1927
Dr. R. K. Johnston	Kingston, 1916
Dr. P. A. McDonald	Western Univ., 1903
Dr. D. R. Chisholm	Dalhousie, 1927
Dr. H. J. Nunn	Western Univ., 1928
Dr. C. Brown	Dalhousie, 1929
Dr. J. H. Chapple	Minnesota, 1929
Dr. R. Harlow	Dalhousie, 1929
Dr. L. M. Mullen	Toronto, 1929
Dr. C. Pitts	Kingston, 1929
Dr. E. A. Taylor	Iowa, 1929
Dr. H. B. Galbraith	Manitoba, 1930
Dr. B. M. Unkauf	Manitoba, 1930

* * *

HEAD INJURIES

Given before the Vancouver Medical Association, Summer School, 1929, by Dr. Ernest Sachs, St. Louis, Mo.

The most important thing to remember about a fracture of the skull is that the fracture is *unimportant* and that the *important* point to remember and determine is what has happened to the intracranial contents.

Therefore though in every case of head injury we try to determine if there has been a fracture, our greatest concern must be the nature of the intracranial injury, for the treatment of the patient depends on this factor and so does the prognosis. Fractures of the skull may be simple or compound, and these may be either linear, depressed, vault or basal. With any one of these fractures there may be intracranial injuries.

These intracranial injuries will all fall into one of the following groups:

1. Frank haemorrhage from a ruptured vessel.
2. Contusion and laceration of the brain.
3. Rupture of the arachnoid with escape of cerebrospinal fluid into the subdural space.
4. Oedema of the brain.
5. Concussion.

Any one of these injuries may have associated with it evidence of increased intracranial pressure.

How, then, may we distinguish these various injuries?

1. Haemorrhage. As a rule when a vesesl is ruptured, it is the middle meningeal, or a branch of it. This may occur without any fracture being present and very little if any brain injury. The classical picture of such a hemorrhage is the momentary period of unconsciousness followed by the return to consciousness, the lucid interval, and then a second period of unconsciousness which comes on in minutes, hours, and rarely in the course of several days. The extent and rapidity of the haemorrhage is the factor that determines the rapidity with which the second period of unconsciousness and deepening coma develops; while the first brief unconscious period is due to the force of the blow, the second is due to the gradually developing compression due to the clot. With this deepening coma there are certain characteristic signs and symptoms. If the blood pressure is frequently observed every fifteen minutes, a progressive rise of blood pressure will be noted and with it a slowing of the pulse. If the patient should have fever at this time, what appears to be a normal pulse may actually be a slow pulse in view of the elevation in temperature.

There may be a hemiparesis or hemiplegia with the characteristic increased pathological reflexes and the presence of such pathological reflexes may be the only means of knowing on which side the vessel has given way. The reflexes will be of course increased on the side opposite the lesion.

The eye grounds may show some changes but in the vast majority of cases they do not show much abnormality, possibly oedema of the disc and full veins, but very, very rarely a choked disc. There may be Jacksonian convulsions.

The patients with contusion and laceration do not have the lucid interval nor do they have a rising blood pressure, but they may be in various stages of unconsciousness, depending upon the severity of the brain injury. With such contusion and laceration there commonly develops oedema of the brain and this I believe is an important factor in the unconsciousness and the associated increased intracranial pressure.

In other cases there may be very little contusion and laceration but rapidly developing pressure symptoms due to the rupture of the arachnoid and the constant pumping of cerebrospinal fluid into the subdural space where it collects and cannot be absorbed. The picture these cases present is very similar or identical to that of a middle meningeal hemorrhage. I have operated two such cases expecting to find a hemorrhage and found slightly yellow cerebrospinal fluid in the subdural space under great pressure. With the evacuation of this fluid, the patient's symptoms promptly cleared up.

Finally we have so-called concussion—a most unfortunate term. It may include any of the cases which have a contusion and laceration and these constitute the vast majority of head injuries. There is no known pathology to concussion, consequently it is really impossible to

speak intelligently about it but the term is in the literature and we cannot ignore it. My own feeling is that only those cases should be called concussion that have a slight cerebral trauma. The patient who is hit with a golf ball and is stunned or perhaps momentarily unconscious, has a headache and perhaps a slow pulse for an hour or two, but no neurological symptoms.

These then are the various types of lesions that may occur with an injury to the head. How are they to be dealt with?

First, the compound fractures. These are to be treated like all potentially infected wounds elsewhere in the body. They should be cleansed out, debrided, and sewed up without drainage. especially if the dura has been torn. Such a debridement may be a very formidable operation for in order to get a good result all traumatized tissue must be excised, brain as well as dura, and the more superficial tissues. The neurological symptoms should be disregarded as the problem is entirely one of preventing infection.

Depressed fractures. My rule and firm belief is that all depressed fractures, even if they are producing no symptoms, should be elevated since it is these cases that are more likely to develop symptoms of epilepsy. If the dura is torn, all tissue that may form a scar is to be removed. Brain wounds heal much more kindly after clean excision.

All cases of frank haemorrhage should be operated promptly and the guide as to where to operate should be the neurological symptoms, not the point where the blow was struck or the site of fracture. The middle meningeal is often injured by contrecoup.

