

THE
BAKER MEDICAL RESEARCH
INSTITUTE



FIFTH
ANNUAL REPORT
1930-1931

PREFACE.

During the past year the work of the Institute has been pursued with devotion. Important clinical problems have taken a gratifyingly large share of attention, and the co-operation between the staffs of the Hospital and the Institute has become increasingly intimate. Thus Mr. Baker's desire to have the work as practical as possible in its aims and objects is being definitely realised.

The progress of the scientific work essayed is recorded in the accompanying report.

(Signed) J. F. MACKEDDIE,

Chairman of the Trustees.

The Baker Medical Research Institute

ALFRED HOSPITAL, PRAHRAN, MELBOURNE

The Baker Institute and Pathological Department are under a unified administration.

TRUSTEES OF THE BAKER INSTITUTE.

DR. J. F. MACKEDDIE, Chairman, Hon. Physician to the Hospital.

R. H. WILKINS, Esq., Member of the Board of Management of the Hospital.

J. SUTHERLAND, Esq.

E. O'DONNELL, Esq., Hon. Treasurer to the Baker Institute and the Hospital.

JOHN TURNBULL, Esq. (Blake and Riggall), Honorary Solicitor.

E. H. FLACK, Esq. (Flack and Flack), Hon. Auditor.

LIEUT.-COL. J. H. P. ELLER, D.S.O., V.D., Secretary to the Trustees.

STAFF OF THE BAKER INSTITUTE.

Medical Personnel:

<i>(a) Full-time Workers—</i>	<i>Duty.</i>
<p>W. J. PENFOLD, M.B., CH.M. (EDIN.), D.P.H., B.HYG. (DURHAM), M.R.C.S. (ENG.), L.R.C.P. (LONDON)</p>	<p>Director of the Institute and Hon. Bacteriologist to the Hospital.</p>
<p>A. B. CORKILL, M.B., B.S. (MELB.)</p>	<p>Experimental Physiologist and Research Biochemist.</p>
<p>J. A. MCLEAN, M.D., B.S. (MELB.) (Resigned)</p>	<p>Biochemist of the Hospital.</p>
<i>(b) Part-time Workers—</i>	
<p>J. F. MACKEDDIE,* B.A., M.D., B.S. (MELB.)</p>	<p>Neurological Research.</p>
<p>R. A. WILLIS, M.D., B.S. (MELB.)</p>	<p>Pathological Research with special reference to malignant tumours.</p>
<p>JOHN FIDDES,* M.D. (ABERDEEN) (Resigned)</p>	<p>Experimental Physiologist.</p>
<p>H. LAWRENCE STOKES,* M.B., B.S. (MELB.), M.R.C.P. (LONDON)</p>	<p>Clinical Electrocardiographist.</p>
<p>CHAS. E. SUTHERLAND,* M.B., B.S. (MELB.), M.R.C.P. (LONDON)</p>	<p>Investigation of methods for the detection and removal of the allergic state.</p>
<p>ALFRED J. TRINCA,* M.D., B.S., (MELB.), F.R.C.S. (ENG.), F.C.S.A.</p>	<p>Hon. Consulting Pathologist to the Institute.</p>
<p>HUGH C. TRUMBLE,* M.C., M.B., B.S. (MELB.), F.R.C.S. (ENG.) F.C.S.A.</p>	<p>The Investigation of (1) the Nerve Supply and Musculature of Certain Abdominal Viscera, (2) other surgical problems.</p>
<p>J. RINGLAND ANDERSON,* M.C., M.B., B.S. (MELB.), F.R.C.S. (EDIN.), F.C.S.A., D.O.M.S. (LONDON)</p>	<p>Various Ophthalmological Investigations.</p>
<p>ROBT. FOWLER,* O.B.E., V.D., M.D., B.S. (MELB.), F.R.C.S. (ENG.), F.A.C.S., F.C.S.A.</p>	<p>Research on Treatment of Carcinoma of Uterine Cervix (in conjunction with League of Nations Cancer Commission).</p>

Medical Personnel: Part-time (Continued)—

G. A. KAYE,* M.D., B.S. (MELB.)	Analysis of Alfred Hospital Cases of Nephritis. Editor of a "Brochure on Anaesthetics."
EWEN DOWNIE, M.D., B.S. (MELB.), M.R.C.P. (LONDON)	Investigation of Arterial Disease in Diabetes.
LEONARD B. COX,* M.D., B.S. (MELB.), M.R.C.P. (EDINBURGH)	Study of the Histo-pathology of the Nervous System.
H. SHANNON,* M.D. (LONDON), D.P.H. (OXFORD)	Study of various problems in Tuberculosis.

