nection with its proper management in the future for wild life conservation.

ACCORDING to an associated press dispatch, a refund of taxes to the Nobel Foundation which would greatly increase the value of the Nobel prizes for next year has been recommended to the Riksdag by the minister of finance, who admits that the taxes so far automatically imposed on the Nobel estate have been out of proportion to the burden laid on the rest of the country. The government proposes to refund three fourths of the sums paid by the estate for 1926, and asks the Riksdag for a special appropriation for that purpose.

## UNIVERSITY AND EDUCATIONAL NOTES

THE University of Pennsylvania has received the sum of $100,000 as a memorial to former Provost Charles C. Harrison, a gift from his sons and daughters. The fund is to be used for an endowment to establish visiting lectureships at the university.

THE late John D. Larkin has bequeathed to the University of Buffalo the sum of $100,000, which is to be added to the John D. and Frances H. Larkin Foundation, toward which Mr. Larkin has previously given $250,000. The fund is primarily for the endowment of the school of chemistry.

TWO $100,000 gifts have been received by the Johns Hopkins half century committee, making a total of $1,358,283 collected. It is hoped to raise in Maryland $1,500,000. Mr. and Mrs. Henry Walters are the donors of the first $100,000, and Mr. R. Brent Keyser, president of the board of trustees of the university, of the second $100,000.

VASSAR COLLEGE has received a gift of $75,000 by an anonymous friend for the erection of a demonstration laboratory in connection with the course in eugenics recently established at the college. The laboratory will serve for the scientific study and demonstration of the care and nurture of children from infant years to school age. It is expected that the building will be erected on the Wing Farm, land recently acquired by the college.

MRS. FRANK R. LILLIE has made an additional gift of $4,000 to the University of Chicago toward the construction and equipment of the Whitman laboratory of experimental zoology, making a total of $94,000 given by Professor and Mrs. Lillie for the laboratory.

DR. JAMES NATHANIEL JENNE, professor of clinical medicine and therapeutics in the College of Medicine of the University of Vermont, has been elected acting dean of the college. Dr. Jenne succeeds the late Dr. H. C. Tinkham, whose death occurred last December.

DR. CHARLES H. KEENE, professor of hygiene and director of physical education at the University of Buffalo, has been appointed lecturer in physical education at the Graduate School of Education, Harvard University, and also director of the Harvard summer school of physical education.

PROFESSOR H. W. TAYLOR, formerly professor of mathematics at Emporia College, has been appointed professor of mathematics at Southwestern College.

AT the University of Aberdeen, Dr. John Cruickshank, reader in bacteriology, has been appointed to the new chair of bacteriology, and Dr. A. W. Borthwick, chief research officer and education officer to the forestry commission, has been appointed to the new chair of forestry.

## DISCUSSION AND CORRESPONDENCE

### BLEACHED FLOUR AND NEUTRALIZED CREAM

IN justice to the milling industry as well as to the bread-eating public, I feel that some statements in Dr. H. W. Wiley's two recent book reviews in SCIENCE of October 16, 1925, p. 352, and December 4, 1925, p. 511, in which he takes occasion to attack what he calls "corpse-white" flour, should have some comment. The present writer is not an apologist for flour bleaching, indeed, he has frequently been accused of being an active opponent of all kinds of bleaching, but in fairness to the readers of SCIENCE, not all of whom may consider themselves expert in the subject of nutrition, the demand of some part of the public for a pure white, bleached flour should be considered, as also the demand for a flour not containing the bran.

I am glad to note that Dr. Wiley is willing to allow the importance of bread by calling it our "fundamental diet"—a statement that admits considerably more than the statement of one who said it had "little more food value than plaster of Paris." I am also glad to note his admission of the greater digestibility of the protein and starch in standard patent flour as compared with graham flour, though he follows it up by a quotation which, as an offset, aims to magnify the importance of the mineral and vitamine content of graham flour.

