is as we all know who have served on committees, the opinion often of one man concurred in by others too indolent or tired or bored to look into the case thoroughly. How often the most efficient man on the committee is the astute but destructive critic who can see obstacles on every hand so clearly that he can not see the possibilities; who looking down an avenue of trees sees a wall of tree trunks and fails to realize that as you move forward there are wide open spaces between the trees.

It appears to most people a strange fact that army boards so generally turn down new and valuable inventions. General Anson Mills, for example, recounts in his autobiography how his cartridge belt (now universally used in all armies, I understand) "was submitted to every equipment board of the army organized between 1866 and 1879, but so wedded were the authorities to the use of ancestral methods that no board ever made favorable mention of my invention." This is a phenomenon traceable to the environment of committee organization and not to be explained on the ground of what is usually termed boneheadedness, and it is this environment factor which surrounds the proposed institution for invention that appears not to be appreciated by the originators of the scheme.

An institute devoted to a special field of knowledge which hires men to do research along those lines and gives them facilities and supports them is very different from one which covers practically the whole field of human knowledge and proposes to sit in judgment upon the ideas of the poor inventors.

DAVID FAIRCHILD

CIRCULAR FREQUENCY

IT would frequently be convenient if there were in common use a name for the letter n which occurs in the equation

$$y = a \cos nt$$

for simple harmonic motion. Mr. Jeans, in his "Theoretical Mechanics," p. 263, calls this n the *frequency* of the motion. This is unfortunate, because the term "frequency" is usually applied to the quantity $n/2\pi$. Professor Lamb, in his "Dynamical Theory of Sound," p. 10, suggests the term *rapidity*. I recall a few years ago seeing some place the term *Kreisfrequenz*, which suggested that we should perhaps have a satisfactory name for this n if we were to call it the *circular frequency* of the motion. This term is longer than *rapidity*, but it has an advantage in that it naturally calls to mind that the n not only is proportional to the frequency of the motion but also represents the angular velocity of an imaginary particle in the reference circle.

ARTHUR TABER JONES

SCIENTIFIC BOOKS

The Conservation of Food Energy. By HENRY PRENTISS ARMSBY. Philadelphia, W. B. Saunders Co. 1918.

This little book of sixty-five pages contains a vast amount of information concerning the relative values of different feeding substances when they are given to farm animals. The method of estimating these values is new. Armsby states "Aside from the milk requirements of the very young animal, it has been demonstrated to be entirely feasible to produce good yields of milk or well fattened carcasses, not only of cattle and sheep but of swine as well, on a ration containing ample roughage to meet the requirements for maintenance, leaving the concentrates to be applied directly to the production of human food." This is a new view point, for T. B. Wood in England[1] believes that meal made from grain is the chief kind of fodder consumed by pigs. Armsby assumes that the maintenance diet of farm animals is at the expense of coarse fodder, grass, hay, straw, etc., and that the development of food value in the animals may be ascribed to the grain ingested. The grains considered are wheat, corn, barley, rye, oats, rice and buckwheat. When these grains are fed under the above conditions, between 15 and 24 per cent. of their energy may be converted into human food in the bodies of cattle and sheep, and between 36 to 61 per cent. when they are fed to pigs and dairy cows.

[1] "The National Food Supply in Peace and War," Cambridge University Press, 1917.

However, when the grains are milled, the resulting flour used as human food and the offals given to cattle and sheep, then between 56 and 81 per cent. of the energy in the grain is recovered as food for human beings, whereas when the same offals are given to pigs and dairy cows between 60 and 85 per cent. of the energy is so recovered. It is evident that food is best conserved for man when edible grains are taken to the miller and the bran is used in meat production. Armsby shows that there is a considerable loss of energy in the food when barley is used in brewing and corn or rye in distilling. If one assumes that alcohol is without food value, then the waste is very large even though the brewers' and distillers' grains are used as fodder for pigs or dairy cows. The details given in the book are of greatest interest to those conversant with the food situation as a whole.

Graham Lusk

THE FLORA OF NORTH DAKOTA

Less than twenty years ago the first catalogue of the vascular plants of North Dakota was published.[1] Now we have a revision of the list in the form of a flora[2] which follows the plan of the well known floras of Colorado and of Washington. The introductory portion (pp. 151–174) contains a review of botanical collections in the state (3 pages), physiography of the state (6 pages), types of vegetation and their distribution (7 pages), and of plant classification with chart showing the evolution and relationship of families. The main portion contains keys to families, genera and species with citations of specimens and notes on habitat. For many species additional notes referring especially to variation of the species and its resemblance to others are given. These form one of the most valuable portions of the work. A glossary and index follow. A report by the same author on the plants of Barnes County is included in the same volume.

The arrangement of families is that of the Bessey system and the nomenclature is said to be in accordance with the Philadelphia code. A conservative stand is taken in regard to species and genera recognized. Synonyms are used freely and the reasons for reduction of segregates are stated in most cases.

Typographical errors seem to be few but one feature of the press work is particularly unfortunate. The generic and specific names in the keys are placed beyond the body of the text at the expense of the margin, especially that of the left hand side of the page. Italics are used for these names and small capitals for the generic headings, otherwise there is no distinction in type.

North Dakota is to be congratulated upon the completion of a work of as high standard as this. The simplicity of the keys, the glossary, introduction and descriptive notes will contribute much to its value to the people of the state. Notes on the flowering period would have been a valuable addition. Botanists will be especially interested on account of the geographical position of the state, situated as it is in territory not entirely covered by either eastern or Rocky Mountain manuals.

The introduction of Clement's flower chart is an excellent feature. Compared with the one in Clement's "Rocky Mountain Flowers" it seems to have been considerably improved by substituting simple symbols for the structural formulæ and especially by adding apetalous families and methods of pollination.

The writer of this review wishes to state that he has in preparation and hopes to publish shortly a paper which will bring together additional records accumulated since the close of Mr. Bergman's work with such other notes as seem worthy of inclusion.

A catalogue[3] of the plants of the state has

[1] Bolley, H. L., and Waldron, L. R., "A Preliminary List of Seed-bearing Plants of North Dakota," Bul. No. 46, N. D. Exp. Station, 1900.

[2] Bergman, Herbert F., "Flora of North Dakota," Sixth Biennial Report, Agr. College Survey of N. D., pp. 151–372, 1911–1912 (pub. September, 1918), The Bismarck *Tribune*, State Printers. The complete report of flora only may be obtained from Herbert A. Hard, Fargo, N. D. Postage 20c. Report in cloth 25c.

[3] Lunell, J., "Enumerantur Plantæ Dakotæ Septentrionalis Vasculares," *Am. Mid. Nat.*, Vol. 4–5, July, 1915–July, 1917 (reprints paged 33 to 188; first 32 blank).