Scientific Personnel and Assistants:

(a) Full-time Workers—

MR. JAS. SUTHERLAND	Bacteriologist.
MR. A. F. DOUTCH	Physical Chemist.
MARGARET E. LONG, M.SC. (MELB.)	Biochemist.
DOROTHY H. IRVING, B.SC. (MELB.)	Biochemist.
MR. GILBERT PARKER	Comparative Bacteriologist.
HILDRED M. BUTLER, B.SC. (MELB.)	Bacteriologist.
MR. CHAS. A. E. PRICE*	The Determination of the Refractive Index of the Body Fluids.
MR. E. M. BURT	Histological Technician.
GLEN BUCKLE	Assistant.
JAS. E. PAYNE	Assistant.
W. P. T. SORRELL	Assistant.

(b) Part-time Workers—

ISOBEL M. MCPHEE, B.SC. (MELB.)	Biochemist.
---	-------------

(One half of Miss McPhee's time is spent in hospital service as Assistant in the Asthma Clinic.)

PHYLLIS G. ASHWORTH,* B.SC. (MELB.)	The Comparison of the Kline and Wassermann Tests.
-------------------------------------	---

Secretarial:

MISS EDITH ROSS Secretary to the Director and Librarian to the Institute.

Animal Attendants:

ALEX. GRAY

LEN. SMITH Assistant.

CHAS. STEWART Assistant.

PATHOLOGICAL DEPARTMENT.

Medical Personnel:

(a) Full-time Workers—

R. A. WILLIS, M.D., B.S. (MELB.) Pathologist to the Hospital.

B. O. JONES, M.B., B.S. (MELB.) Assistant Pathologist.

H. A. PHILLIPS, M.D., B.S. (MELB.) (Resigned) . . . Assistant Pathologist.

(b) Part-time Workers—

PROFESSOR P. McCALLUM,* M.C., M.B., CH.B. Hon. Pathologist to the Hospital.

ALFRED J. TRINCA,* M.D., B.S. (MELB.), F.R.C.S. (ENG.), F.C.S.A. Hon. Curator of the Pathological Museum.

F. M. READ,* M.B., B.S. (MELB.) Assists the Curator of the Museum.

Scientific Personnel and Assistants:

MR. A. HYAMS Bacteriologist.

MR. A. H. ENNOR Assistant.

MR. REGINALD PROSSER P.M. and Histological Assistant.

GORDON LEY Assistant.

MR. ARTHUR STEELE* Assistant.

*Denotes Honorary Workers.

Fifth Annual Report

of

The Baker Medical Research Institute

April 30th, 1931.

Gentlemen,—

At the end of another year I should like to express to you the gratitude of the staff for the support that you have extended to us in the work. We have shared in the difficulties of the depression through which our country is passing, confident in your understanding and consideration.

As a staff we congratulate you on the recovery of Mr. Wilkins from his serious illness, and trust that he may be long spared to assist in the direction of the Trust.

We should like to be permitted to express our regret at the passing of Professor Brailsford Robertson, one of Australia's most devoted sons in the field of biological research.

During the past year relations have unfortunately been severed with valued colleagues. Dr. John Fiddes, Pathologist to the Hospital and Experimental Physiologist to the Baker Institute, left us to take up a position as Professor of Physiology in the University of Saskatchewan. During his time here he laid the foundations of a physiological unit, being associated in the work with Dr. Chas. Sutherland and Mr. H. C. Trumble, F.R.C.S. His scientific co-operation and friendship are greatly missed.

Dr. John McLean, Biochemist, and Dr. H. A. Phillips, Assistant Pathologist to the Hospital, left during the year for England to undertake further professional study. It is hoped that on their return opportunities will arise to enable them to continue in association with us in some branch of research.

Dr. Keith Hallam has also gone to England, and has found it necessary definitely to sever his connection with the Institute.

Mr. Gilbert Parker, who has done useful work in the investigation of various veterinary problems, now works here for only a few hours weekly, the great hulk of his time being spent in the private laboratory of Mr. H. S. Rudduck, Veterinary Surgeon of this city.

Dr. A. B. Corkill returned during the year from England after a period of fruitful work with Dr. Dale in the Medical Research Council Laboratory at Hampstead. He will largely take over the responsibility of the physiological work of the Institute. The training that he received with Dr. Dale eminently fits him for this work. Owing to the present need for drastic economy, no great extension in the physiological equipment has been possible during the year, nevertheless, recognising the importance of the work, the Trustees agreed to the purchase of a Schuster perfusion pump, a uterus bath and other accessories. This equipment, together with that collected by Dr. Fiddes, will enable an efficient, though small, physiological unit to operate. We believe these arrangements will result in much valuable work being issued from the Institute.

The vacancy on the pathological staff of the Hospital, created by the elevation of Dr. Fiddes to the Chair of Physiology at Saskatoon, has been filled by Dr. R. A. Willis, formerly Superintendent of the Austin Hospital. Since his coming he has clearly shown that pathological routine work, teaching and research will all reach a very high standard in his hands.

Dr. Geoffrey Kaye has returned from a tour embracing England, the Continent and the United States. During the tour he worked fruitfully with Dr. Griffiths, under Professor MacLean, on the Van den Bergh test, and also paid special attention to the anaesthetic work of the various countries he visited. He hopes to resume his work on the subject of nephritis at an early date at the Institute.

