# LIFE AND WORK OF SIR JOHN BOYD ORR

FIRST DIRECTOR GENERAL OF THE FOOD AND AGRICULTURE ORGANIZATION WASHINGTON

HONORARY DOCTOR OF AGRICULTURE, AGRICULTURAL UNIVERSITY WAGENINGEN (NETHERLANDS) MARCH 9, 1948

Prof. Dr E. DE VRIES



H. VEENMAN & ZONEN . WAGENINGEN

# SIR JOHN BOYD ORR

### BIOGRAPHICAL NOTES

Sir John Boyd Orr, the First Director-General of the Food and Agriculture Organization of the United Nations, is a nutritionist, an agricultural scientist, practical farmer and humanitarian. Born in Kilmaurs, Ayreshire, Scotland, 23 September 1880, he studied at Glasgow University for ten years and is a graduate in three faculties: arts, science and medicine.

In the early years of his life, JOHN ORR was attracted by the new problems in the field of metabolism and nutrition. In 1914 he was named director of a new institute of animal nutrition to be established at Aberdeen, Scotland. After the war, in 1919 he returned to that task and helped to establish the Rowett Institute. He served for 25 years as its Director. Under his direction the Institute became an Empire clearing house of information, and when the Imperial Bureaux were set up the Nutrition Bureau was established at the Rowett.

In 1930, in connection with the work of the the Bureau of Nutrition, he established the journal "Nutrition Abstracts and Reviews" which gave an account of the research work in human and animal nutrition all over the world, and served as its editor-in-chief until he became head of FAO

During the years when he was working on animal nutrition, JOHN ORR was also investigating problems of human nutrition. In 1925, he carried out a test with school children in the seven largest towns of Scotland, which showed that when children who were supposed to be in normal health were given a pint of milk at school each day, they showed a remarkable improvement in health and physique, and their rate of growth was increased by about 20 percent.

In 1929, JOHN ORR published "Minerals in Pastures and Their Relation to Animal Nutrition", a book which summed up much of the early pioneering work of the Institute in the field of mineral metabolism. The book is still used by experts, and has left its mark on

thinking in many countries.

While JOHN ORR was at the Rowett, he was also interested in the operation by the Institute of a successful thousand-acre stock farm on which the results of research were applied on farm animals under farming conditions. He also owns and has actively operated a large mixed farm in the County of Angus in Scotland.

By 1935 ORR had gained practical knowledge of both farm and health problems, and his next step was to measure the relationship between the incomes of British families and their diet and health, in

his pioneer study "Food, Health, and Income". His figures showed that in 1934 more than one-third of the population of Great-Britain were living on a diet which could not support health, and the main cause of the resulting mal nutrition was poverty. The book caused considerable stir. The League of Nations set up an international committee to draw up a report on food requirements for health, and Sir John was a member.

In 1935 ORR was knighted for his service to agriculture. He was also a member of the British Nutrition Committee, and was for 20 years a member of the Colonial Agriculture and Animal Health Council, and Chairman of the Scottish Scientific Advisory Committee which advised the government on matters affecting the health and welfare of the people of Scotland.

In 1945 Sir John resigned as Director of the Rowett Institute and Professor of Agriculture at Aberdeen University and stood for Parliament as an independent. In a by-election he won his seat as representative of the Scottish Universities.

During World War I, ORR served with the British Royal Army Medical Corps and was awarded the Military Cross and in 1917 the Distinguished Service Order for bravery in action. He raised and commanded a combatant unit of the Officers Training Corps at Aberdeen University after World War I, and during the recent war was an officer of the home guard, and a member of the War Cabinet Scientific Committee on Food Policy. But with all his military background, he has an intense hatred of war and is President of the National Peace Council which has for its object the promotion of better social and economic conditions and world unity as a means of removing the causes of war, one of the greatest of which he believes to be hunger.

Sir John has received many academic distinctions, he is a Fellow of the Royal Society, elected for his fundamental research in Physiology, and an Honorary Graduate LL.D. of St. Andrews and Edinburgh Universities, Scotland, and of Princeton University, USA. In 1945, he was appointed Rector of Glasgow University, and became Chancellor in 1946. Recently he was nominated for the 1947 Nobel Peace Prize. Sir John and Lady Orr have two daughters. An only son was killed in action with the R.A.F.