From this it might appear that I advocate much surgery in head injuries; far from it, for the compound and depressed fractures and middle meningeal haemorrhages constitute but a very small portion of all head injuries. The vast number, in fact, most of the cases have a contusion and laceration and in these the problem is to combat cerebral oedema. This is most effectively done by dehydration. Magnesium sulphate in saturated solution per rectum every four hours or by mouth if the patient is not vomiting; intravenous glucose, 50%, or sodium chloride saturated solution intravenously.

* * *

TUBERCULOSIS OF THE KIDNEY AND URETER

By Dr. O. S. Lowsley, New York

Being an abstract of an address delivered before the Summer School, (June, 1929), of the Vancouver Medical Association.

This type of tuberculosis is always secondary and never primary. The portal of entry may be from the epididymis by way of the lymphatics to the glands at the hilus or it may be blood borne from a distant focus such as, the lungs or throat. Often the source is obscure. The surprising thing is that there is not more tuberculosis of the urinary tract when there is marked tuberculosis elsewhere. It is a fact that tubercle bacilli may pass through the entire urinary tract in moderate

numbers for a long period of time without causing any recognizable infection.

On the other had there are certain rare cases of renal infection in which there is marked peripheral tuberculosis and no organisms appearing in the urine, the lesion having sealed itself off perfectly.

All grades of the condition may be found from solitary calcified lesions of small size to tuberculous abscesses extending even to autonephrectomy.

Symptoms

The urinary symptoms are at first frequency both day and night, this later becomes painful extending even to strangury. There is hematuria present usually fairly early and always pyuria later.

The general symptoms consist of loss of weight although this is not invariably the case, in fact, some cases appear to be very well fed in spite of the trying disturbance to rest and sleep due to urinary symptoms.

All cases are neurotic. They often do not have any pain in the lumbar region or over the course of the ureter. There is often pain in the suprapubic region fairly early.

One must carefully question the patients regarding any previous history of tuberculosis of the lungs, throat or epididymis.

Examination

General: A thorough general physical examination is made of the entire body in the usual way.

Inspection: It is particularly noted whether the patient is poorly developed, has a general attitude of nervousness, and the body carefully inspected for evidence of pulmonary damage.

Palpation: In addition to the general examination of the body the loin is carefully felt bimanually to determine whether the kidney is palpable, tender, or enlarged. The pressure is made over the course of the ureters to determine whether there is tenderness present. In the male the testicles, epididymis, prostate and seminal vesicles are examined for evidences of tuberculosis.

Percussion: Sometimes reveals enlargement of a kidney which cannot be felt. This is particularly true of well fed patients. Ballottment may reveal an enlarged or tender kidney not otherwise made out.

Special Examination

The urine is examined completely including an occult blood test and carefully search for tubercle bacilli by all methods (including Guinea Pig inoculation and potato culture.

Cystoscopy: Ordinarily novocaine borate solution one per cent. will be a satisfactory anaesthetic; if, however, the patient has a particularly irritable bladder it is wise to do the cystoscopy under sacral anaesthesia.

The vesical fundus is carefully examined for tuberculous ulcerations or other evidences of irritation. The uretural orifices are observed and any pathological appearances carefully noted. The trigone and vesical orifice are then observed for oedema or other irritative lesions.

The ureters are then catheterized. One may not be able to get in both sides in which case all the tests are done as usual, the specimens being removed from the bladder which will give us information regarding the secretions of the side not penetrated. The specimens thus collected are sent for comparative urea, microscopic, guinea pig inoculation, and the potato culture. A comparative phenolsulphonephthalein test is then made in the usual manner.

A plain X-ray is followed by a pyelogram on the side which has been determined by this time to be defective. A ureterogram is then done by withdrawing the catheter and injecting sodium iodide, the patient being in a sitting posture.

If neither ureter can be catheterized the bladder is irrigated for one week with Rivanol dextrose 1-1000 or Acriflavine 1-6000 and then a further attempt made to examine both sides. If neither ureter can yet be catheterized an indigo carmine test is done. The output from each kidney is observed and an idea may be obtained regarding the comparative function of the two kidneys.

Perirenal insufflation by means of oxygen or other gas after the method of Carelli may bring out the kidney shadow sufficiently.

Operative Treatment

When one kidney only is involved very definitely, nethprectomy and ureterectomy under regional anaesthesia is the procedure of choice. If one kidney is very badly involved and the other only slightly so as shown by functional tests one also performs a nephrectomy. One never operates unless the remaining kidney is able to sustain life as demonstrated by the various functional tests above mentioned.

Kidney Operation Under Paravertebral Anaesthesia

Certain conditions such as tuberculosis make it particularly important not to give any type of general anaesthesia for kidney operations; therefore, the use of procaine 1% for the purpose of inducing anaesthesia by the block method is particularly useful in urological surgery.

The administration of this anaesthesia is quite easily accomplished. Wheals are made in the skin, following which a needle is passed to the angle formed by the transverse process and the lamellae of bone covering the spinal cord. The posterior roots emerge just at this angle and therefore the needle is passed over the edge of the bone and from three to five cubic centimeters of 1% procaine is induced into the area around the emerging routes of the eighth, ninth, tenth, eleventh and twelfth dorsal and first lumbar nerves. A particularly large amount of the solution is introduced into the costo-vertebral angle formed by the twelfth rib and the spinal column, because here emerge three important innervations of the loin, namely the twelth subcostal nerve, the ilio inguinal

and the ilio hypogastric nerves. Superficial and deep infiltration of procaine is used in the loin. In addition a long needle is introduced into the region of the splanchnic ganglion just below the costo-vertebral angle and six or eight cubic centimeters of procaine solution is injected into this area.