In August, 1930, Dr. Leonard B. Cox joined the Institute as collaborator with Mr. Trumble in his work on the innervation of some of the hollow viscera of the abdomen. It is hoped that he will be able to develop the microscopic neurological work of the Institute and the Hospital.

Dr. H. Shannon is about to join us with the object of investigating the precipitation tests that are used so greatly in France in the diagnosis and oversight of tuberculosis, syphilis, and other diseases. It is believed that Dr. Shannon's service in this direction will be of value both from the clinical and research points of view.

Miss Phyllis Ashworth gives us one morning weekly carrying out the Kline Test on all sera sent to the laboratory for examination by means of the Wassermann reaction. She proposes to make a comparison of the results obtained by the Kline and Wassermann methods as used in diagnosis and treatment.

We have all been put under a deep debt of gratitude to Miss Ross, our librarian, who has obtained innumerable references for us, translated literature when necessary, and given much secretarial and editorial help in the preparation of many of the papers.

Bacteriological Department :

Wassermann Tests	2,165
Gonococcal Complement Fixation Tests	17
Diphtheria Examinations	1,447
Examinations for Gonococci, etc.	1,465
Dark-ground Examinations	25
Blood Cultures	140
Sundry Cultures	317
Vaccines	99
Investigations for Typhoid and Dysentery	156
Widal Tests	10
Other Agglutination Tests	60
Pneumococcal Typing	57
Sundry Smears	85
Inoculations	100
Miscellaneous	3
	— 6,146
Total	<u>15,519</u>

RESEARCH WORK.

The work published during the year or in course of preparation for publication is as follows:—

(The papers are arranged in the alphabetical order of the names of authors.)

P. G. ASHWORTH, B.Sc.; and DOROTHY H. IRVING, B.Sc. :

“A Comparison of the Kline and Wassermann Tests.” In preparation.

A. B. CORKILL, M.B., B.S. (Melb.) :

“The Effects of Insulin and Adrenaline on Carbohydrate Metabolism.” In the press.

“The Effects Produced by Toxaemic States on the Actions of Insulin and Adrenaline.” In preparation.

LEONARD B. COX, M.D., B.S. (Melb.); M.R.C.P. (Edinburgh) :

“The Origin of Sluder’s or Spheno-palatine Neuralgia.” Appeared in the “Medical Journal of Australia,” 11th April, 1931, page 435.

“The Effect of Resection of the Sensory Root of the Fifth Nerve on Sluder’s Neuralgia.” In preparation.

EWEN DOWNIE, M.D., B.S. (Melb.); M.R.C.P. (London):

The Armytage Prize Essay—"Vascular Disease in Relationship to Diabetes Mellitus." Presented to the Australian Association of Physicians, 2nd May, 1931.

"Diabetic Gangrene." In preparation.

JOHN FIDDES, M.D.; H. LAWRENCE STOKES, M.B., B.S. (Melb);
M.R.C.P. (London); and S. E. ALLASON, B.Sc. (Melb.):

"The Action of Electrolytes on the Heart." Appeared in the "Medical Journal of Australia," 28th June, 1930, page 835.

ROBT. FOWLER, O.B.E., V.D., M.D., B.S. (Melb.); F.R.C.S. (Eng.); F.A.C.S., F.C.S.A.:

"Gynaecological Electro-Surgery with High Frequency Currents." Appeared in the "Journal of the College of Surgeons of Australasia," July, 1930, page 75.

"Treatment of Uterine Cancer." Read at the Second Cancer Conference, Canberra, March, 1931. In the press.

GEOFFREY KAYE, M.D., B.S. (Melb.):

"Anaesthetics," a brochure in course of preparation, edited by Dr. Kaye. Written by the anaesthetists of the Hospital.

MARGARET E. LONG, M.Sc. (Melb.), and EWEN DOWNIE, M.D., B.S. (Melb.); M.R.C.P. (London):

"Pruritus Vulvae in Relationship to Intermittent Glycosuria." In the press.

J. F. MACKEDDIE, B.A., M.D., B.S. (Melb.):

"Lipiodol—I. and II.," presented at a meeting of the British Medical Association, May, 1931. In the press.

JOHN McLEAN, M.D., B.S. (Melb.):

"Blood Cells: Recent Advances in Examination and Interpretation." Appeared in the "Medical Journal of Australia," 8th November, 1930, page 623.

W. J. PENFOLD, M.B., CH.M., B.Hyg., M.R.C.S., and A. HYAMS:

"A Dangerous Typhoid Carrier." Appeared in the "Medical Journal of Australia," 29th November, 1930, page 728.

W. J. PENFOLD, M.B., CH.M., B.HYG., M.R.C.S., and HILDRED
M. BUTLER, B.Sc.:

"Undulant Fever in Australia." Appeared in the "Medical
Journal of Australia," 31st May, 1930, page 702.

"The Aetiology of Eclampsia." In preparation.

"The Toxin of B. coli." In preparation.

"The Serum Treatment of Experimental Streptococcal
Infections." In preparation.

