

Dr. P. J. du Toit.



An Appreciation.



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Retirement of Dr. P. J. DU TOIT as Director of Veterinary Services, Department of Agriculture, and as Dean of the Faculty of Veterinary Science, University of Pretoria, Union of South Africa.

Veterinary Science and Science in general in South Africa have sustained a very heavy loss by the retirement on the 16th March, 1948, of Dr. P. J. du Toit from the position of Director of Veterinary Services, a post which he has held with great distinction and dignity for the past 21 years. During his long and active career he has become a world-famous figure, and his reputation as a scientist is well-known and respected in all countries. It is difficult, during his life-time, to write an appreciation of a scientist such as P. J. du Toit, as he would, in his great modesty, be the first to say that the praise was undeserved and that whatever he had achieved was mainly due to the efforts of his colleagues, and to the inspiration he received from the late Sir Arnold Theiler, whom he succeeded. In view of the multiplicity and diversity of his work and investigations, it would obviously be impossible within the scope of a brief review to detail his contributions to Veterinary Science and Biology.

He was born on 16th March, 1888, at Somerset Strand, and his father was the late Mr. D. F. du Toit, one of the founders of "Die Genootskap van Regte Afrikaners", in 1875. Later his father was the owner and editor of "Di Patriot" which may account for Dr. du Toit's great love for and interest in the Afrikaans language. He had a brilliant school career, passing the matriculation examination at the age of 16, being placed first on the list of successful candidates. He proceeded to Victoria College, Stellenbosch, where he obtained the B. A. degree in 1907 with honours in zoology. Dr. Broom, recognized as South Africa's premier paleontologist, with a world-wide reputation, was his teacher and Dr. du Toit has often paid a tribute to the inspiration he received from this great scientist, still actively engaged in research at the age of 81.

On leaving Stellenbosch he was awarded the Queen Victoria Scholarship in 1908 and proceeded overseas to Europe to continue his student career. He studied at Halle, Berlin and Zurich, obtaining the Ph. D. degree with honours in 1912. During a visit to South Africa and to the late Sir Arnold Theiler at Onderstepoort, he decided to study Veterinary Science. His zoology training was a decided advantage and by inclination he devoted his life to Science. His early choice of a laboratory career came at a time when studies in Tropical Diseases opened up new fields of research. He returned to Berlin where he took his Staatsexamen in 1915. In 1916 he wrote a brilliant thesis on "Leukaemia in Cattle" and was awarded a doctorate in veterinary science. The first world war was then in progress, but he was allowed to continue his studies and on their completion he obtained some experience in abattoir work. At the Veterinary High School in Berlin he became associated with Professor Knuth, with whom he collaborated in studies on tropical veterinary problems, and was the co-author with him in the volume of Mense's Tropenkrankheiten devoted to diseases of domesticated animals published in 1921.

With this auspicious beginning to his scientific career, he returned to South Africa in 1919 and was appointed a senior veterinary research officer at Armoedsvlakte, Vryburg, where Sir Arnold Theiler, after his first retirement in 1918, was carrying out those fundamental researches into lamsiekte which were to have such far-reaching results in the development of the study of mineral deficiencies. He undertook some of the lamsiekte work, and in the following year was transferred to Onderstepoort where he became a sub-director. As a result of his superior gift of mind, spirit and versatility in thought, and his energy to an intensive degree, he was appointed later in the year Deputy Director under the late Sir Arnold Theiler.

With the founding of the Faculty of Veterinary Science, in the Transvaal University College of South Africa, in 1920, he was appointed Professor of Infectious Diseases. The bacterial diseases aspect was detached in 1928, so that he could confine himself to protozoology and virus diseases. His lectures are characterised by a clarity in description. His eagerness of exposition is extraordinary and it is remarkable with what simplicity and precision he explains many a problem. In 1927 on the retirement of Sir Arnold Theiler he became Dean of the Veterinary Faculty. He conducted the meetings of Faculty with eminent fairness, and his mind was comprehensive in its grasp of the meaning of things. Due to his unusual alertness and the ready way with which he could make use of his storehouse of knowledge he was elected chairman of the Senate of the University of South Africa from 1924-1926. At the time it was stated that he was the first chairman who had been able to conduct the business of the meeting in both official languages. He became a leading force in university policy and teaching. Since those days he has become a member of two University Commissions, and was a member of the Committee which reported on the advisability of creating a Medical Faculty at the Pretoria University.