The patient is then placed on the well side, the diseased side being put on a stretch by a special appliance used in kidney surgery. The incision is then made through the skin and deepened through the muscle wall of the loin, care being taken to avoid injury to the important nerves of the loin which pass through this region. The incision of the costo-vertebral ligaments allows the twelfth rib to swing up so that it is not necessary to resect a rib. However, this is unhesitatingly done if it is deemed advisable. The fatty capsule surrounding the kidney is then incised and separated, the kidney freed by blunt dissection from surrounding structures and any aberrant vessels that are met are ligated and cut. The ureter is then isolated and ligated. The vascular pedicle is freed from surrounding structures, clamped with a kidney clamp and then ligated before being incised. At the time, the knot is tied tightly, the clamp is relaxed, thus allowing the pedicle which has been pressed into a ribbon form to assume a circular form and thus prevent slipping of the vessels after the excision of the kidney. Having tied this knot firmly but not tight enough to cut through the blood vessels the pedicle is incised and the kidney removed. It is our custom to put a transfixion suture in the pedicle, tying it beneath the first ligature before finally removing the clamp. This permits one to be certain that there will be no bleeding. The abdominal wall is now repaired in layers with proper drainage of the area of operation. We believe that the patient is much better off to have his wound repaired in layers than by the method sometimes used abroad of repairing the abdominal wall *en masse*. The tuberculosis may be accompanied by some other pathological lesion such as case No. 1, in which the tuberculosis lesion occurred in an adenomatous hypertrophy of the prostate gland.

There are very few conditions in which surgical removal of a tuberculous prostate is indicated. Evacuation of tuberculous abscess is to be avoided when possible as such a procedure is liable to be followed by sinuses which heal slowly or not at all and may become a source of great annoyance.

Non-Operative Treatment

It is our practice to subject cases that have been operated upon as well as those upon whom operation is not done to a continual period of observation and care.

In the clinic which we have established for this purpose and in fact for the treatment of all cases of post operative and inoperable tuberculosis of the organs of the genital and urinary tracts, the patient's temperature is taken and recorded, the weight is observed. Instructions as to diet, exercise, rest, fresh air, sunlight and other hygienic measures are carefully explained and enforced as far as possible. In addition parallel series of cases are being observed, one group of which is given

Alpine light or quartz light therapy and the other Koch's old tuberculin in graduated doses.

At the clinic for the treatment of inoperable and postoperative Urologic Tuberculosis, Urological Department, (James Buchanan Brady Foundation), of the New York Hospital, tuberculin has been in use for more than three years. It is not used alone but it is included in the regime of treatment as an adjunct or subsidiary agent. The regime comprises besides tuberculin, the hygienic, dietetic and rest treatment of tuberculosis, mercury vapor quartz light therapy, heliotherapy and the indicated urologic treatment. The general plan is to combine the urologic treatment with the treatment of tuberculosis to the extent it is applicable, thus developing a regime of treatment which may be adapted to the needs of the individual patient. Those patients with active pulmonary tuberculosis in addition to their urologic lesions are not given tuberculin.

The theory upon which tuberculin is given a place in the general plan of treatment is the present day accepted theory that tuberculin causes an inflammatory focal reaction at the site of the disease and thus promotes fibrosis of the lesion. It is recognized that it is difficult to bring about unharmful focal reactions since the characteristics of the lesions vary so widely, particularly in renal tuberculosis. In the same renal lesion young tubercles, old tubercles, small uncaseated tubercles and large pus filled or fibrotic cavities frequently coexist. It is evident that the effects of a given amount of tuberculin on the various lesions must vary widely. Therefore, it has not been deemed wise to adhere to the plan of small dosage relying on the appearance of any evidence of local, focal or constitutional reactions as the guide to the dosage. This method is of course open to criticism on the grounds that focal reactions are not always obtained when there is no subjective or objective evidence in them. However, the method seems to have worked out satisfactorily.

Koch's old tuberculin is the only tuberculin used. It was chosen for no particular reason except a somewhat more extensive experience in its use and it has been suggested that it causes more inflammatory changes at the focus of the disease.

Serial doses begun in small amounts are slowly increased until evidence of a local or constitutional reaction occurs, then the dose is reduced and continued with a cautious increase until a reaction again occurs. It is again reduced and continued as before. The usual beginning dose is one-tenth c.c. of a one to ten million dilution of tuberculin. The injections are given subcutaneously on the outer aspect of the upper arm.

The serial dilutions of tuberculin are prepared in the following manner which is at least in part widely used. Seven small wide mouthed glass stoppers bottled, a graduated one c.c. glass pipette and a graduated ten c.c. glass pipette are sterilized. In one of the glass bottles one c.c. of Koch's Old Tuberculin is placed. To this is added nine c.c.