W. J. PENFOLD, M.B., CH.M., B.HYG., M.R.C.S., and DOROTHY
H. IRVING, B.Sc.:

"The Refractive Index of the Cerebro-Spinal Fluid, used
as a Check on the Chemical Analysis." Appeared in the
"Medical Journal of Australia," 14th June, 1930, page
772.

W. J. PENFOLD, M.B., CH.M., B.HYG., M.R.C.S., and GILBERT
PARKER:

"Active Immunity Against Bacillus Oedematiens, with
Special Reference to Black Disease of Sheep and the Pos-
sibility of the Prevention of Gas Gangrene in Man: A
Preliminary Communication." Appeared in the "Medical
Journal of Australia," 1st November, 1930, page 601.

W. J. PENFOLD, M.B., CH.M., B.HYG., M.R.C.S., and JAS.
SUTHERLAND:

"The Effect of Light on Blair Bell's Colloidal Lead." Ap-
peared in the "Medical Journal of Australia," 7th June,
1930, page 739.

"The Effect of the Gamma Rays of Radium and of X-Rays
on Blair Bell's Colloidal Lead." In the press.

"Electrolytic Precipitation of an Amphoteric Colloid." In
the press.

"The Active Immunization of Man Against the Toxins of
Certain Sporing Anaerobes." In preparation.

CHAS. E. SUTHERLAND, M.B., B.S. (Melb.); M.R.C.P. (London):

"Specific Desensitization in Asthma and Hay Fever." Ap-
peared in the "Medical Journal of Australia," 15th No-
vember, 1930, page 661.

"Some Observations on the Effect of Histamine on the
Bronchioles of Pithed Guinea-pigs." In preparation.

"The Anti-Anaphylactic Effect of Sodium Thiosulphate."
In preparation.

ALFRED J. TRINCA, M.D., B.S. (Melb.); F.R.C.S. (Eng.),
F.C.S.A.:

“The Treatment of Carcinoma of the Female Breast by Radium and Radon.” In the press.

HUGH C. TRUMBLE, M.C., M.B., B.S. (Melb.); F.R.C.S. (Eng.),
F.C.S.A.:

“The Skin Tolerance for Pressure and Pressure Sores.”
Appeared in the “Medical Journal of Australia,” 29th
November, 1930, page 724.

“‘Made to Order’ Splints: The Method of Construction and
Field of Application.” In the press.

“The Surgical Treatment of Constipation.” In the press.

“The Innervation of the Distal Colon, with Special Refer-
ence to the Act of Defaecation, Normal and Abnormal.”
In preparation.

“A Method of Fixation of the Hip Joint by Means of an
Extra-articular Bone Graft.” In preparation.

“The Lateral Prone Position.” In preparation.

“Points of Importance in the Treatment of Surgical
Tuberculosis.” In preparation.

“The Fable of the Loaded Caecum.” In preparation.

R. A. WILLIS, M.D., B.S. (Melb.):

“Unilateral Fusion of the Kidneys.” Appeared in the
“Journal of the College of Surgeons of Australasia,”
March, 1931, page 402.

“Metastatic Tumours in the Thyroid Gland.” In the press.

“Metastatic Tumours in the Intestine.” In the press.

“Latent Primary Growths.” In the press.

“Mitosis in Metastatic Tumours in the Liver.” In the press.

“A Monstrous Twin-Embryo in the Blue-tongued Lizard.”
In the press.

The chief results obtained by the various workers are briefly
indicated as follows:—

Miss Ashworth and Miss Irving have compared the results
obtained by the Wassermann and Kline tests applied to one
thousand sera. The Kline Test is easy to perform, and has been
found to give results agreeing qualitatively very closely with
those obtained by the Wassermann method. Kline's test requires

for its performance so little in the way of apparatus, time and laboratory experience, that it could be readily used by the general practitioner.

Dr. Corkill has continued the studies on carbohydrate metabolism that were begun under the direction of Dr. Dale at the National Institute for Medical Research, Hampstead. Recently he has investigated the effects produced by toxaemic states on the actions of insulin and adrenaline. Previous workers on this subject had produced a state of diminished glucose tolerance in adult rabbits when diphtheria toxin was injected. The blood sugar curves found in these animals were closely similar to those occurring in non-diabetic patients during the course of an infection. Up to the present no results of investigations on the influence of toxaemia on glycogen distribution have been published. Using young rabbits suffering from a mild diphtheritic toxaemia, a striking modification of the usual action of insulin has been demonstrated. In the normal young fasting rabbit, as Goldblatt originally found, insulin is capable of causing a marked deposition of liver glycogen. On the other hand, in the young rabbit rendered mildly toxaemic, insulin consistently fails to produce this deposition of liver glycogen. Experiments by Dr. Corkill have shown that the failure to deposit glycogen cannot be attributed to a defective storage capacity of the liver. A similar type of discrepancy has also been observed between the action of adrenaline in normal and in toxaemic young rabbits. In the former a suitable dose produces a deposition of liver glycogen similar to that produced by insulin. In the mildly toxaemic rabbit adrenaline, like insulin, fails to cause this deposition of liver glycogen. The fact that adrenaline can produce a deposition of liver glycogen similar to that found when a young rabbit is killed in definite insulin hypoglycaemia together with the evidence afforded by Cannon, McIver and Bliss of a secretion of adrenaline in response to insulin hypoglycaemia, leads to the hypothesis that the observed deposition of liver glycogen found in young rabbits after insulin is in reality due to a secondary outpouring of adrenaline. The facts obtained whilst investigating the influence of toxaemic states on this glycogen distribution lend strong support to the hypothesis. It would appear that adrenaline cannot deposit liver glycogen in these toxaemic states, and hence an insulin hypoglycaemia, although leading to the secretion of adrenaline, fails to produce the normal effect on liver glycogen.