In 1926 he went overseas on a year's study leave which he spent in Basle and Paris and on his return he was appointed Director of Veterinary Services and Animal Husbandry, a wider sphere of action than his predecessor had. Animal Husbandry was subsequently again detached and still forms a special Division of the Agricultural Department.

Dr. du Toit has attended three International Veterinary Congresses as an official delegate from the Union of South Africa. The first one was in London in 1930, held after a lapse of 11 years, owing to the 1914-1918 war having intervened, and the paper which he read on Theileriosis attracted a great deal of attention. The Congress in 1934 was held in New York and after the meeting he made a tour of the United States, visiting important scientific institutions. The last meeting was held in Zurich in 1938.

In 1927 he visited Nigeria and reported on veterinary matters there at the request of the Colonial Office in Great Britain.

In 1927 he was an official delegate to the Imperial Agricultural Research Conference in London. It was there decided to form Agricultural Bureaux for the study of various aspects of scientific work in agriculture in the British Commonwealth of Nations. His profound knowledge and experience and the impression he created persuaded the authorities in Great Britain to create a number of fellowships for studies at Onderstepoort and to erect a Library Building, the cost of which was defrayed from funds provided by the Empire Marketing Board in furtherance of the development of Onderstepoort as an Empire centre of research in the field of Veterinary Science.

His interest in science as a whole in South Africa is evidenced by his many years of membership of the South African Association for the Advancement of Science of which he was president at Durban in 1932 and received the South Africa Medal and Grant in 1934, probably the highest honour a scientist in South Africa can aspire to.

He has been a member of the South African Biological Society since 1921 and was president of it in 1927. He received the Senior Scott medal awarded by this society in 1929. He is a Fellow of the Royal Society of South Africa and a membre correspondante de l'Academie Veterinaire de France et de la Societe de Pathologie Exotique, Paris.

As principal veterinary officer he gained wide experience in respect of the measures of control under the Stock Diseases Act, and his keen interest in and knowledge of veterinary matters in South Africa was evidenced by his election as President of the South African Veterinary Medical Association, a post which he held from 1924-1930.

In 1929 he acted as chairman of the 6th Pan-African Veterinary Conference held in Pretoria and all who attended that conference will recollect the skill with which he conducted and inspired the meetings. In 1944 he was a member of a special Commission to investigate the training of native veterinary assistants. In 1943 he was a member of a commission constituted to report on the position as regards East Coast Fever in South Africa as a consequence of a very serious recrudescence of the disease in the Vryheid district, Natal. It was felt that the whole position should be carefully reviewed.

In 1945 he was appointed to a Committee to enquire into various aspects of Veterinary Services and Education, the so-called Adams' Committee. This committee took evidence from all the various bodies and individuals interested in the matters included in its terms of reference, and a very comprehensive report with far-reaching recommendations was issued..

Of his many other activities a few must be mentioned. In virtue of his official position he has been a member of the Public Health Council since its inception. In addition he has been a valued member of the Historical Monuments Commission since its inception in 1924. As a member of the Research Grants Board for many years he was able to bring his mature scientific experience to bear on the task of selecting suitable candidates and subjects for the receipt of financial support in scientific research problems. Another activity which he was engaged in was membership of the Wool Council and in 1930 he attended an Empire Wool Conference in Great Britain. In the same year he was president of Section M (Agriculture) of the British Association at Bristol.

In addition to his scientific and academic duties he gave much time to public work of various kinds. He took an interest in the general welfare of the public servant and was president of the Public Servants' Association from 1934 to 1936.

After the late war he was appointed an official delegate to the Empire Scientific Conference in July 1946, organized by the Royal Society of England, taking his first overseas trip by air, to be later followed by others. In October of that year he attended the World's Food Conference at Copenhagen presided over by Sir John Orr. He was elected chairman of one of the committees, a signal honour. In 1947, with the formation of the Food and Agricultural Organization, to be known as F.A.O., he attended two conferences of it overseas, one in New York and the other at Geneva. It is interesting to note that at the former one he was only away from South Africa for a month of which a week only was spent in travelling.

The last conference he was able to attend before his retirement was held in February of this year at Brazzaville in the French Congo, on the methods of combating tsetse flies.

It should be mentioned that Dr. du Toit was one of the early members of the "Suid-Afrikaanse Akademie vir Taal, Kuns en Wetenskap" and received the Havenga prize awarded by that society in 1947.