(*Continued on page* 233)

OUR PROBLEM

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British Columbia Laboratory Bulletin

Published irregularly in co-operation with the Vancouver Medical Association Bulletin, in the interests of the Hospital, Clinical and Public Health Laboratories of B. C.

Edited by

DONNA E. KERR, M.A., OF THE VANCOUVER GENERAL HOSPITAL LABORATORIES

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BLOOD SUGAR DETERMINATIONS

J. E. MATHESON, M.B.
Technical Medical Assistant, V. G. H. Laboratories.

In an effort to be of the most aid to the practising physician in the treatment of patients, there will be published, in this Laboratory Bulletin from time to time, short articles on the various laboratory examinations and their interpretations.

One must not forget that a laboratory examination is only an additional aid to the physician, to be correlated with his other findings, history and physical examination. It is not and cannot be of value if carried out at random, being then, more or less, a shot in the dark; and further it cannot be expected to be, in itself, an absolute, and complete means of diagnosis, forgetting all other methods. True, the occasional shot in the dark does sometimes reveal the true source of trouble but this is an exceedingly uncertain method. Laboratory procedures are additional aids as the stethescope is to the ear, and the X-ray machine to the eye.

BLOOD SUGAR

Blood sugar determinations should be asked for only in those cases in which the other findings, history, physical and urinary, suggest an altered blood level. It might be as well to mention here that in suggestive or borderline cases of diabetes single blood sugar determinations are of little value. It is in this type of case that a sugar curve is indicated.

BLOOD SUGAR CURVE

On the other hand, the known diabetic is in no way benefited nor is his treatment enhanced, by his being submitted to a sugar curve determination. The sugar curve is a sugar tolerance test to determine, in a patient suggesting a diagnosis of diabetes, if the blood sugar content will rise above the normal level and how long it will be maintained above the normal, following the ingestion of 100 gms. of glucose. The healthy fasting individual should not, following the ingestion of 100 gms. of glucose, show a blood sugar above 160-180 mgms. per

100 cc. of blood and by the end of two hours this level should have dropped to normal again. There should be no glycosuria.

The patient is asked to fast over night in order that the result will in no way be distorted by any peculiarities or variations in diet for which he is responsible. The first sample of blood taken, before feeding glucose, therefore, gives the fasting blood sugar level for that individual, i.e., a base line from which can be calculated the subsequent changes.

The interpretation of these subsequent changes is important. In normal individuals the rise from the fasting blood sugar base line, say 80 mgs. to, say, 150 mgs. per 100 cc. occurs within the first hour, returning to normal in the second hour. In pathological conditions (diabetes, hyperthyroidism and severe nephritis) the curve rises to a higher peak and remains high for a period of three hours or longer. In diabetes particularly the curve is also longer in reaching the peak, usually about two hours. Some regard the height of the curve, others the length of time the curve remains high, as the criterion for a diagnosis of diabetes.

High blood sugar levels may be encountered in conditions other than diabetes, as hyperthyroidism, severe nephritis, pancreatic disease and certain liver disorders, so that an abnormal sugar curve report indicates only the amount and the degree of the impaired sugar tolerance, not the final diagnosis.

Diabetic Coma

In the treatment of cases in diabetic coma, we frequently see a rise in blood sugar content over that found on admission, even after treatment has been instituted. The patient even when given insulin along with an interstitial of glucose may show this rise in the second sample of blood taken up to two hours. The insulin not having had sufficient time to act has no effect on the blood sugar level, while the interstitial has produced a further rise in blood sugar. This would seem to indicate that 1 - 2 hours after the first dose of insulin, the interstitial of glucose should be given, *at that time repeating the insulin,* should the blood sugar determination warrant it.

In known cases of diabetes which have been taking insulin and which are seen in coma, it behooves one to have a blood sugar determination done at once, in order to rule out the possibility of the patient being in a state of hypoglycemia.

Blood sugar determinations are done on unclotted blood samples. In those instances where the blood has to stand any period of time before being examined, a preservative as well as an anticoagulant should be added. Here we use a mixture of one part thymol to ten parts sodium fluoride, of which 0.11 gms. are added to the tubes for each 10 cc. of blood.

With the particular method used in the Vancouver General Hospital Laboratories, the normal limits for blood sugar concentration are *80 - 120 mgms.* per 100 cc. (Other methods give normal limits as 70 - 80 and 80 - 110, but of course it is the relative not the absolute which is of practical significance).

The upper limit is set by the kidney threshold, i.e. the point at which the glucose commences to "spill over" into the urine. In diabetics this renal threshold is frequently raised.

There are numerous factors which influence carbohydrate metabolism. Fasting decreases the tolerance of the body for carbohydrate. On the other hand diets of protein, and those of carbohydrate increase the capacity of the body to use glucose while a diet of fat decreases this capacity.

Preliminary Technique

FASTING SUGAR

After an overnight fast, the sample of blood is taken as for Wassermann from the median basilic vein, and placed in the specially prepared tube.

GLUCOSE CURVE

After an overnight fast, the sample of blood is taken as above and the patient is then given 100 gms. of anhydrous glucose, along with the juice of a lemon. Samples of blood are taken ¾ hour, 2 hours, and three hours after. The urine is also collected at the same times and examined quantitatively for sugar.