Dr. Cox during the past year has been busy with the study of neuralgia generally, and of Sluder's neuralgia in particular. His work shows clearly that this type of neuralgia does not depend on the sphenopalatine ganglion, as Sluder supposed, but that it can be entirely abolished by section of the fifth nerve. The

nerve fibres involved in this neuralgia run in the mesial half of the fifth root, and they are related to the sensory supply of the nasal mucous membrane, the cornea and the eyeball.

In addition, Dr. Cox has undertaken the microscopic examination of tumours of the brain and meninges, and various other morbid nervous tissues. He has acquired facility in the use of the most modern histological methods that have been developed for these purposes. This work will elucidate an important section of pathology which we have hitherto neglected.

Dr. Downie has been chiefly occupied in the study of vascular disease in relation to diabetes. He has presented an essay on this subject to the University which has been awarded the Armytage Prize, making this the third consecutive year in which the Prize has been won by a Baker Institute worker. His essay deals largely with the pathological conditions found in the arteries microscopically, but clinical and experimental work of an interesting and helpful character is also reported by him. The real essential cause, however, of the disease of the arteries in diabetes still remains doubtful. Dr. Downie is continuing his work on the subject.

In collaboration with Miss Long, he has also published a paper of great practical importance on pruritus vulvae in relation to intermittent glycosuria. This pruritus is well known to be associated with diabetes, but its relationship to intermittent glycosuria is usually overlooked by the physician. In a series of 22 cases not known to be associated with diabetes and having given on examination a negative test for urinary sugar, it was found by Miss Long and Dr. Downie that if a glucose meal were administered urinary sugar became at once evident in no less than nineteen of the series. In this group blood sugar curves were carefully worked out, and the patients classified and treated according to well-recognised principles, with the result that the pruritus was usually relieved. This condition is at once trying to the patient and, unless treated in the way here described, very persistent, and annoying to the physician.

In addition, Dr. Downie has in preparation a paper on diabetic gangrene for the "Journal of the College of Surgeons of Australasia."

Mr. Fowler has chiefly concerned himself with a study of the treatment of uterine cancer. His paper on this subject was read at the Second Cancer Conference at Canberra, and will shortly be published in the "Medical Journal of Australia." The paper chiefly deals with radium therapy, either alone or in combination with surgical excision. The work has been made possible by the loan of 50 milligrams of radium from the Commonwealth Health Department. The British Section of the League of

Nations' enquiry into cancer of the uterine cervix has solicited our co-operation, which Mr. Fowler and his colleagues will freely give. In addition to that Mr. Fowler has given considerable thought to the subject of the permeability of the placenta, and he has been able, in conjunction with the laboratory, to show the fairly rapid transference of horse serum protein from the mother's circulation to that of the seven months' foetus in utero. We believe this to be the first occasion that permeability of the human placenta to proteins has been directly demonstrated. There is a good deal of evidence to show that active immunity of the foetus can be obtained by vaccination of the mother. This work shows us that in reality the foreign protein arrives in the body of the foetus, and is there in a position to act as an active antigen. Similar work had previously been done on animals, but the extent to which it applied to the human subject was not certain.

Dr. Geoffrey Kaye has been appointed by his fellow-anaesthetists of the Alfred Hospital editor of a brochure on anaesthetics for the use of medical officers of the Hospital and final year students. The Baker Institute hopes to be able to undertake the publication of the brochure, and has given every possible encouragement to the work. In addition, Dr. Kaye is making an analysis of the patients that have been treated for nephritis at the Alfred Hospital during the last ten years. He is making a careful clinical and laboratory examination of their condition, which it is hoped will throw a great deal of light on the prognosis and nature of the disease. In this work Miss McPhee is acting as his collaborator.

Dr. Mackeddie has continued his work on the diagnostic use of lipiodol. His two papers in the press deal with the historical development of the use of lipiodol in the diagnosis of tumours of the spinal cord especially, and in the diagnosis and treatment of various pulmonary conditions. The first paper is illustrated by a representative series of X-ray pictures demonstrating the findings in tumours of the cauda equina and in tumours of the thoracic and cervical regions of the cord. There can be no question of the value of lipiodol in localising the exact position of various spinal blocks. Only one unnecessary laminectomy was done in the series of cases dealt with. In the pulmonary series of X-ray films the findings in bronchiectasis, lung abscess, tubercle, tumours and foreign bodies are well shown. These papers are well illustrated, and represent the most comprehensive statement in Australian medical literature of the diagnostic value of lipiodol.