In conclusion some reference should be made to his other interests of which his hobby of coin collecting is perhaps the chief one. His collection of South African coins is a very fine one and has given him many hours of pleasure. With a love for the best literature he combines an appreciation of music. There has hardly been a concert in Pretoria which he has not attended and he takes a keen interest in many aspects of art. A member of the Pretoria Rotary Club since its inception in 1925, he was president of it in 1944 and has always been affectionately known to its members as "P.J." His hospitality is proverbial and his life is enlivened by a wide social acquaintance and world-wide professional friendship. He is a most charming companion, a most entertaining personality and one of South Africa's outstanding after-dinner speakers. He is the life and soul of many scientific meetings and public functions. He is characterised by his keen sense of humor and wit and love of a joke or chaffing. No one can come into contact with him without being impressed by his personality. He never glorifies in his own accomplishments nor does he understate the works of others. He is always sceptical of hasty judgments and looks with distrust upon unverified generalizations. He is known for his innate neatness and exquisite taste and his designing of buildings and the laying out of grounds and gardens at Onderstepoort are a remarkable tribute to his foresight.

Dr. du Toit was married in 1919 and there have been four children of his marriage. Throughout his arduous and strenuous career he was ably and wholeheartedly supported by Mrs. du Toit. He is greatly interested in the careers of his children. The eldest daughter, Annemarie, is married to Mr. Pistorius, a young architect of promise. His son Stephen qualified in medicine two years ago and is at present specializing in children's diseases. The second daughter, Dorinda, is at present a sister at the Florence Nightingale hospital in Johannesburg, while the youngest daughter, Josephine, is still a student at the Pretoria University.

Those of his colleagues who have been closely associated with him for many years will feel his retirement as a personal loss, not only as a chief but as a friend.

The good wishes of his colleagues in the veterinary profession will go with him in his retirement and may he live long to enjoy freedom from the many petty worries which the leadership of a big Division entails and to devote himself more to the work which is nearest to his heart's desire. In view of his wide knowledge and experience, it is sincerely hoped that the State will continue to consult Dr. du Toit in respect of veterinary and agricultural problems.

His contribution to knowledge is the outcome of years of study and reflection, and anyone merely glancing through his list of publications hereunder must needs be impressed by the fertility of his mind and the far-reaching scope of his work.

GILLES DE KOCK AND E. M. ROBINSON,

Onderstepoort, February, 1948.

LIST OF PUBLICATIONS BY P. J. DU TOIT.