In 1945, JOHN ORR was an adviser to the United Kingdom delegation to the Food and Agriculture Conference held in October 1945 at the City of Quebec. The Conference elected him as the First Director-General of FAO for a two year term ending December 31, 1947. This term was extended at the Geneva Conference in September 1947 till a successor would be found probably till the middle of 1948.

Unter his direction FAO emerged from the initial stages of organization into an agency which has undertaken programs in many fields, and has taken an active part in both emergency and long-term international policy-making on food and agriculture.

## SPEECH

BY PROF. DR E. DE VRIES ON OCCASION OF THE CEREMONY OF THE INSTALLATION OF SIR JOHN BOYD ORR AS HONORARY DOCTOR OF AGRICULTURE, WAGENINGEN, AGRICULTURAL UNIVERSITY, MARCH 9, 1948

SIXTH LUSTRUM OF THE UNIVERSITY

Mr Gage, Ladies and Gentlemen,

We are here together to honor a great country fellowman of you, Sir, and a great civil servant of the world as a whole, John Orr, born in Scotland in September 1880, now Sir John Boyd Orr, the first director general of the Food and Agriculture Organization of the United Nations.

We regret that Sir John, being, as you all know, "one of the busiest men in the world at the present time" (1), was unable to attend our ceremony and we thank you, Sir, for your kindness to come tot Wageningen on his behalf.

JOHN ORR studied at Glasgow University for ten years and is a graduate in three faculties: arts, science and medicine. This broad scientific basis of his life and work may give some explanation of his tremendous activity in many fields of science, agriculture, human life and human relations, but on the other hand I see his attitude as a student to be the result of his broad and deep mind.

Somewhere, Sir John wrote "Fortunately for agricultural science, the investigation of the normal metabolism of health and the abnormal metabolism of disease will never lack workers. These are the basic phenomena of life and the investigation leads to those ultimate truths which indeed may never be reached but the pursuit of which yields information of inestimatable value to mankind" (2).

In these words, he pays the highest tribute to agricultural science that can possibly be given and John Orr proved by his work that he was a valiant fighter for this high standard of our science. He never lost sight of the ultimate aims of agriculture and stockfarming to raise the standards of health and living of man.

In 1914 he was named director of a new institute of animal nutrition to be established at Aberdeen, Scotland. After the war, which gave him the Military Cross and the Distinguished Service Order for bravery in action, he established the famous Rowett Institute and served 25 years as its director. In this period he visited several overseas territories to study malnutrition in cattle and man.

JOHN ORR states of himself "to be born and bred a farmer" (3). The Rowett Institute operates a successful 1000 acres stockfarm and Sir John himself owns and has actively operated a large mixed farm

in Scotland.

The Rowett Institute did much of the pioneering work in the field of mineral metabolism and in 1929 its director published a book to sum up this work.

Important for agricultural science as this is — his bibliography contains not less than 117 different publications — still more important is the fact, that he was forced by his great human interests to study the food-requirements of men as well as those of animals, and to find the way for the implementation of a health standard as a goal for agriculture and for a national and a world policy.

In 1935 John Orr was knighted for his outstanding work in the field of agriculture and this same year seems to be the decisive moment in his life through his co-operation in a League of Nations Committee

for the establishment of normal foodrequirements.

From this time on, Sir John Boyd Orr devoted much of his interest to the social aspects of nutrition and agriculture. I can illustrate this with the titles of some publications — Public health and agriculture (1936), Food, health and income (1936), What science stands for (1937), The physiological and economic basis of nutrition (1939), Food science in the future (1940), Food and the people (1943), Foundations of the new World Order (1942), The role of food in postwar-reconstruction (1942).

And I can show it from the forceful words he wrote: "The new science of nutrition has upset our ideas of the amounts of different foodstuffs required for health. At the same time mechanization, the increasing use of fertilizers, and improvements in methods have greatly increased our capacity to produce food. These two developments were of themselves sufficient to produce revolutionary changes in agriculture." He adds: "the world economic crisis, with widespread unemployment, decreased purchasing power and resulting collapse in the price of agricultural products made worse the confusion of the period of change" (6). And somewhere else "the necessity for reconciling the interest of agriculture and public health has raised questions of the utmost importance on Government measures affecting the foodsupply" (5).

"It is of little use for a committee to tell the farmer what he should produce: If he cannot see a profit, the committee cannot compel him to produce. The only way is to offer guaranteed prices which will

induce the farmer to produce them" (6).