Dr. John McLean, just before leaving the Institute, published an interesting paper on blood cells, in which he dealt with (a) blood volume in lead poisoning, (b) the use of the halome-

ter in obtaining a rapid and accurate idea of the size of the red cells of the blood, (c) the limitations of the oxidase and supravital staining methods in classifying mononuclear leucocytes, and (d) the correlation of the changes found in the blood with those occurring in the bone marrow.

During the last two years a considerable mortality in fat lambs has occurred in Victoria, the losses occasioned having been as high as 40 per cent. in some cases. Specimens have been examined by Mr. Parker and the writer from over twenty of the epidemics, and an organism common to all the specimens has been tried in the field as a vaccine. The results have been striking, each epidemic having stopped forthwith.

Miss Butler and the writer have been engaged in a study of the etiology of eclampsia. Although the bacterial origin of this disease has been scouted by the great majority of authors during the last 30 years, nevertheless no satisfactory explanation of the toxæmia is as yet forthcoming. This, together with various considerations relative to placental and intra-uterine infections, caused us to examine again the possibility of a bacterial explanation for the disease. Our results in this direction are by no means convincing, but some results have emerged which may enable a better judgment to be formed of the value of certain forms of treatment at present in vogue.

We have given much study to the toxin of bacillus coli. Hitherto no satisfactory bacillus coli toxin, free from bacteria, has been obtained by filtration. We have been able to elucidate certain factors in the production of this toxin, but we have not been able to get evidence of its immunising power.

We have continued our study of experimental streptococcal infections in mice, and find that serum treatment has not infrequently a very deleterious influence. In addition, we have found that the anaerobic streptococci, described recently in England by Colebrook, and previously by German authors, are very prevalent in septicaemias occurring in Australia.

Mr. Hyams and the writer have during the last year been interested in Barga's dysentery, and have just recently got some slight evidence in favour of its specific character.

Mr. Price and the writer have continued to work on the subject of the refractive index of the bile. We have found that the refractive index of gall bladder bile is very much lower in the guinea-pig than it is in the rabbit, dog, sheep, ox, opossum or the human subject. The rise in concentration of biliary solids during fasting has also been confirmed by us by refractometric determinations and determination of total solids. For some purposes we prefer this method of work to that used by Evarts Graham, where artificial dye preparations were taken by the mouth or injected into the blood stream. These heavy

iodine preparations may not behave in the same way as ordinary bile, and it seemed to us wise to do the work without the addition of extraneous material. A commencement has been made in studying the effect of various meals on the refractive index of the bile, but this section of the work has not yet progressed very far.

Mr. Sutherland and the writer have examined the effect of the gamma rays of radium and of X-rays on Blair Bell's Colloidal lead and also on colloidal silver. It was hoped that if the gamma rays of radium exerted an attractive effect, such as that of light on Blair Bell's colloidal lead, it might be used to concentrate the circulating lead in malignant tumours. No attractive effect, however, was discovered either of the gamma rays of radium or of X-rays.

We have worked on the subject of the cataphoresis of an amphoteric colloid, which during an electrolysis experiment showed a reversal of sign of the colloid around one electrode, so that during the experiment waves of colloid advanced from each electrode, these waves precipitating each other at their place of meeting about the middle of the cell used in the experiment.

We have also commenced an investigation of the possibilities of immunising the human subject against the pathogenic sporing anaerobes. Several infections with *Bacillus welchii* have occurred in the last two years in the Hospital, some of which have been fatal. They seem specially prone to occur in gynaecological practice, probably in some cases due to illegal operations conducted on the patients before admission to the Hospital. It is very desirable that adequate vaccines should be available to produce active immunity in subjects likely to be attacked by these infections. Such vaccines have been used extensively in animals, but their use in the human subject must be undertaken with great caution because of the difficulty of being certain that the so-called anaerobes contain no living spores.

Dr. Chas. Sutherland has continued his study of the phenomenon of bronchiolar spasm produced by anaphylaxis, histamine and other agents. He has been able to demonstrate an increase of tolerance of histamine following the use of repeated small doses. He has also investigated the inhibitory effect of sodium thiosulphate in the prevention of anaphylaxis, a subject of very considerable importance. He and Miss McPhee have classified two thousand cases which have been under observation at the Asthma Clinic, and at a later date it is proposed to get into touch with all these patients so that a critical evaluation of the various methods of treatment that have been used may be arrived at.

Mr. Trinca, during the past year, has made a special study of the treatment of carcinoma of the breast by radium and

radon. He has developed a new technique for the radiation of the regional glands, and in his communication to the Cancer Conference in March, 1931, he described the results, extending over a period of two years, of the treatment of carcinoma of the breast by radium. He believes that the products of necrosis resulting from the use of radium in carcinoma act as an antigen and confer a measure of immunity on the cancer patient. He believes further that radium treatment of carcinoma of the breast will be the treatment of election in the future.