The actual determination is done by Folin and Wu's method. The latest method, though giving perhaps a more absolute result, has not been adopted widely for routine examination, being more complicated and lending itself less readily to ordinary rapid laboratory requirements. The results obtained are not any more satisfactory from the clinical point of view. The method as given in the Journal of Biological Chemistry, 1920, 41, 367, "Determination of Sugar in the Blood," is the technique used in this laboratory.

1. Single fasting blood sugar determinations are of little value in borderline cases of diabetes, except when high results are obtained.
2. A blood sugar curve determination is only of use in borderline cases suggesting diabetes, from the other findings, and showing a normal fasting blood sugar.
3. The report of a sugar curve is a record of the patients glucose tolerance and not a final diagnosis.
4. The amounts determined are relative quantities and vary slightly with the method used.
5. Patients who have been on insulin, if in coma, should at once have a single blood sugar determination to ascertain whether the condition is one of hyper—or hyper-glycemia.
6. The examination is done on whole, unclotted blood, which must have a preservative added to it if it will be standing any appreciable length of time before examination.

* * *

"TEN CLINICAL APHORISMS"

From an editorial in the Journal of Laboratory and Clinical Medicine, March, 1929, extracted from article by Reed and Rockwood on Chemical Tests of the Blood.

"1. Never ask for both non-protein nitrogen and urea on the same patient.
2. Except in emergency, never ask for a non-protein nitrogen determination when the phenolsulphonephthalein secretion is normal. Determine the output of the phenolsulphonephthalein first.
3. Never ask for the creatinine value of the blood unless the non-protein nitrogen content is above 60 mg. per hundred cubic

centimeters. Then determine the concentration of the creatinine as a matter of routine.

4. Order determinations of the uric acid content only in cases of gout.
5. Order blood-sugar determinations only in cases of diabetes or suspected diabetes or hypoglycemia.
6. Ask for a test of the carbon dioxide combining power of plasma in:
   (*a*) Diabetic patients with diacetic in the urine.
   (*b*) Uremic patients with nitrogen retention and dyspnea.
   (*c*) Patients showing toxic symptoms who are receiving large doses of alkali.
   (*d*) Conditions associated with disturbed motility of the gastrointestinal tract with marked toxemia.
   (*e*) Tetany of any type.
7. Order chlorides, non-protein nitrogen and carbon dioxide combining power determinations in all cases of disturbances of the gastrointestinal motility with marked toxemia.
8. Ask for serum bilirubin or icterus index tests in cases of jaundice, but do not pay much attention to borderland values.
9. Ask for blood calcium determinations only in cases of rickets and infantile tetany.
10. Order inorganic phosphorous tests, if practicable only in cases of rickets and infantile tetany."

* * *

TWO MONTHS' SERIES OF WASSERMANN AND KAHN TESTS

MABEL M. MALCOLM
Head, Bacteriology Division, V. G. H. Laboratories.

After running as a routine test for two months the Kahn Precipitation Test and the Wassermann Complement Fixation Test in a parallel series, we find that the Kahn Test shows 20% more positive reactions than the Wassermann Test.

The following table is a resume of results obtained during the two months:

Number of Wassermann Tests	1841	3558
Number of Kahn Tests	1717	
Number of agreements in both tests	1366	
Number of Kahns positive and Wassermanns negative	351	
Number of Wassermanns positive and Kahns negative	0	

This series of about 1800 comparative tests tends to show that the Kahn Test is more sensitive both in picking up new cases and in remaining positive after treatment has been given. In all cases where we have been able to obtain information regarding the disagreements there has been reason for a positive reaction; and we have not been able to find any instance where a false positive reaction has been obtained with the Kahn Test.

We sincerely hope that physicians will continue reporting to us the clinical conditions of patients showing "Kahn positive, Wassermann negative," especially if the clinical findings indicate a discrepancy from the Kahn positive.

(*Continued from page* 228)

of the diluent consisting of distilled water to which eight-tenths of one per cent. of sodium chloride and twenty-five hundredths of one per cent. of phenol have been added and sterilized by autoclave. The bottle is labelled O.T. 1 and for convenience the date of the preparation is also placed on the label. The bottle is shaken vigorously by hand and one c.c. is withdrawn and placed in one of the remaining bottles. To this is added nine c.c. of the diluent and the bottle is labelled O.T 01. After shaking, one c.c. is then withdrawn from this bottle and the dilutions are carried on in the same manner through the remainder of the seven bottles. There are then seven bottles labelled as follows:

O.T. 1; O.T. .01; O.T. .001; O.T. .0001; O.T. .00001; O.T. .000001; O.T. .0000001.

The tuberculin is not designated in milligrams or grams as the above liquid measurements have been found practical for both estimating the individual patient dosage and for record keeping. The dilutions are kept in the refrigerator in the intervals between clinic sessions. Fresh dilutions are made about every two weeks during summer months and monthly during the winter. The diluent has been kept as long as a year with no evident deterioration.

Conclusions

In conclusion I wish to repeat that the diagnosis of tuberculosis is now based largely on the appearance of the pyelogram and the decision to remove a kidney for tuberculosis is based entirely upon its function as compared with the other. The mere finding of tubercle bacilli in the urine from a suspected kidney or the positive guinea pig test plays almost no part in one's decision to remove the kidney.