- 1911 Über Broom's Ableitung der Säugetiere von den theromorphen Reptilien. *Naturwissenschaftliche Wochenschrift*, Vol. 26, p. 417-423.
- 1913 Untersuchungen über das Synsacrum und den Schwanz von Gallus domesticus. Ein Beitrag zur Frage nach der Homologie der Wirbel und Wirbelregionen. *Jennische Zeitschrift*. Vol. 49, p. 149-312.
- 1916 Beitrag zur Morphologie des normalen und des leukämischen, Rinderblutes. *Folia haematologica*, Vol. 21, p. 1-58.
- 1916 Über das Kontagium der Rinderpest. *Zeitschrift für Infektionskrankheiten der Haustiere*, Vol. 18, p. 181-216.
- 1917 Über das Sammeln und die Zucht unserer heimischen Zecke, *Ixodes ricinus* L. *Berliner tierärztliche Wochenschrift*, Vol. 33, Nos. 10 und 11, p. 109-112 und 124-127.
- 1917 (With Knuth, P.) Weitere Untersuchungen über die Lymphozytomatose des Rindes. II. Mitteilung. *Berliner tierärztliche Wochenschrift*, Vol. 33, No. 18, p. 205-208.
- 1917 Die anaphylaktische Natur der parasitären Intoxikation, von Van Es und Schalk. *Monatshefte für praktische Tierheilkunde*, Vol. 29, p. 405-413.
- 1918 Über Zecken und deren Bekämpfung. *Zeitschrift für Infektionskrankheiten der Haustiere*, Vol. 19, p. 1-79.
- 1918 Zur Systematik der Piroplassen. *Archiv für Protistenkunde*, Vol. 39, p. 84-104.
- 1918 Gastrularven und infektiöse Anaemie der Pferde. *Monatshefte für praktische Tierheilkunde*. Vol. 30, p. 97-118.
- 1918 Bemerkungen zur Gasbehandlung der Pferderäude. *Berliner tierärztliche Wochenschrift*. Vol. 34, No. 37, p. 361-362.
- 1919 Experimentelle Studien über die Pferde-piroplassose I. Kreuzimpfungsversuche mit *Nuttallia equi* und *Piroplasma caballi*. *Archiv für Schiffs- und Tropen-Hygiene*, Vol. 23, p. 121-135.
- 1919 II. Übertragungsversuche mit *Ixodes ricinus* bei der *Nuttallia equi* Infektion. *Archiv für Schiffs- und Tropen-Hygiene*, Vol. 23, p. 141-147.
- 1919 III. Übertragungsversuche mit Zecken bei der *Piroplasma caballi* Infektion. *Archiv für Schiffs- und Tropen-Hygiene*, Vol. 23, p. 359-368.
- 1920 Weitere Untersuchungen über die Lymphozytomatose des Rindes.. III. Mitteilung. *Zeitschrift für Infektionskrankheiten der Haustiere*, Vol. 20, p. 320-350.
- 1921 (With Knuth, P.) Tropenkrankheiten der Haustiere. XVI and 889 pages. Leipzig, Johann Ambrosius Barth.
- 1923 (With Theiler A, and Mitchell D. T.) Gousiekte in Sheep. *Ninth and tenth Reports of the Director of Veterinary Research*. p. 9-105.
- 1923 Sheep Scab: The Infectivity of Kraals. *Ninth and tenth Reports of the Director of Veterinary Research*, p. 223-229.
- 1923 Sweating Sickness in Calves. *Ninth and tenth Reports of the Director of Veterinary Research*, p. 233-250.
- 1924 Horsiesickness in 1923. *Journal of the Department of Agriculture*, April, 1924. p. 370-382.
- 1924 (With Theiler, A, and Green, H. H.). Phosphorus in the Live Stock Industry. *Journal of the Department of Agriculture*. May, 1924. p. 460-504.
- 1926 (With Theiler, A. and Green, H. H.). Minimum Mineral Requirements of Cattle. Paper read before the British Association for the Advancement of Science, Oxford, August, 1926. Printed in *Journal of Agric. Science*, Vol. 17, part 3, p. 291-314 (1927).
- 1926 (With Theiler, A.). La transmission des maladies, dont les tiques sont les vecteurs, par l'injection intrajugulaire d'une émulsion de l'hôte intermédiaire. *Bulletin de la Société Pathologie exotique*. Vol. 19, p. 725-737.
- 1927 (With Theiler, Viljoen, Green, Meier and Robinson). Lamsiekte (Parabotulism) in Cattle in South Africa. *Eleventh and Twelfth Reports of the Director of Veterinary Research*, Part II, p. 821-1361.
- 1927 Report on Live Stock Problems in Nigeria. Official Report to the Colonial Office. Sessional Paper No. 5 of 1927 of the Nigerian Government. 28 Pages.