"It remains to adjust our foodpolicy so that the great wealth of food which we have or can produce will be brought within the purchasing power of the poorest. This is no easy task. It will require economic statemanship of the highest order" (7).

These words, dating July 1937 lead us to the most important work of Sir John who became an international agricultural statesman of

the highest order himself.

The Atlantic Charter and the Conference at Hotsprings in 1943 made him write:

"Each nation should untertake the primary responsibility for seeing that their own people have the food needed for health and life."

"Governments should co-operate with each other to achieve this

end for the people of all nations."

"These are the first concrete steps to fulfil the promise in the Atlantic Charter to bring freedom from want all men in all lands" (8).

The conference of The Food and Agriculture Organization of the United Nations at Quebec in October 1945, following the Hotsprings Conference, elected Sir John Boyd Orr as its first director general.

In the course of two and a half year leadership of this organization Sir John acted upon his principles, based upon a vast knowledge of agricultural and nutritional science, and a broad conception of the economic, social, moral and political problems related to food and agriculture.

He has achieved that everywhere in the world his ideals of food on a health basis and stable and fair prices for the farmers are the hope of

peaceful nations.

Agricultural science became in a very short period one of the most important pillars of human progress and prosperity. We can compare the tremendous development of the aknowledged importance of our science for human welfare with the development of nuclear physics, the study of the structure of the atom, which promises to be a major factor in the future development of society. All we know, is that agricultural and nutritional science is bound to have beneficial effects on human relations, if the ideology of Sir John Boyd Orr marks the road of scientists, farmers, nations and governments. It is an ideology of co-operation between nations, mutual responsibility of the highest order to ensure sufficient food for all men in all countries.

The Senate of the Agricultural University of Wageningen is convinced that this ideology can inspire our young generation of agricultural scientists to archieve "a sound basis of national and world prosperity and stability for our social and economic system" (9).

And for this reason it awarded Sir John the highest honor it can

give — the honorary degree of doctor of agriculture.

It is a great pleasure, Sir, for me to hand over to you the document which gives expression of the high esteem we have for this great man and I would like to ask you the favor to be so kind to forward it to Sir John.

# SPEECH

BY MR B. E. F. GAGE, COUNSELLOR, HIS MAJESTY'S EMBASSY FOR THE UNITED KINGDOM AT THE HAGUE ON ACCEPTING THE DOCUMENT IN BEHALF OF SIR JOHN BOYD ORR

Mr President and members of the Senate,

I have much pleasure in accepting on behalf of Sir John Boyd Orr the Honorary Degree of the University of Wageningen which has just been handed over to me. I know that Sir John would wish me to thank the Senate most warmly for the great honour thus conferred upon him and also for the tribute to his qualities and work so gracefully paid to him by Professor DE VRIES in his speech. I will see that the Degree is forwarded to Sir John at once.

Owing to the necessity for his presence in Washington at this time it was unfortunately impossible for Sir John to come to Wageningen personally to receive the Honorary Degree, to his deep regret.

Accordingly Sir Philip Nichols, the new British Ambassador, who has only just arrived in this country, instructed me to proceed here to receive it on behalf of Sir John.

I understand that Sir John hopes very much to visit Wageningen later on this year when you would have an opportunity of welcoming him personally. Meanwhile I am most happy to have had this chance of visiting your great university, which I understand is the only one of its type in Holland. I wish it all success in the most important human work which it is doing.

### CITATIONS

- 1. The chairman, introducing Sir John on a lecture on Public Health and agriculture, Febr. 1936.
- 2. The mineral elements in animal nutrition. Br. Ass. Science Report 1925.
- 3. The economic basis of the minimum wage in agriculture. The agr. econsoc. London, 1930.
- 4. Public health and agriculture, Febr. 1936.
- 5. Food, health and income, Febr. 1936.
- 6. Feeding the people in wartime, 1940.
- 7. Food, health and income, Febr. 1936.
- 8. Freedom from want of food, July 1943.
- 9. The effects of war on agriculture, 1940.