Mr. Trumble has been chiefly occupied with the study of the surgical treatment of constipation, and has described a method of dividing the inferior splanchnic nerves. He believes that by this procedure abnormal reflex inhibition of the colonic musculature and reflex hypertonus or persistent spasm of the retaining sphincters are prevented. The colon freed in this way from abnormal nervous interference voids more easily, and constipation is frequently cured. He finds that the plan of the extrinsic innervation of the cloacal structures in man is similar to that in animals, as described by Langley, Gaskell and others, and not as is described in many text books of anatomy. Mr. Trumble's studies of the innervation of the large gut are likely to have very important practical results. He has also described a method of fixation of the hip joint by inserting a bone graft between the tuberosity of the ischium and the femoral shaft. In this way he seems to be able to secure absolute rest for the joint, which is the first essential in the treatment of tuberculous disease of the hip.

He has also worked on the subject of the so-called loaded caecum. He has dealt with the specific gravity of individual portions of the gut in their various states, and finds that organs that have hitherto been believed to drag do in reality float up because of their relatively low specific gravity.

He has also described the lateral prone position for use during operations when the patient is under an anaesthetic. By having a suitable gap in the operating table, the thoracic wall is directly supported by the table surface, while the brachial nerves and vessels are protected from pressure.

Dr. Willis, during the year, has continued the study of the metastatic distribution of malignant tumours. His papers on this subject, those that have been published and those in the press, are remarkably interesting and informative, and throw much new light on the spread of malignant disease. He has also dealt with the frequency of mitotic figures in metastatic tumours of the liver, and has endeavoured to estimate the relative rates of growth of metastatic tumours by determining the proportion of such cells in mitosis to the non-mitotic cells.

He has also studied a twin embryo monster occurring in the blue-tongued lizard. By means of a large number of serial sections

of the monster, he has been able to reconstruct it, and has shown that the entoderm formed its external covering, while the ectoderm, which should have produced the skin, was contained in its interior. This monster is believed to be unique, and could only have been adequately described by one thoroughly versed in embryology.

RELATIONSHIPS WITH OUTSIDE BODIES.

During the year an intimate association with the *clinical staffs* of the Children's, Women's, and Queen Victoria Hospitals has been inaugurated. From the Women's and Queen Victoria Hospitals we have received much valuable material for an investigation of eclampsia, which is being conducted in the Institute, while from the Women's and the Children's Hospitals we have received many blood cultures which have given us valuable information about the septicaemias prevailing in Melbourne.

The University has continued to be a source of help to us in the Physics, Biochemical, Pathological, Physiological, Chemical and Library Departments. We feel, in approaching these various departments, that we are assured of generous help and support.

Professor Sir Colin McKenzie, of the Institute of Anatomy of Canberra, has been good enough to help us to procure supplies of animals and to provide us with information about the marsupalia.

Mr. Wilkie, of the Zoological Gardens, has very generously maintained monkeys for us which we require to use from time to time.

GIFTS.

The Institute has been fortunate in securing helpful gifts from various sources.

We would thank the Medical Research Council, the Rockefeller Institute, the Lister Institute, the London Hospital, Dr. W. H. Park, of New York; Professor Dean, of Cambridge; Professor Boycott, of the University College; the Mayo Clinic, Dr. J. G. Fitzgerald, of the Connaught Laboratories; Professor Banting, Sir Robert Philip, of the Royal College of Physicians, Edinburgh; Professor Mackie, of the Edinburgh University; Professor Kraus, of Santiago, Chile, and Dr. Joslin, of Boston, for gifts of literature, which have been extremely helpful in keeping us informed of scientific advances abroad.

The thanks of the Institute are due to the Felton Bequests' Committee for the sum of £100 to support the diabetic work carried out by Dr. Ewen Downie.

The Commonwealth Government very generously placed 50 milligrams of radium at the disposal of the Institute for research by Mr. Robert Fowler into the treatment of carcinoma of the cervix uteri.

Dr. Frank Nyulasy has presented to the Institute the library of the late Dr. Arthur Nyulasy, of Perth. This library is of great use to workers interested in obstetrics and gynaecology, as well as in general medicine.

Mr. Robt. Fowler, Gynaecologist to the Hospital, generously presented to the library "Surgery, Gynaecology and Obstetrics," from the year 1925, a valuable work of reference in these subjects.

Dr. H. Shannon is providing a Vernes outfit which will be extremely useful in carrying out the precipitation tests required in the investigation of so many diseases.

From time to time Mr. Sutherland, Director of Kodak (Australia) Pty. Ltd., has put the Institute in his debt by making the technical knowledge of the Kodak staff available to us.

EDUCATIONAL.

The Fourth Year Students of the Hospital were provided with demonstrations and lectures on pathology and bacteriology daily for the first seven weeks of their academic year. All the candidates passed without any requiring supplementary examinations.