- 1928 (With Theiler, A. and Green H. H.). Breeding of Cattle on phosphorus deficient pasture. *Jnl. of Agric. Science*, Vol. 18, part 3, p. 369-371.
- 1928 (With Malan, A. I. and Green, H. H.). Composition of Bovine blood on phosphorus deficient pasture. *Jnl. of Agric. Science*. Vol. 18, part 3, p. 376-383.
- 1928 (With Theiler, A.). Theileriose Süd-Africaine experimentale transmise par la sang. *Bulletin de la Société de Pathologie exotique*. Vol. 21, p. 121-132.
- 1928 The Veterinary Service of the Union of South Africa. *Jnl. of the S.A. Vet. Med. Assn.*, Vol. I, No. 2, p. 9-17.
- 1928 The Significance of Zoology in Veterinary Science. Presidential Address to Section D. (Zoology) of the S.A. Assn. for the Advancement of Science. *S.A. Journal of Science*, Vol. 25, p. 52-66.
- 1928 Observations on Immunity in East Coast Fever. *S.A. Journal of Science*, Vol. 25, p. 282-287.
- 1928 A Note on the Longevity of the Brown Tick, *Rhipicephalus appendiculatus*. *S.A. Jnl. of Science*, Vol. 25, p. 288-290.
- 1928 (With Theiler, A.). The Transmission of Tick-Borne Diseases by the Intrajugular Injection of the Emulsified Intermediary Host Itself. *Thirteenth and Fourteenth Reports of the Dir. of Vety. Education and Research*. p. 17-44.
- 1928 Investigations into the Cause of Vomeersiekte in Sheep. *Thirteenth and Fourteenth Repts. of the Dir. of Vet. Educ. & Res.* p. 19-153.
- 1928 On the Nature of Anaplasma. *Thirteenth and Fourteenth Repts. of Dir. of Vet. Educ. & Research*. p. 157-184.
- 1929 Our Most Urgent Veterinary Problems of To-day. Presidential Address to the S.A. Biological Society. *S.A. Jnl. of Natural History*, Vol. 6, No. 4, p. 221-230.
- 1929 The Value of Phosphorus in the Cattle Industry of South Africa. Paper read before the British Association for the Advancement of Science. Pretoria, July, 1929.
- 1929 Rabies in South Africa. Paper read before the sixth Pan-African Veterinary Conference. Pretoria, August, 1929.
- 1929 A Note on the Diagnosis of *Trypanosoma vivax* Infection. *Fifteenth Rept. of the Dir. of Vety. Serv.*, p. 3-8.
- 1929 (With Theiler, A.). Transmission of East Coast Fever by Means of Blood. *Fifteenth Rept. of the Dir. of Vet. Serv.*, p. 15-31.
- 1929 (With Viljoen, P. R.). Dipping as a Method of Eradicating East Coast Fever. *Fifteenth Report of the Director of Vet. Services*, p. 33-66.
- 1929 The Nature and Duration of the Immunity against Bluetongue in Sheep. *Fifteenth Rept. of the Dir. of Vet. Services*, p. 69-78.
- 1929 Studies on the Virus of Bluetongue. *Fifteenth Report of the Director of Veterinary Services*, p. 79-93.
- 1929 (With Bisschop, J. H. R.). The Breeding of Cattle on Phosphorus Deficient Veld. *Fifteenth Report of the Director of Vet. Services*, p. 1059-1166.
- 1930 Theileriasis. *Eleventh International Veterinary Congress, London*. August, 1930, 34 pages.
- 1930 Veterinary Science and Agriculture. Presidential Address of Section M. British Association for the Advancement of Science, Bristol. September, 1930. 16 pages.
- 1930 Wool Research in South Africa. Paper read before the Imperial Wool Research Conference, London. September, 1930. Printed by H.M. Stationery Office, London, 1931, p. 65-70.
- 1930 (With Alexander, R. A.). The Immunization of Horses against Horsesickness by the Use of formalized virus. *Sixteenth Rept. of the Dir. of Vet. Serv.*, p. 85-104.
- 1930 (With Green, H. H.). Dicalcium Phosphate as a Source of Phosphorus in Nutrition. *Sixteenth Rept. of the Dir. of Vet. Services*, p. 267-285.
- 1930 (With Malan, A. I. and Rossouw, S. D.). Studies in Mineral Metabolism XII. -Phosphorus in the Sheep Industry. Preliminary Report. *Sixteenth Rept. of the Dir. of Vet. Serv.*, p. 313-326.
- 1931 Immunity in East Coast Fever. *Seventeenth Rept. of the Dir. of Vet. Services*, p. 3-25.
- 1931 (With Alexander, R. A.). An Attempt to Attenuate the Virus of Heartwater by Passage. *Seventeenth Rept. of the Dir. of Vet. Services*, p. 151-160.
- 1931 (With Malan, A. I. and Groenewald, J. W.). Studies in Mineral Metabolism XVII. Phosphorus in the Nutrition of Sheep (Second Report). *Seventeenth Rept. of the D.V.S.*, p. 453-472.
- 1931 (With de Kock, G. and Steyn, D. G.). Studies on the Aetiology of Dunsiekte or Enzootic Liver Disease of Equines in South Africa. *Seventeenth Report of the D.V.S.*, p. 617-644.

