

namely, (a) the willing agreement among all technical writers to use the word *weight* to designate the earth pull on a body, followed by (b) a careless reversion to the usage of the coal man and the acceptance of his meaning when he sends a bill for 2,000 pounds weight of coal! Let it be understood that the coal man's weight is precisely the physicist's and the chemist's mass. The balance scale measures mass, it does not and can not measure force in any precise sense until the ratio of the local value of gravity to the value of gravity in London is known.

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that his contention that the *Gnetum* and *Ephedra* types of vessels are fundamentally different in origin from those of the angiosperms is without foundation in fact, since both these types are actually present in quite high angiosperms. Professor Thompson's attitude is further highly inconsistent, since in earlier publication he has called attention to the resemblances between the wood rays of *Ephedra* and those of certain angiosperms, and to the occurrence of nuclear fusions in *Gnetum* which he compares with that found in the case of the endosperm nucleus of the angiosperms.

E. C. JEFFREY

THE CANONS OF COMPARATIVE ANATOMY

IN a recent number of SCIENCE¹ Professor W. P. Thompson refers to a recent letter of mine to that journal. He maintains that the assertion on my part that he made use of the Canons of Comparative Anatomy through ignorance to reach an erroneous conclusion is inaccurate. This seems to be contrary to the facts, since Professor Thompson on his own showing is culpable either of inexcusable ignorance or deliberate misrepresentation. He emphasizes the value of the genus *Vaccinium* as a type illustrative of the relations between two main forms of vessel in the angiosperms, namely, the one with scalariform perforations and that with porous perforations. Had his acquaintance with the anatomy of *Vaccinium* been more complete, he would have realized that the type of vessel found in the Gnetalian genus *Ephedra* is also present there. Contrary to Mr. Thompson's statement, moreover, vessels of the *Gnetum* type prevail in the higher angiosperms rather than in the lower ones, being universal, for example, in the Compositæ and extremely common in the monocotyledons. It is unfortunate that Professor Thompson either through ignorance or intention has failed to emphasize the presence of the *Gnetum* type of vessel in the angiosperms, particularly as in many cases it has in that large group a mode of origin similar to that described by him in the case of *Gnetum*. It thus appears

¹ N. S., Vol. XLVII., No. 1221.

WHOLE-WHEAT BREAD

TO THE EDITOR OF SCIENCE: As a contribution to the discussion "Shall We Eat Whole-wheat Bread,"¹ may I quote from the findings of a special committee appointed by the Royal Society of England, to study this matter,² as follows:

The bread now in use is prepared from grain milled to 90 per cent. with the addition of other cereals. After investigation, a committee of the Royal Society has issued a report on the following questions: (1) What gain, if any, in food value accrues from a rise in the milling standard from 80 to 90 per cent., and does the dilution of wheat flour with other cereals modify the food value of the bread? (2) What would be the effect on the health of the consumption of such breads? (3) How far would such breads prove acceptable? Experiments were made with wheat flour, extracted to 80 and to 90 per cent. The analytical work was done in the biochemical department of the University of Cambridge and in the physiological laboratories of the universities of Glasgow and London. The diet consisted of 800 gm. of bread with butter, cheese, minced or potted meat, fruit jelly, milk and sugar, tea or coffee, and in one case beer was taken as a beverage. This dietary yielded about 3,680 calories a day. *The effects were remarkably uniform.*³ Bread made from the 80 per cent. flour yielded for nutrition 96.1 per cent. of the energy contained in the diet; bread made from 90 per

¹ "The Conservation of Wheat," SCIENCE, Vol. XLVII., No. 1218, p. 429; SCIENCE, N. S., Vol. XLVII., No. 1210, p. 228, March 8, 1918.

² Copied from the *J. Amer. Med. Assn.*, Vol. 70, No. 22, p. 1619, June 1, 1918.

³ The italics are my own.

cent. flour, 94.5 per cent. The loss of energy with the second bread was greater (5.5 per cent.) than with the first (3.9 per cent.). The intestinal secretions were considered to contribute largely to this. The feces with the 90 per cent. bread were more bulky, and the coarser particles of this bread produced a greater stimulation of the secretion of the intestine. The increase in the bulk of the evacuation is not an evil and in the case of many is even an advantage. As to the nitrogenous constituents, the average digestibility was 89.4 per cent. in bread made from flour extracted to 80 per cent., and 87.3 per cent. in that extracted to 90 per cent. In most of the cases there was a slight gain in body weight with both breads. Thus a *greater proportion of the energy of the grains is available for human consumption when flour is milled at the 90 per cent. scale than on the 80 per cent. scale. The increase would extend the cereal supply of energy for the country for more than a month.* Against this is to be set the loss of protein in the offal as food for pigs. Another set of experiments were made with bread made from flour consisting four fifths of wheat extracted at 80 per cent., and one fifth of maize. At first the flavor of the maize was commented on, and there was in some cases disturbance of digestion, attended sometimes with diarrhea, and more often with constipation; but these symptoms passed off. The general conclusion is that bread made with the addition of maize flour was as digestible as bread made without it, and it was well digested by children. The addition of maize made practically no difference in the utilization of energy and nitrogen. Observations were made at a canteen on the dietetic effects and on the palatability of bread made from flour containing four fifths of wheat extracted to 90 per cent., and one fifth of other permitted cereals (10 per cent. barley, made up to 20 per cent. with maize and rice, or rice alone). It was found to be palatable and never to cause indigestion.

These conclusions seem to strongly support my former statements that the "attack on the higher extraction flours is unmerited" and "that higher extraction flours are not normally harmful" and also when these flours are used more generally over the country "more grain will be released for the allied armies."

R. ADAMS DUTCHER

SCIENTIFIC ACTIVITY AND THE WAR

THE Italian mathematician G. Vivanti opened the preface of his book entitled "Equa-

zioni Integrali Lineari," 1916, with the following words:

While our sons fight valorously to liberate Europe from the Teutonic yoke it devolves on us, whose age and strength do not permit to offer arms to our country, to work for its scientific emancipation. A *national science* is an absurdity and he would be foolish who would refuse a scientific truth because it arose from beyond the Alps or the sea; but the work of scientific exposition and publication can be and ought to be national. Who does not recognize a German treatise by its minute and sometimes wearisome care of particulars, an English by its good-natured and discursive tone, a French by its form which is sometimes a little vague but always suggestive and elegant?

These words of an Italian scholar may be of especial interest at this time when so many of us are considering the question of how to render the most effective service to our country. It is interesting to note that Vivanti emphasized scientific exposition and publication as a means towards securing scientific emancipation. While scientific investigation should always occupy the foremost place in a permanent scientific program, it must be admitted that there is danger in fixing our attention too completely on the most important element in our scientific progress. Our students should not have to feel that the great majority of the best expository works relating to their subject are to be found only in the language of a people of low ideals imbued with a morbid desire to dominate the world at any cost.

From a quotation found on page 9 of the May, 1918, *Bulletin of the American Association of University Professors*, it appears that the German professors are still very active in the production of scholarly works, while those of England and France are devoting themselves much more completely to direct service connected with the war. This direct service is probably a natural concomitant of the high ideals which prevail in these countries, but it is evident that it points to the possibility "of winning the war in a military sense, only to find ourselves dominated by German knowledge and German science!"

The preparation of scholarly works of the