

they entail the great risk of possibly introducing foot-and-mouth disease or swine fever which might endanger the whole animal industry here. There is more need for supplies of pork from overseas than of any other product. Before the war large quantities of frozen pork came from New Zealand and Australia and it is to be hoped that the difficulties there will soon be overcome. The possibility of pork from South Africa (van der Post, 1950) gives a ray of hope and, if the dollar problem could be solved, Canada could do a lot to help in this respect. Stepping up home production is entirely a matter of supplies of feeding-stuffs, and possibly the sorghum from Australia, and soya-bean by-products, if their production is a success, from Africa, will be a means of solving our worst problem of meat supplies.

#### *Poultry-meat*

The consumption of poultry-meat in this country, unlike that of other classes of meat, is limited by price rather than by coupons. At present considerable supplies are coming from continental Europe but here, again as with pigs, there is considerable risk to our own poultry industry from the introduction of fowl pest. It is, therefore, good to hear that increase in supplies from Australia is likely (Heywood, 1950). To what extent this trade will develop depends largely on price for, unlike with other meats at the present time, the amount consumed depends on price to the consumer.

#### REFERENCES

- Callow, E. H. (1950). *Brit. J. Nutrit.* 4, 82.  
Heywood, R. H. (1950). *Brit. J. Nutrit.* 4, 53.  
Hopkirk, C. S. M. (1950). *Brit. J. Nutrit.* 4, 57.  
Robertson, J. G. (1950). *Brit. J. Nutrit.* 4, 49.  
van der Post, A. P. (1950). *Brit. J. Nutrit.* 4, 63.

### **Commonwealth Contributions and British Requirement of Cereals**

By A. GREEN, *Spillers Ltd. Central Laboratory, Station Road, Cambridge*

#### *Wheat*

*Protein content.* Wheat has received most attention from this morning's contributors, and the Australian (Heywood, 1950) and the Canadian (Robertson, 1950) representatives have both shown the importance to Great Britain of their countries' wheat and flour exports. Furthermore, we can safely accept Col. Robertson's statement that Canada's wheat 'is the very best in the world'. The Canadian system of grading its wheat according to certain standard characteristics of quality is a model, but the criteria which are applied do not include any for nutrient factors, and it is with them that this Society is most concerned. Nevertheless, the nutritive value of Canadian bread-making wheats is high, and their protein contribution to our diet is important. The Scientific Adviser to the Ministry of Food, Dr Norman Wright, has recently said that wheat-flour products provide about one-third of our total protein (Wright, 1949). Our native wheats and those which come to us from Australia have relatively low protein contents and can be balanced satisfactorily only by the liberal use of high-protein wheats of the Canadian

type. The difference affects not only the nutritive value, but also the ability to yield acceptable bread. Nevertheless, between Canadian wheat cargoes of any one grade there are variations which are sufficiently marked to affect directly the standard of nutritive value, and also the bread-making quality of the flour milled here. Canada ships her wheat to us from both Atlantic and Pacific ports, and there is an appreciable difference in the same grade of wheat depending on the seaboard from which it is shipped, as is shown below by figures taken from my own experience:

Grade of wheat	Average protein content (%)	No. of cargoes sampled
No. 1. Atlantic	13.4	103
No. 1. Vancouver	12.35	34
No. 2. Atlantic	13.5	80
No. 2. Vancouver	12.5	28

Col. Robertson (1950) has said that in the year 1947-8 Canada sent us about  $4\frac{1}{2}$  million tons of wheat. Some came as Atlantic shipments and some as Pacific, but if it had been all of the one type or all of the other, the difference between the two in the contribution of protein to our diet would have been about 45,000 tons. A point which concerns this meeting less is the fact that some wheat varieties which form a large proportion of the Vancouver shipments are, in their bread-making capacity, not as useful as the Atlantic wheats.

*New Canadian varieties.* The efforts of Canada's wheat breeders in providing varieties which will escape the early autumn frosts in the northern parts of the Dominion have been mentioned (Robertson, 1950). Here again there is danger of loss of protein content. A typical early maturing variety is Garnet, of which the average protein content, compared with that of Canadian standard grades delivered here during November 1949, is as follows (Amos, 1950):

Grade of wheat	Average protein content (%)
No. 1. Atlantic	13.9
No. 1. Vancouver	12.0
Garnet	12.0

It is now recognized by the Canadian authorities that Garnet is inferior to their best wheats in other qualities besides that of its relatively low protein content. It and similar varieties are very useful wheats as long as they are kept separate from the standard grades. Garnet is now kept in a separate class by the Canadian authorities.

*Australian.* Australian wheats have a smaller percentage of protein than Canadian, the respective figures being about 10 and 13. Furthermore, the buyer knows in advance approximately what protein content he will get in Canadian cargoes, but with Australian he does not. The following are typical figures for the cargoes from the five wheat-growing states of Australia (Ward, 1950):

State	Protein content (%)	State	Protein content (%)
Queensland	11.1	Victoria	10.0
New South Wales	10.6	Western Australia	8.9
South Australia	10.5		

Unpredictable variations of this type present a problem to the miller who is trying to produce a uniform flour, and the problem will be greater if, in the future, he has to mill flour to a prescribed nutritive standard. A practical aspect is illustrated by a statement (O'Brien, 1948) that 28% of Victorian wheat had insufficient protein for the making of satisfactory bread. In prewar days the miller in these islands did not look for a high protein content in Australian wheats. Now that he has to use much larger quantities of home-grown wheat of low-protein content, the quantity and quality of protein in the imported wheats is much more important.