- 1932 Foot and Mouth Disease in Southern Rhodesia. Report to the Government of Southern Rhodesia. *Jnl. of S.A. Vet. Med. Assn.* Vol. 3, No. 1, p. 26-37.
- 1932 Africa's Debt to Science. Presidential Address to S.A. Assn. for the Advancement of Science. Durban, July, 1932. *S.A. Jnl. of Science*, Vol. 29, p. 1-18.
- 1932 (With Neitz, W. O.). Bovine Anaplasmosis. A Method of Obtaining Pure Strains of *Anaplasma marginale* and *Anaplasma centrale* through Antelopes. *Eighteenth Report of the D.V.S.*, p. 3.
- 1932 (With Neitz, W. O.). The Immunization of Mules, with Formalized Horse-Sickness Virus. *Eighteenth Rept. of the D.V.S.*, p. 35-48.
- 1932 (With G. A. H. Bedford). Goat Mange. The Infectivity of Kraals. *Eighteenth Rept. of the D.V.S.*, p. 145-152.
- 1932 (With Malan, A. I., Louw, J. G., Holzapfel, C. R. and Roets, G. C. S.). A Study of the Mineral Content and Feeding Value of Natural Pastures in the Union of South Africa. (First Report). *Eighteenth Rept. of the D.V.S.*, p. 525-578.
- 1932 (With Malan, A. I. and Groenewald, J. W.). Studies in Mineral Metabolism XVIII. Phosphorus in the Nutrition of Sheep. (Final Report). *Eighteenth Rept. of the D.V.S.*, p. 611-630.
- 1932 (With Malan, A. I. and Groenewald, J. W.). Studies in Mineral Metabolism XX. Iodine in the Nutrition of Sheep. *Eighteenth Rept. of the D.V.S.*, p. 651-676.
- 1932 (With Malan, A. I.). Studies in Mineral Metabolism XXI. A Comparison of Phosphatic Supplements for the Prevention of Aphasphorosis. *Eighteenth Rept. of the D.V.S.*, p. 702-732.
- 1932 (With Malan, A. I., Groenewald, J. W. and de Kock, G.). Studies in Mineral Metabolism XXVI. The Effect of Fluorine in Pregnant Heifers. *Eighteenth Rept. of the D.V.S.*, p. 805-818.
- 1932 (With Malan, A. I.) The Mineral Requirements of Livestock. *Farming in S. Africa*. Vol. 7, Nos. 78 and 81. Sept. and Dec.
- 1932 Transmission of Animal Diseases by Aeroplanes. *Quart. Bull. of Health Organisation, League of Nations*. Vol. 2, No. 1 (Extract) p. 113.
- 1933 (With R. A. Alexander and W. O. Neitz). The Immunisation of Mules with Formalized Horsesickness Virus II. *Onderstepoort Jnl. Vet. Sc. and An. Ind.* Vol. 1, No. 1, p. 21.
- 1933 (With Alexander, R. A. and Neitz, W. O.). The Immunisation of Horses against Horsesickness by the Use of Formalized Virus. *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 1, No. 1, p. 25.
- 1933 (With Malan, A. I. and Groenewald, J. W.). Studies in Mineral Metabolism XXVII. The Effect of Two Different Calcium Phosphorus Ratios upon the Growth of Calves. *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 1 No. 2 p. 421.
- 1933 The Unions' Livestock Industry. Report of the Division of Veterinary Services and Animal Industry. *Farming in S. Africa*. Vol. 8, pp. 477-485.
- 1934 (With Alexander, R. A.). The Immunisation of Horses and Mules against Horsesickness by Means of the Neurotropic Virus of Mice and Guinea Pigs. *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 2, No. 2, p. 375.
- 1934 (With Malan, A. I. and Groenewald, J. W.). Studies in Mineral Metabolism XXXI. Minimum Mineral Requirements of Cattle. (Second Report). *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 2, No. 2, p. 565.
- 1934 (With Malan, A. I., Louw, J. G., Holzapfel, C. R. and Roets, G. C. S.). A Study of the Mineral Content and Feeding Value of Natural Pastures in the Union of South Africa—Second Report. *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 2, No. 2, p. 607.
- 1934 (With Neitz, W. O. and Alexander, R. A.). *Eperythrozoon ovis* (sp. nov.) Infection in Sheep. *O.P. Jnl. of Vet. Sc. and An. Ind.* Vol. 3, No. 2, p. 263.
- 1934 Anaplasmosis. *Twelfth International Veterinary Congress*. Vol. 3, p. 325.
- 1934 Discussion of Papers on African Horsesickness. *Twelfth International Veterinary Congress*. Vol. 3, p. 369.
- 1934 Does South Africa need a State Veterinary Service. *Farming in S. Africa*. Vol. 9, p. 530-538.
- 1934 Safeguarding Stock Farming in the Union. Annual Report of the Division of Veterinary Services and Animal Industry. *Farming in S. Africa*. Vol. 9, p. 530-538.
- 1935 (With Malan, A. I., Groenewald, J. W. and Botha, M. L.). Studies in Mineral Metabolism XXXII. The Effect of Different Forms of Sulphur in the Diet upon the Growth and Wool Production of Sheep. *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 4, No. 1, p. 229.
- 1935 (With Malan, A. I., Louw, J. G., Holzapfel, C. R. and Roets, G. C. S.). A Study of the Mineral Content and Feeding Value of Natural Pastures in the Union of South Africa (Third Report). *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 5, No. 1, p. 201.