The removal of a tuberculous kidney marks the beginning of the wise surgeon's work and not the end. We now feel that the after care of this type of patient is the most important feature of such a case; also that the word "arrested" is better when applied to a case of urinary tuberculosis than cured just as the medical man considers the pulmonary case arrested and never cured.

* * *

THE NEW "CANADIAN JOURNAL OF RESEARCH" *of the* NATIONAL RESEARCH COUNCIL OF CANADA

Volume 1, No. 1, May, 1929 of this welcome accession to Canadian Scientific literature is now in our hands. All Canadians, and especially all interested in Canadian contributions to science, must welcome it heartily. Not always has it been fully recognized that Canada has contributed very notably to literature, especially to scientific literature, and to such an extent that Canada and Canadians rank very high indeed in scientific fields; outstandingly in Medicine, e.g. Osler, Barker, and in Geology, e.g. Dawson, Coleman.

The first volume of this new Journal, introduced by a Foreword from H. M. Tory, contains articles, all from Canadian sources, on Rust

in Wheat, Aluminates of Calcium, Vaccination with B. C. G., Ultra-violet light—a wide range. The Universities of Alberta, Saskatchewan, Manitoba, Toronto, Queen's, McGill, and Montreal, the Federal Department of Agriculture, the Biological Board of Canada, Sanatoria in Qu'Appelle, Saskatchewan and London, Ontario, and the Sun Life Assurance Company, have all contributed to one or more of the co-operative investigations here reported, in conjunction with the National Research Council of Canada.

Amongst other items of interest, the following extract throws a side-light on a biological problem of everyday practice of medicine, in a field not yet fully worked out—the problem of general resistance to infection as distinct from specific resistance.

Newton, Lehmann and Clarke of the University of Saskatchewan, reporting on "Studies of the Nature of Rust Resistance in Wheat" as the first article of the first volume, make the following statements (the italics are ours):

"There existed some years ago a popular impression that the susceptibility of a plant might be influenced directly by its general condition of health, and that improved methods of culture might maintain the plants in a thriftier state in which they could better ward off their fungus enemies. In view, however, of the quasi-symbiotic relationship between susceptible host and parasite, it is not surprising to find that most investigations on this point *have shown the reverse to be true.* Stakman and Levine (63) found that adverse environmental conditions, unfavourable for wheat, were also unfavourable for the rust parasite, decreasing its virulence and spore size. Raines (57) reported a direct correlation between vigour of host and virulence of disease in a number of other cereal rusts. An apparent exception to this relationship is reported by Lee (37), who was able to prolong for several months the sound, healthy condition of sugar-cane cuttings in soil, by a system of pruning which maintained the cuttings in an actively functioning state. Normally, when the new shoots are allowed to form independent roots, the cuttings fall an early prey to soil fungi. But it would appear that the issue is complicated here by the onset of natural necrosis, independent of parasitic attack, in tissues which have ceased to function.

Peltier (53) investigated the influence of soil temperature, soil moisture, air temperature, relative humidity, and light intensity on infection by wheat stem rust. He found that the longevity of the urediniospores, the ease of initial infection, and the vigour of development of the disease could be modified to some extent by controlling these factors; also that two biologic forms of rust showed certain differences in adaptations. *In general, however, changes in growing conditions caused the vigour of host and parasite to fluctuate together,* and in no instance was the characteristic type of infection changed.

While it appears, therefore, that we cannot look to environmental adaptations as a basis for true resistance or susceptibility, we must nevertheless recognize the direct relation of environment to the metabolic status of the plant, and in consequence to the probable virulence of disease attack. Henning (28) drew attention to the relation between

resistance to yellow rust in wheat and the *acid-sugar ratio in the plants found in certain expeṛiments.* Dickson and Holbert (21,22) were able to modify the severity of seedling blight in corn and wheat by controlling the growing temperatures. This result was associated with the altered composition of seedlings grown at different temperatures, particularly in regard to carbohydrate distribution. *Pentose substances were shown by culture experiments to be superior to hexose compounds* as a source of carbon for the causal organism, and in practice those conditions which favoured the accumulation of pentosans in the seedlings also favoured the development of blight. The metabolism of susceptible and resistant host strains was significantly different, and seemed in this instance to be the determining factor in disease reaction."

There is much "food for thought" in the above, which is recommended to students of these problems everywhere for careful consideration.

H. W. H.

* * *

B. C. MEDICAL ASSOCIATION NEWS

The Annual Meeting of the B. C. Medical Association will be held on Wednesday and Thursday, September 25th and 26th. A very strong clinical, business and social programme is being arranged, and already a great many out-of-town doctors have signified their intention to be present. The following gentlemen from the east are included in the list of speakers:

Dr. A. T. Bazin, President C. M. A., Montreal.

Dr. K. A. MacKenzie, Associate Profesor of Medicine, Dalhousie University, Halifax.

Dr. Geo. H. Murphy, Associate Professor of Surgery, Dalhousie University, Halifax.

Dr. G. E. Richards, Professor of Radiology, University of Toronto.

Dr. Geo. S. Young, Associate Professor of Medicine, University of Toronto.

Dr. H. B. Van Wyck, Associate Professor of Obstetrics, and Gynaecology, University of Toronto.