### *Flour*

*Protein content.* Both of the dominions send us flour. Australian flour is of the low-protein type; the Canadian is high. Both show the anomaly that they are short-extraction flours (70–75%) compared with our own 85% extraction National flour. This is certainly an anomaly commercially; its effect on nutritive value has doubtless received due consideration at the Ministry of Food. The average protein content of the imported Australian flours which have come to one large milling company during the past 12 months has been only 8.8 compared with 11.4% for our National flour; the average vitamin B<sub>1</sub> content was less than half that of National flour. It appears that the Australian flour which has been purchased for us is low both in protein content and in bread-making quality. It is not surprising that it should be so, because the high-protein, good bread-making wheats are all needed by the Australians themselves, and their wheat breeders are working to produce new varieties in which these qualities are enhanced.

Recently 100,000 tons of Australian flour was purchased by us. Such an amount in the form of wheat would have kept any one of our largest mills grinding day and night for 15 months, and would have provided more than 17,000 tons of wheat by-products for animal feeding.

To anticipate any suggestion of ingratitude, it must be said that our home-grown wheats are markedly inferior on nearly all counts to Canadian, and not better than Australian. It is precisely for this reason that we have to scrutinize so closely the quality of our imported wheats. In this connexion Dr T. Moran and Dr C. R. Jones of the Research Association of British Flour Millers have said that, if the flour has to contain fixed amounts of nutrients derived from the grain, attention will have to be paid to the selection and/or breeding of the most desirable varieties (Moran & Jones, 1946). They were talking of home-grown wheats, but the comment applies to all the wheats which go into the British miller's grist.

### *Sorghum*

I have seen samples of the Queensland sorghum of both red and white varieties. They were not as free from extraneous matter as prewar imports of this grain, and contained rather large quantities of broken grains. These faults will doubtless be eliminated as the reaping and cleaning machinery is increased and improved. The analytical figures for these samples were similar to those of the varieties which we used to import before the war from the United States.

## REFERENCES

- Amos, A. J. (1950). *Food Manuf.* **25**, 13.  
 Heywood, R. H. (1950). *Brit. J. Nutrit.* **4**, 53.  
 Moran, T. & Jones, C. R. (1946). *Nature, Lond.*, **157**, 643.  
 O'Brien, E. J. (1948). *J. Dep. Agric., Victoria*, **46**, 303.  
 Robertson, J. G. (1950). *Brit. J. Nutrit.* **4**, 49.  
 Ward, H. H. (1950). Private communication.  
 Wright, N. C. (1949). *Baker and Confectioner*, **116**, 828.

### Commonwealth Contributions and British Requirement of Bacon

By E. H. CALLOW, *Low Temperature Research Station, University of Cambridge, and Department of Scientific and Industrial Research*

In 1938 our total supplies of bacon and ham were 10,727,600 cwt., of which 1,507,100 came from Canada and 552,500 came from Eire. Australia and New Zealand between them sent us about 300,000 cwt. of frozen pork which was manufactured as Empire bacon in the United Kingdom. Commonwealth supplies thus accounted for 22% of our total supplies.

During the past 12 months our total supplies of bacon have been about 6,000,000 cwt., of which 804,000 have come from Canada, 24,000 from Eire, and about 150,000 have been manufactured from frozen pork sent by Australia and New Zealand. South Africa also has sent about 10,000 cwt. of frozen pork and bacon. Thus Commonwealth supplies have dropped to 16% of our total supplies.

The present position is that we now have a 5 oz. ration but, to maintain this for 12 months, slightly over 10,000,000 cwt. would be required, and on this basis Commonwealth supplies would drop to about 10% of our total requirements, instead of the 22% of 1938.

What is the cause of this drop in supplies from Commonwealth sources? With Canada it is simply our inability to finance our purchases on a dollar basis. There is no doubt that Canada could easily double her present supplies and thus exceed her 1938 figure. Eire has only just started to send us bacon again, and she may well send us about 100,000 cwt. in the next 12 months, but even this is only one-fifth of the 1938 figure. This drop must be attributed to lack of feeding-stuffs for the pigs and a higher standard of living in Eire, so we cannot expect to see the 1938 figures reached for some years.

The drop in the supplies of frozen pork from Australia and New Zealand may be attributed to several causes, all acting in the same direction. First must come the uncertainties about the demand for frozen carcasses in the United Kingdom during the war. The result was a loss of confidence, and numbers of producers killed off their sows. Secondly, there was a man-power shortage. For example, in New Zealand there were fewer people engaged on farms in 1947 than in 1930. It is an astounding fact that in 1947 fewer than 120,000 men were engaged on over 86,000 farm-holdings. Thirdly, as we have heard, supplies of skim-milk for pig feeding are growing less; and fourthly, the populations of both dominions are increasing in numbers.