- 1935 (With J. G. Louw, and Malan, A. I.). A Study of the Mineral Content and Feeding Value of Natural Pastures in the Union of South Africa. IV. The Influence of Season and Frequency of Cutting on the Yield, Persistency, and Chemical Composition of Grass Species. *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 5, No. 1, p. 215.
- 1935 (With Malan, A. I. and Groenewald, J. W.). Studies in Mineral Metabolism XXXIII. Iodine in the Nutrition of Sheep. (Second Report). *O.P. Jnl. of Vet. Sc. and An. Ind.* Vol. 5, No. 1, p. 189.
- 1935 Acclimatisation of Animals. *S. African Med. Jnl.* Vol. 9, p. 739-741.
- 1935 Heartwater. *Farming in South Africa.* Vol. 10, No. 114, Sept.
- 1935 Viruses. *S.A. Jnl. of Science.* Vol. 32, pp. 696-705.
- 1935 The Health and Nutrition of the Union's Livestock. Annual Report of the Division of Veterinary Services, (1935). *Farming in South Africa.* Vol. 10, p. 542.
- 1936 (With Steyn, D. G.). The Dangers of the Locust Campaign to Stock. *Quart. Bull. of Health Organisation, League of Nations.* Vol. 5, No. 1, p. 159.
- 1936 (With Thomas, A. D. and Neitz, W. O.). Wild Carnivora as Carriers of Rabies. *Quart. Bull. Health Organisation, League of Nations.* Vol. 5, No. 1, p. 162.
- 1936 (With G. de Kock). Bovine Tuberculosis. *Quart. Bull. of Health Organisation, League of Nations.* Vol. 5, No. 1, p. 166.
- 1936 (With B. S. Parkin and R. H. T. P. Harris). Trypanosomiasis of Domestic Animals. *Quart. Bull. of Health Organisation, League of Nations.* Vol. 5, No. 1, p. 170.
- 1936 (With Mönning, H. O.). Internal Parasites in Relation to Meat Supplies. *Quart. Bull. of Health Organisation, League of Nations.* Vol. 5, No. 1, p. 182.
- 1936 (With Robinson, E. M.). Brucella Infections from the Public Health Point of View. *Quart. Bull. of Health Organisation, League of Nations.* Vol. 5, No. 1, p. 187.
- 1936 (With Alexander, R. A.). Virus Diseases of Animals Communicable to Man. *Quart. Bull. of Health Organisation, League of Nations.* Vol. 5, No. 1, p. 191.
- 1936 (With Malan, A. I.). Mineral Licks for Stock. *Farming in South Africa.* Vol. 11, Nos. 122, 123, 125, p. 177, 195 and 313.
- 1936 Co-operation between the Division of Veterinary Services and the Farmer. *Farming in S. Africa.* Vol. 11, p. 223.
- 1936 Veterinary Services in the Union. *Farming in S. Africa.* Vol. 11, p. 407.
- 1936 Veterinary Science in Relation to Preventive Medicine. *Jnl. Royal Sanitary Institute.* Vol. 56, No. 12, p. 739.
- 1936 Problems of Immunity in Animal Diseases. *Jnl. Royal Sanitary Institute.* Vol. 56, No. 12, p. 769.
- 1936 Sir Arnold Theiler (Obituary). *O.P. Jnl. of Vet. Sc. and An. Ind.* Vol. 7, No. 1, p. 2.
- 1936 (With Alexander, R. A. and Neitz, W. O.). Horsiesickness Immunisation of Horses and Mules in the Field during the Season 1934-35 with a Description of the Technique of Preparation of Polyvalent Mouse Neurotropic Vaccine. *O.P. Jnl. of Vet. Sc. and An. Ind.* Vol. 7, No. 1, p. 17.
- 1936 (With Malan, A. I., Groenewald, J. W. and Botha, M. L.). Studies in Mineral Metabolism XXXIV. The Effect of Sulphur upon the Weight and Wool Production of Sheep when Food Intake is Not Limited. *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 7, No. 1, p. 181.
- 1936 (With Malan, A. I. and Groenewald, J. W.). Studies in Mineral Metabolism XXXV. The Role of Iodine in the Nutrition of Sheep. *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 7, No. 2, p. 523.
- 1936 (With C. Jackson). The Life and Work of Sir Arnold Theiler. *Jnl. of S.A. Vet. Med. Assoc.* Vol. VII, No. 4, p. 135-186.
- 1936 Safeguarding the Health of Our Livestock. Annual Report of the Division of Veterinary Services, (1936). *Farming in S. Africa.* Vol. 11, p. 551.
- 1937 (With Smuts, D. B. and Malan, A. I.). Studies in Mineral Metabolism XXXVI. Fluorine Metabolism in Rats and Bovines. *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 8, No. 2, p. 359.
- 1937 (With Theiler, A. and Malan, A. I.). Studies in Mineral Metabolism XXXVII. The Influence of Variations in the Dietary Phosphorus and in the Ca : P Ratio on the Production of Rickets in Cattle. *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 8, No. 2, p. 375.
- 1937 (With Theiler, A. and Malan, A. I.). Studies in Mineral Metabolism XXXVIII. Calcium and Phosphorus in the Nutrition of Growing Pigs. *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 9, No. 1, p. 127.
- 1937 A New *Proplasma* (*Saroplasma Thomasi* sp. n. n. g.) of a Lizard (*Sonurus giganteus* Smith.) *O.P. Jnl. Vet. Sc. and An. Ind.* Vol. 9, No. 2.