Help has been given in providing demonstrations to old Alfred Hospital Residents and to Post-graduates.

Dr. Gribble, of the Mooroopna Hospital, worked with us for ten days, doing diabetic laboratory work.

Mr. Howling, of Western Australia, introduced by Dr. Stang, a West Australian Government Medical Officer, did a short course of bacteriology in the Institute.

Finally, Mr. Steele, who relinquished his service with the Australian Navy on personal grounds, was sent unofficially to us by Captain Darby to receive some instruction as a technical assistant. He continues an agreeable colleague in the laboratories.

THE DIABETIC SCHEME.

The Diabetic Scheme of the Institute has been recently subject to review. Thirty-eight doctors who had notified cases under the scheme were written to in reference to the booklets issued by the Institute, and advice was sought on any possible improve-

ments that might be introduced. The replies received from the various doctors were highly gratifying, but showed that certain difficulties had existed. The supply of booklets had not been quite equal to the demand, and the patients with poor intelligence had not been able quite to comprehend the printed explanations dealing with the treatment of their condition. Probably this difficulty will not be met efficiently until some after-care scheme is inaugurated.

The notifications of diabetes have come mainly from country doctors. The response from the doctors in the metropolis has been extremely disappointing in view of the fact that the British Medical Association and all the metropolitan hospitals promised their cordial support of the scheme. There can, however, be no doubt that the scheme has done great good. The letters we have received from doctors show that it has not only been a means of educating patients to a more enlightened understanding of their condition, but it has also been of substantial value to medical men themselves. We hope that this section of our work will be continued, so that the State of Victoria may have a more efficient anti-diabetic scheme than any to be found elsewhere.

At the present time the main cause of death in diabetes is diabetic gangrene, and this is being made the subject of special research, as previously mentioned in this report.

The Institute supported a prosecution launched by the Town Council to prevent the sale of diabetic bread. The prosecution, however, failed.

FINANCE.

The financial position has been somewhat uncertain during the year. For the first two years after the foundation of the Institute we worked under an undertaking which provided us with £1500 per annum for the hospital routine work. Owing to the adverse financial position of the Hospital, the payment of the amount due for the second year was not made until the year now under review, and the routine work for one year and nine months following the expiration of the period of the undertaking has been done without securing us any financial recompense. For the current year, starting at the beginning of November, 1930, the Hospital Management has felt it necessary to reduce its contribution to the Baker Institute to £500. The general financial position has occasioned a reduction in the salaries of the staff, which has been accepted in an understanding spirit.

In August the Hon. Frank Anstey, Minister of Health, communicated to us the fact that he had allocated £1000 to the Institute to help it in its work during the depression. Later on, however, the financial difficulties of the Commonwealth Government itself were so acute that this promise could not be fulfilled.

The illustration of papers published from the Institute is very costly. This cost is not borne wholly by the Journals, as might be supposed, but is a burden which the Institute would be very glad to avoid if proper provision were made by Australian editors.

(Signed) WILLIAM JAS. PENFOLD,

Director.

To the Trustees of the Baker Institute,
Alfred Hospital,
Prahran.

THE THOMAS BAKER, ALICE BAKER, AND ELEANOR SHAW MEDICAL RESEARCH INSTITUTE.
Financial Statement, 1st April, 1930, to 31st March, 1931.

RECEIPTS.				PAYMENTS.			
To Balance at 31st March, 1930	£7,146	15	3	By Medical Salaries	£2,599	10	8
„ The Thomas Baker (Kodak), Alice Baker and Eleanor Shaw Benefactions	£2,500	0	0	„ Other Salaries and Wages	3,425	5	8
„ Alfred Hospital, Rou- tine Work	2,000	0	0	6,024	16	4	
„ Sundry Donations	12	0	0	Less Salary Adjust- ment	50	0	0
„ Royal Insurance Co. Ltd., Claim for Loss of Radium	130	0	0	£5,974	16	4	
„ Medical Fees	173	7	9	„ Drugs	132	17	0
„ Proceeds, Sale of Equip- ment	54	2	11	„ Instruments and Glass- ware	719	7	2
<u>4,869</u>	10	8		„ Radium	111	7	6
				„ Experimental Apparatus	983	18	9
				„ Furniture and Fittings	125	12	0
				„ Fuel and Lighting	181	7	7
				„ Sundries	87	11	1
				„ Insurance	18	18	11
				„ Repairs	17	12	10
				„ Library	538	11	1
				„ Printing and Stationery	103	8	8
				„ Travelling Expenses ..	156	11	2
				„ Lectures	5	5	0
				<u>3,182</u>	8	9	
					£9,157	5	1
				„ Balance	2,859	0	10
				<u>£12,016</u>	5	11	
To Balance at 31st March, 1931, Cash at Bank	£2,859	0	10				

24

I have audited the above Statement, and certify it to be correct,
 E. H. FLACK, Hon. Auditor.
 4th August, 1931.

J. F. MACKEDDIE, }
 (Sgd.) J. SUTHERLAND, } Trustees.
 R. H. WILKINS, }