One need hardly add that this group of speakers will present a type of programme which will be most acceptable. Subjects will be published in the next issue of the *Bulletin.*

In addition to the above, Dr. Ross Millar of Ottawa will bring greetings from the Department of Health for Canada. Dr. G. Harvey Agnew will also have something to say about the Department of Hospital Service of the Canadian Medical Association.

Dr. A. T. Bazin, as President of the C. M. A. will speak on one subject only, viz.; "A potpourri—the Pitfalls of Practice." This is due to the fact that he desires, on this trip, to talk medical organization, etc., rather than to stress the scientific side of the programme from his point of view.

THE COOKING OF LIVER FOR THE TREATMENT OF PERNICIOUS ANÆMIA

By C. E. Pollock, M.R.C.S., Eng.

Reprinted from the Lancet, September 22, 1928.

Liver as usually cooked soon palls. Being myself an involuntary member of the "honourable company of liverers," and not relishing the prospect of having to eat the same preparation of liver four or five days a week, I set to work to find ways of converting our mainstay of life into an attractive item on the menu. I give the results obtained up to the present, and with further experience I hope to add to the list.

When cooking liver the following general rules should be observed:

(*a*) Fresh ox liver is more effective than calf liver.

(*b*) The cooking should be short, and the temperature should be kept as low as possible—just sufficient to make the liver seem to have been cooked.

(*c*) No more fat should be used than is actually necessary for each dish.

(*d*) Grilling makes the liver tough.

(*e*) Only a little salt should be used in the cooking; more can be added when it is eaten.

(*f*) Any sweet flavouring, such as chutney, should be used sparingly.

Some Recipes

Liver Sandwiches.—The following has been successfully used by friends for a child. Put the raw liver through a mincer and remove any fibrous parts. Spread the minced liver on thinly cut slices of bread and butter, or a piece of toast which has been split in two. In either case use little or no butter. Add pepper and salt according to taste, sprinkle it freely with fresh lemon juice, and a trace of grated onion. A few dabs of Bovril, or a thin layer of grated cooked ham improves the flavour. Finely-chopped pickles may be used in place of ham.

Fried Liver.—Cut the liver into rather thin slices. Put a small quantity of butter, margarine, or a slice of not very fat bacon into the frying-pan and heat to low frying temperature. Cook gently from five to ten minutes to suit the individual's taste.

Dry Curry.—Slice the liver as above. Put into the frying-pan a little butter and a dessert-spoonful of chutney with a squeeze of lemon juice. Heat this while stirring it to a low frying temperature. Roll the slices of liver in dry curry powder and place them in the pan. Cook gently for five to ten minutes.

Liver Puree.—(*a*) Prepare a white sauce. Stir in six ounces of grated raw carrots; if it is coarse, or, if young carrots are obtainable, the same quantity finely chopped. Boil gently for a few minutes. Stir in the minced raw liver and let it stand for three minutes on the warm top of the stove, away from the flame.

(*b*) Prepare a brown gravy, using as little fatty substance as possible. Bring this to the boil, then move the pan away from the flame, and stir in the minced raw liver. Let it stand for three to five minutes.

Green peas or finely-sliced young carrots improve the flavour. Serve on toast.

(*c*) Prepare a breakfast-cupful of Bovril or Marmite. Bring it to the boil, stir in the minced liver, and let it stand for a couple of minutes on the top of the hot stove. This is very useful when the liver is required at short notice.

Liver Soups.—Prepare a breakfast-cupful of any of the following soups: Tomato, veal broth, chicken, or rabbit broth. Many others, such as potato soup, game soup, milk and celery soup, make a pleasant variation. Bring the soup up to the boil. Take the pan off the fire, stir in the minced raw liver, and let it stand for a few minutes.

Minced Liver on Toast.—Prepare a tasty gravy flavoured with a sauce such as A. 1 or Harvey's. Chop the liver and cook gently in the gravy for three minutes, spread it on the toast, and serve hot.

Liver and Eggs.—Minced raw liver may be beaten up with milk and eggs and served as scrambled eggs. An omelette may be filled with minced liver cooked slightly in a tasty gravy.

Liver Roll.—Mince together twelve ounces of liver, six ounces of beef (preferably steak), and six ounces of rather lean bacon. Add a trace of finely chopped onion. Mix a teacupful of breadcrumbs with the minced liver and bacon. Beat up one egg and stir it into the liver mixture, flavouring the whole with a little tomato sauce. Wrap it in grease-proof paper, and cook in a steamer from one to one and a half hours. Let it get cold and eat it as a sandwich, or in place of cold meat. This is a useful preparation when travelling.

Rissotto.—Boil some rice in the ordinary way. Cut the liver into dice of about half an inch, and cook in a savoury sauce, tomato for preference. Place the cooked rice in a hot dish, making a hollow in the middle. Put the liver into this. If preferred, the liver may be sprinkled with lemon juice and lightly fried. In this case a well-flavoured sauce should be served to pour over the rice. Cooked macaroni may be used in place of rice.

Stuffed Potatoes.—Bake or boil two large potatoes in their skins. When cooked cut off the upper third. Scoop out one-third of the potato. Into the space thus formed put minced liver, previously cooked in brown gravy and well seasoned with ketchup and lemon juice. Mash the removed potato, and use some of it to form a cap to the liver. Place a thin slice of bacon over the top, and put them into a hot oven for three minutes.