- 1937 Protecting the Union's Livestock Industry. Annual Report of the Division of Veterinary Services. *Farming in South Africa*. Vol. 12, No. 141.
- 1938 Veterinäre Tropenmedizin in Südafrika. Festschrift Bernhardt Nocht. Hamburg. p. 631-635.
- 1938 General Conditions Governing the Origin and Development of Infectious Diseases. Thirteenth International Veterinary Congress, Zurich.
- 1938 (With Alexander, R. A.). Malignant Catarrhal Fever and Similar Diseases. Thirteenth International Veterinary Congress, Zurich.
- 1938 Imperial Bureau of Animal Health. Report of the First Imperial Veterinary Conference (London). p. 24-25.
- 1938 (With Neitz, W. O.). Tick-borne Diseases. *Journal of the South African Veterinary Medical Assn.* Vol. 9, No. 3, p. 58-124.
- 1938 (With Malan, A. I.). Calcium and Phosphorus Deficiency In Relation to the Production of Osteodystrophic Diseases. Third International Congress for Tropical Medicine and Malaria. Amsterdam.
- 1938 Veterinary Science in the British Empire. *The Veterinary Record*. Vol. 50, No. 44, pp. 1486-1488.
- 1938 Safeguarding the Union's Live-Stock Industry. Annual Report of the Division of Veterinary Services. *Farming in South Africa*. Vol. 13, No. 153.
- 1939 The Rinderpest Position in Southern Africa. *Farm. in S.A.* Vol. 14.
- 1939 (With Malan, A. I. and v. d. Merwe, P. K.). The Feeding of Phosphates to Animals in Drinking Waters. *Farm. in S.A.* Vol. 14.
- 1939 Safeguarding the Union's Livestock Industry. Annual Report of the Div. of Vet. Services. *Farm. in S.A.* Vol. 14.
- 1940 (With Louw, J. G. and Malan, A. I.). A Study of the Mineral Content and Feeding Value of Natural Pastures in the Union of S.A. *O.P. Jnl.* Vol. 14, Nos 1 and 2, pp. 123-328.
- 1940 (With Malan, A. I. and Groenewald, J. W.). Iodine in the Nutrition of Sheep (Final Report). *O.P. Jnl.* Vol. 14, pp. 329-334.
- 1940 (With Malan, A. I., v. d. Merwe, P. K. and Louw, J. G.). Mineral Supplements for Stock. The Composition of Animal Licks. *Farm. in S.A.* Vol. 15.
- 1940 (With Louw, J. G. and Malan, A. I.). The Nutritive Value of Natural Pastures in the Union of S.A. *Farm. in S.A.* Vol. 15.
- 1941 The Economic Aspect of Veterinary Science. *Ass. S. and Tech. Soc. of S.A.* p. 1-15.
- 1941 The Veterinary Research Institute at Onderstepoort. Official Yearbook of the Union. 22. pp. 743-751.
- 1941 The Welfare of the Stock in the Union, 1940-41. *Farm. in S.A.* Dec., 1941.
- 1941 Veterinary Services during the War. *Farm. in S.A.* Vol. 16.
- 1943 Discussion on Post-War Developments in the Veterinary Profession in S.A. *Jnl. S.A.V.M.A.* Vol. 14.
- 1946 Some Outstanding Veterinary Problems in S.A. Commonwealth Scientific Conference, London.
- 1946 Regional Research in S.A. Veterinary Science. *Ibid.*
- 1946 Game in Relation to Animal Diseases. *Ibid.*