# **PUBLICATIONS**

- 1914 Burns, D. and Orr, J. B., The influence of excessive water ingestion on the excretion of creatin and creatinin. Brit. Med. J., 19th September, 1914.
- 1914 ORR, J. B., The influence of excessive water ingestion on protein metabolism. Biochem. J., 1914, Vol. 8.
- 1915 ORR, J. B. and ORWIN, C. S., The cultivation of sugar beet in Norfolk and Suffolk.
- 1916 ORR, J. B., Agriculture in Oxfordshire.
- 1918 ORR, J. B., Agriculture in Berkshire.
- 1919 ORR, J. B. and CATHCART, Energy expenditure of infantry recruit in training.
- 1920 ORR, J. B., Influence of increased water ingestion on blood pressure. Proceedings of the Physiological Society, 19th June, 1920. (J. Physiol., Vol. 54.)
- ORR, J. B. and Kinloch, J. P., Note on the influence of diet on the energy expenditure on work. J. Roy. Army Med. Corps, February, 1921.
- ORR, J. B., The vitamin hypothesis and its practical significance in stock feeding. Transactions of the Highland and Agricultural Society of Scotland, 1922.
- 1922 ORR, J. B. and INNES, I., The effect on arterial hypertension of increased fluid intake. Brit. J. Exp. Pathol., 1922, Vol. 3.
- 1922 ELLIOT, W. E., CRICHTON, A. and ORR, J. B. The importance of the inorganic constituents of the food in nutritional disorders. 1. Rickets in pigs. Brit. J. Exp. Pathol., 1922, Vol. 3.
- 1922 ORR, J. B., CRICHTON, A. and GREEN, J. J. The value of fish meal as a feeding stuff. Scot. J. Agric., 1922, Vol. 5.
- 1922 ORR, J. B. and Husband, A. D., The importance of mineral matter for growing animals. Scot. J. Agric., 1922, Vol. 5.
- 1922 ORR, J. B. and CRICHTON, A., The mineral requirements of the pig. Pig Breeders' Annual, 1922.
- 1922 ORR, J. B., A short history of british agriculture.
- ORR, J. B. and CRICHTON, A., The food value of dried whey solids. Scot. J. Agric., 1923, Vol. 6, No 1.
- 1923 ORR, J. B., The importance of mineral matter in nutrition. Transactions of the Highland and Agricultural Society of Scotland, 1923, Vol. 35.
- 1923 ORR, J. B. and CRICHTON, A., Fish meal and tainted bacon. Scot. J. Agric., 1923, Vol. 6, No 3, July.
- 1923 ORR, J. B. The influence of oils in poultry feeding. Scot. J. Agric., 1923, Vol. 6, No. 3, July.
- 1923 ORR, J. B. and Magee, H. E., The application of the indirect method of calorimetry to ruminants. J. Agric. Sci., 1923, Vol. 13, No 4, October.
- ORR, J. B., The role of vitamins and of minerals in poultry feeding.
  National Utility Poultry Society Year Book, 1924.
- ORR, J. B. and CRICHTON, A., The requirements of the pig for vitamin A and vitamin C. J. Agric. Sci., 1924, Vol. 14, No 1, January.

1924 ORR, J. B., HENDERSON, J. M. and MAGEE, H. E., The effect of irradiation with the carbon arc on pigs on a diet high in phosphorus and low in calcium. Proc. Physiological Society; J. Physiol., 1924, Vol. 59, July.

1924 ORR, J. B. et al. The nutritive requirements of poultry. The effect of adding vitamin-rich substances to normal rations for poultry.

(1. The fat soluble vitamin or vitamin A)

Scot. J. Agric., 1924, Vol. 7, No 3.

1924 ORR, J. B., The importance of mineral elements in the maintenance of health. Brit. Med. J., 1924, September.

1924 ORR, J. B., The importance of mineral elements in the nutrition of children. J. State Med., 1924, Vol. 32, No 9.

1924 ORR, J. B., The chemical and physiological properties of milk. Transactions of the Highland and Agricultural Society, 1924.

1924 ORR, J. B. and MAGEE, H. E., The course of metabolism after food in the goat. J. Agric. Sci., 1924, Vol. 14, No 4.

1924 ORR, J. B., The influence of nutrition on the incidence of disease. Vet. Rec., 1924.

1925 ORR, J. B. et al. The nutritive requirements of poultry. The effect of adding vitamin-rich substances to normal rations (2. Vitamin B or the water soluble vitamin of yeast.) Scot. J. Agric.; 1925, Vol. 8, No 1.

1925 ORR, J. B. et al. The nutritive requirements of poultry. The mineral requirements – preliminary communication. Scot. J. Agric., 1925, Vol. 8, No 1.