Chicken and Liver Fricassee.—Minced liver mixes well with chicken fricassee prepared in the ordinary way.

Toad-in-the-Hole.—Liver may be used in this dish in place of beef. When making the batter stir in a teaspoonful of ketchup. Cold cooked liver and potato salad made with mayonnaise is excellent for an occasional change, but contains too much oil to be used frequently.

With experience other recipes will suggest themselves to the interested cook, and the anæmic brother will bless her ingenuity.

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VANCOUVER HEALTH DEPARTMENT

STATISTICS JUNE, 1929

Total Population (Estimated)		228,193
Asiatic Population (Estimated)		12,300
		Rate per 1,000 of Population
Total Deaths	197	10.50
Asiatic Deaths	25	24.73
Deaths—Residents only	171	9.12
Birth Registrations	335	17.86
Male 175		
Female 160		

INFANTILE MORTALITY—

Deaths under one year of age	14
Death rate per 1,000 births	41.80
Stillbirths (not included in above)	14

CASES OF CONTAGIOUS DISEASES REPORTED IN CITY

	May, 1929		June, 1929		July 1st to 15th, 1929	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Smallpox	22	1	13	0	4	0
Scarlet Fever	14	0	15	0	6	0
Diphtheria	35	0	26	1	14	1
Chicken-pox	65	0	27	0	4	0
Measles	607	1	236	5	10	0
Mumps	156	0	77	0	2	0
Whooping-cough	13	0	17	0	0	0
Tuberculosis	16	15	22	26	6	1
Erysipelas	8	0	12	1	4	0
Typhoid Fever	1	0	1	0	0	0
Poliomyelitis	2	0	0	0	0	0
Meningococcus Meningitis	5	2	1	1	0	0

N.B.—Typhoid case from outside City.

* * *

A SHOCK PROOF X-RAY APPARATUS

One of the large manufacturers of electrical machines has invented a new type of X-ray apparatus which is completely insulated in oil and with all high voltage wires eliminated.

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—From the *New England Journal of Medicine.*

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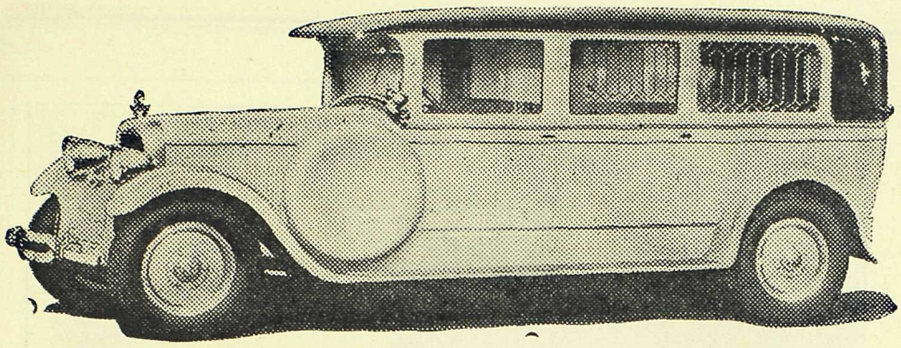

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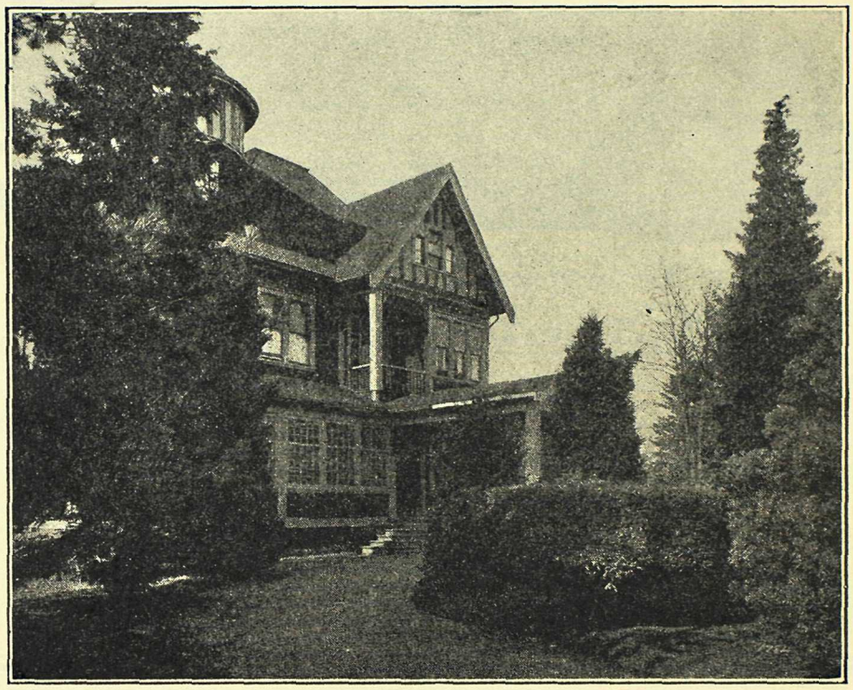

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