1925 ORR, J. B., Vitamins in stock feeding. Agricultural Progress, 1925.

1925 ORR, J. B., Mineral metabolism and disease. Practitioner, 1925, January.

1925 ORR, J. B. et al. The nutritive requirements of poultry. 5th Communication. Scot. J. Agric., 1925, 8, 263.

1925 ORR, J. B., CRICHTON, A. and MIDDLETON, W., Mineral nutrients in the rations of dairy cows. Scot. J. Agric., 1925, 8, 312.

1925 ORR, J. B., The mineral requirements of dairy cows. The Milk Industry, 1925, August.

1925 Elliot, W. E., Orr, J. B. and Wood, T. B., The mineral content of pastures. Scot. J. Agric., 1925, 8, 349.

1925 ORR, J. B., MAGEE, H. E. and HENDERSON, J. M., The effect of ultra-violet light on the mineral metabolism of the lactating animal. Preliminary communication. Biochem. J., 1925, 19, 569.

1925 ORR, J. B., The mineral elements in animal nutrition. Rep. Brit. Ass. for the advance of science, 1925, 204.

1926 ORR, J. B., South African Veterinary Research Station, Onderstepoort. Scot. J. Agric., 1926, 9, 290.

1926 ORR, J. B. and Thomson, J. S., Agricultural research in Canada. Scot. J. Agric., 1926, 9, 357.

1926 Elliot, W. E., Orr, J. B. and Wood, T. B., Investigation on the mineral content of pasture grass and its effect on herbivora. J. Agric. Sci., 1926, 16.

1926 ORR, J. B., HENDERSON, J. M. and CRICHTON, A., The influence on nutrition of sunlight and artificially produced ultra-violet rays. Trans. High. Agric. Soc. Scot., 1926, 38, 88.

- 1926 ORR, J. B. and LEITCH, I., Iodine in relation to plant and animal life. J. Roy. Agric. Soc. Engl., 1926, 87, 43.
- 1926 ORR, J. B. et al. The effect of pasteurisation on the nutritive value of milk. Scot. J. Agric., 1926, 9, 377.
- 1926 ORR, J. B. et al. The nutritive requirements of poultry. Note on growth in chickens. Scot. J. Agric., 1926, 9, 392.
- 1927 Thomson, J. S. and Orr, J. B., Agricultural research in New Zealand. Scot. J. Agric., 1927, 10, 12.
- 1927 GILKS, J. L. and ORR, J. B., The nutritional condition of the East African native. Lancet, 1927, 212 (1), 560.
- 1927 ORR, J. B. and CRICHTON, A., Review of recent work on the nutrition of the pig. Trans. Highl. Agric. Soc. Scot., 1927, 39, 25.
- 1928 ORR, J. B., Milk consumption and the growth of school children. Lancet, 1928, 214 (1), 202.
- 1928 ORR, J. B., GODDEN, W. and DUNDAS, J. M., Iodine in drinking water. J. Hyg., 1928, 27, 197.
- 1928 ORR, J. B. and MAGEE, H. E., Calcium and phosphorus in the metabolism of the lactating animal and factors that influence their assimilation. Proc. World's Dairy Congress, 1928, 42.
- 1928 ORR, J. B., KELLY, F. C. and STUART, G. L., The effect of iodine manuring on the iodine content of plants. J. Agric. Sci., 1928, 18, 159.
- 1928 ORR, J. B., The influence of diet on the physiology of the stomach. Oxford Medical Publication, "Gastro Intestinal Diseases", (Oxford Univ. Press), 1928.
- 1929 ORR, J. B., Minerals in pastures and their relation to animal nutrition. H. K. Lewis and Co., London, 1929.
- 1929 ORR, J. B., The mineral requirements of farm animals. Fertilizer and Feeding stuffs Journal, XIV, 639-642, 1929.
- 1929 ORR, J. B., The composition of pastures. H. M. Stationery Office, E.M.B. No 18, 1929.
- 1929 ORR, J. B. and LEITCH, I., Iodine in nutrition. H. M. Stationary Office, M.R.C. No 123, 1929.
- 1929 ORR, J. B., CRICHTON, A. and SHEARER, E., Milk substitutes in the rearing of calves. Scot. J. Agric., 1929, 12, 168.
- 1929 ORR, J. B., The relation of the chemical composition of pasture to its feeding value. Trans. High. Agric. Soc. Scot., 1929, 41, 99.
- 1929 ORR, J. B., The calcium and phosphorus requirements of farm animals and the effects of deficiencies. Paper at Vet. Congress, Ayr, 1929.
- ORR, J. B., CRICHTON, A. and MIDDLETON, W., A note on the toleration of farm animals for high doses of iodine. Vet. Rec., 1929, 9, 1055.
- 1930 ORR, J. B. and HOLM, A., Investigation on mineral deficiencies in pastures of Kenya Colony and effects on grazing animals. H. M. Stationery Office, 1930.
- ORR, J. B. and CLARK, M. L., A report on seasonal variation in the growth of school children. Lancet, 1930, ii, No 5581.
- ORR, J. B. and CLARK, M. L., A dietary survey of six hundred and seven families in seven cities and towns in Scotland. Lancet, 1930, ii, No 5585.

- 1930 ORR, J. B., The economic basis of the minimum wage in agriculture. The agricultural economics society, London.
- 1930 ORR, J. B., The influence of diet on susceptibility to disease. Trans. Highl. and Agric. Soc. of Scotland, 1930, xlii, p. 28.
- 1930 ORR, J. B. and LEITCH, I., Iodine in practical agriculture. Internat. Rev. Agric. Part 1 Monthly Bull. of Agric. Sci. and Practice, Year 21, no 6, June, 1930.
- 1930 ORR, J. B., The role of vitamins and minerals in stock feeding.
  1. Vitamins. 2. Minerals. J. Min. Agric., April and May, 1930.
- 1930 ROBERTSON, G. S., ORR, J. B., PRENTICE, J. H. and MACDONALD, A. J., Nutritive requirements of poultry. 7. Growth in chickens. Scot. J. Agric., 1930, 13, No 4.
- 1931 ORR, J. B., Iodine supply and the incidence of endemic goitre. H. M. Stationary Office, M.R.C. Spec. Rep. Ser. No 154, 1931.
- 1931 ORR, J. B. and GILKS, J. L., Studies of nutrition, the physique and health of two African tribes. H. M. Stationery Office, M.R.C. Spec. Rep. Ser. No 155, 1931.
- 1931 ORR, J. B. and HOLM, A., The influence on animal health of minerals in diet. H. M. Stationery Office, Economic Advisory Council Committee on the Mineral Content of Natural Pastures, 6th Report, 1931.
- 1931 ORR, J. B., The national importance of stock farming. Scot. J. Agric., 1931, 14, 16.
- 1931 ORR, J. B., MACLEOD, J. J. R. and MACKIE, T. J., Studies on nutrition in relation to immunity. Lancet, 1931, i, No 5622.
- 1931 ORR, J. B., Grass and hay farming.
- 1931 ORR, J. B., The development of the science of nutrition in relation to disease. Brit. Med. J., 1931, pp. 883-886.
- 1931 Orr, J. B., Faulty diet as a factor in disease. Scot. J. Agric., 1931, 14, No 4.
- 1931 ORR, J. B. and DAVIDSON, H. R., Observations on the nutrition of breeding pigs. The Pig Breeders' Annual, 1930-31, p. 53.
- 1932 ORR, J. B. and CRICHTON, A., Improvement of permanent pasture. Scot. J. Agric., 1932, 15, No 1.
- 1932 ORR, J. B. and FRASER, A. H. H., Restoring the fertility of Scottish sheep grazings. Trans. Highl. and Agric. Soc. of Scotland, 1932.
- 1934 ORR, J. B., The national food supply and its influence on public health. Chadwick Lecture, 1934.
- 1934 ORR, J. B. and RICHARDS, M. B., Growth and vitamin A deficiency. Biochem. J., 1934, 28, 1259-1273.
- 1934 ORR, J. B., FRASER, A. H. H. and ROBERTSON, D., Parasitic worms and their importance in sheep farming. Trans. Highl. Agric. Soc. Scot., 1934, 46, 113-125.
- 1934 ORR, J. B., FRASER, A. H. H. and ROBERTSON, D., The problem of parasitic roundworms in sheep. Transactions of the Yorkshire Agricultural Society, No 91, 1934, 35-38.
- 1935 ORR, J. B., The role of inorganic elements in nutritional anaemia. Proc. Roy. Soc. Med., 1935, 28, 9-15.
- 1935 ORR, J. B., The economics of diet. Address at British Association Meeting, Sept. 10, 1935.

- 1936 ORR, J. B., Public health and agriculture. J. Farmers' Club, Part 1, Febr., 1936.
- 1936 ORR, J. B., Food, health and income. Report on a survey of adequacy of diet in relation to income. Macmillan and Co. Ltd., London, 1936.
- 1936 ORR, J. B., THOMSON, W. and GARRY, R. C., A long term experiment with rats on a human dietary. J. Hyg., 1936, 35, 476-497.
- 1936 ORR, J. B., The trend of changes in the agricultural economic system. Trans. Highl. Agric. Soc. Scotland, 1936, 48, 122-142.
- 1937 ORR, J. B., Agricultural research as a career. Some coming developments. J. Careers, 1937, 16, 537-540.
- 1937 ORR, J. B., The science of nutrition and agricultural policy. Nat. Farmers' Union Year Book, 1937, 321-331.
- 1937 ORR, J. B., Nutrition in relation to education, agriculture, and medicine. Health and Empire, 1937, 12, 192-207.
- 1937 ORR, J. B., Grass and money. Scot. J. Agric. 20, 1, 1937.
- 1937 ORR, J. B., DOLLAN, P. J. et al. Eleventh Hour Questions. Moray Press, Edinburgh and London, 1937.
- 1937 ORR, J. B. and HILL, A. B. et al. What science stands for. George Allen and Unwin, Ltd., London, 1937.
- 1937 ORR, J. B., Not enough food for fitness. The Listener, 26th May, 1937.
- 1937- ORR, J. B. and LEITCH, I., The determination of the calorie require-'38 ments of man. Nutrit. Absts. and Revs., 1937-38, 7, 509-529.
- 1938 ORR, J. B., A review of the development of milk marketing. Trans. Highl. Agric. Soc. Scot., 1938, 50, 133-159.
- 1938- ORR, J. B., Nutrition in everyday practice. Nutrition Problems.
  '39 Committee on Nutrition of the Canadian Medical Association, Oct. 1939.
- 1939 ORR, J. B., Health, agriculture and the standard of living. First of three speeches to The Economic Reform Club, London, February 24th, 1939.
- 1939 ORR, J. B., Nutrition problems. Dietary requirements for health. Canadian Med. Assoc. J., 1939, 41, 78-80.
- 1939 ORR, J. B., The physiological and economic bases of nutrition. Harben Lectures. J. Roy. Inst. Pub. Health Hyg., 1939, 2, 661-676.
- 1939 ORR, J. B., Nutrition during war-time. Nature, 1939, 144, 733.
- 1940 ORR, J. B. and LUBBOCK, D., Feeding the people in war-time. Macmillan and Co., Ltd., London, 1940.
- 1940 ORR, J. B., Food and the ordinary man. Chambers's Journal, 1940.
- ORR, J. B., Food science in the future. Food Group Jubilee Memorial Lecture. Chem. and Industr., 1940, 59, 356.
- 1940 ORR, J. B., Nutrition in war. Fabian Society, 11 Dartmouth St., London, 1940.
- ORR, J. B., Summary of the series of articles on the vitamins. Post-Grad. Med. J., April, 1941.
- 1942 ORR, J. B., Fighting for what? Macmillan and Co., Ltd., London, 1942.
- 1942 ORR, J. B., Foundations of the New World Order. Nature, 1942, 149, 401.

- 1942 ORR, J. B., Speech delivered at a meeting of Government Agencies represented on the Interdepartmental Nutrition Coordinating Committee. Federal Security Agency, Office of Defense Health and Welfare Services, Washington, D.C., 1942.
- 1943 ORR, J. B., Food and the people. Pilot Press, Ltd., 45 Gt. Russell St., London, 1943.
- 1943 ORR, J. B., Nutrition and psychology. Journal of Education, 1943, 75, 159-162.
- 1943 ORR, J. B., The role of food in post-war reconstruction. International Labour Review, 1943, 47, No 3, March.
- 1944 Orr, J. B., The probable effects on British agriculture of the recommendations of the United Nations Conference on Food and Agriculture. Trans. Highl. Agric. Soc. Scot., 1944.

### F.A.O.

Proposals for a World Food Board, Washington, July, 1946.

First Annual Report of the Director-General to the F.A.O. conference, July, 1946.

Second Annual Report of the Director-General to the F.A.O. conference, July, 1947.

## **ACKNOWLEDGEMENTS**

The biographical notes were prepared with the help of the F.A.O. information service.

The bibliography id. with the help of the Library Edinburgh University.