It is difficult for one who has interested himself in the methods and details of milling and the efforts of millers to produce from wheat the maximum amount of pure flour to have sympathy with his criticisms directed against wheat conditioning methods in which the purpose of the miller is to produce as sharp a separation between the branny and the floury portion of the wheat grain as is possible. Once having learned the effect which water has in preventing the comminution of the bran, it would

be strange indeed if the miller did not endeavor to practice using the optimum amount of water for this purpose. As a matter of fact, the amount of water that may be used in conditioning is very closely limited. Too little added moisture means either a low flour yield or a yield of flour containing considerable speckiness or grayness. On the other hand, too much added water causes a considerable reduction in flour yield due to gumming up, flaking, reduction of bolting surface, and production of flours and feeds which are very subject to molding, souring, or other damage directly due to excessive moisture content.

American flours are notable for their low moisture content and consequent ability to keep in good sound condition for many months. English and French flour will average at least 2 per cent. more moisture and they must be consumed without delay. American flours exported to Europe, including both the high grade flours and the low grade flours, are also notable for their excellent keeping quality even after the long ocean voyage.

It is indeed a matter in which American millers take pride "that the flour of the country is gradually approaching the condition in which the bran and germ remnants are reduced to the greatest possible minimum," but it does not follow "that this means a more thorough extraction from the white flour of the vital elements of the wheat" or that "it is distinctly deteriorated in nutritional value." What is "nutritional value?" It is not claimed that white flour as purchased from the grocer is a perfect food. No one eats white flour. It is used in the manufacture of numerous articles of food which are eaten together with other foods. What does it signify if fowls or white rats fed nothing but white flour die after a few months? The same thing will occur with almost any single food including even milk which comes pretty near being a perfect food for infants. Even a liberal diet of graham bread would not supply sufficient iron or iodin nor even the important element calcium, since so large a proportion of the relatively limited amount of minerals in the branny portion of the wheat is indigestible in the human stomach. The mineral elements present in wheat and bran and flour are those of which there is little or no lack, *viz.*, phosphorus and potassium, wheat ash being about three quarters potassium phosphate. Feed the bran to cows, equipped by nature with digestive fluids containing enzymes capable of breaking down the cell walls of bran, alfalfa and other coarse fodders and let them supply us the necessary calcium, vitamines, etc. Then make from milk, flour and yeast a good, rich milk bread which, with other ordinary foods, will contain most of the needed elements. A full milk loaf spread with vitamine-rich butter comes much closer than any single article of diet to supplying the nutritional value desired.

Dr. Wiley doubts if any household consumer ever demanded a whiter flour. His doubts may be set at rest. During twenty-five years' experience in constant consultation with millers and flour buyers, no small proportion of our investigations have been concerned with the question of color. Any small miller dealing directly with housewives of the town could testify on this point.

Dr. Wiley appears to hold the common notion that the darker portions of flour produced in milling can be bleached and sold at the price of patent flour. But no bleaching process is capable of removing or bleaching the branny impurities which give a grayish or dull color to flour. Flour bleaching processes do only what bleaching does to linen—remove yellowness, therefore grayness remains just as gray as before.

I was unaware until Dr. Wiley stated it that nitrogen peroxid is a mixture of nitrogen and nitrous oxids or that nitrous oxid has any flour bleaching ability. Whether the presence in flour of 0.2 to 0.5 parts per million of nitrogen in nitrites or of 24 to 159 parts of chlorin in chlorids or the residue of 32 parts of benzoyl peroxid or rather, of what remains of these substances after fermentation and baking into bread, is deleterious, is a question regarding which the Department of Agriculture and the general public seem long ago to have come to the same conclusion which Dr. Bailey expressed, namely "that the effect of bleaching on digestibility is too slight to merit consideration."

Dr. Wiley says: "The curse of corpse-white flour will, of course, die out in time. The people of our country are learning little by little that the whiteness in the flour is inversely proportional to its nutritive value." This prophecy is not justified by any facts which I know of. The proportion of bleached flours to unbleached flours which we have seen in recent years is certainly increasing. I have no figures for the proportional output of bolted flour in comparison with grahams and so-called whole-wheat flours. Any miller is willing to supply graham and whole-wheat flours, but he knows from experience that these flours soon become rancid and unsound while the high grades of flour remain sound and wholesome months after the low grade flours have become inedible. I infer that it is both bleached and unbleached flours upon which Dr. Wiley considers a curse rests. To all appearances, however, the general public is continuing in its belief (justified both by the bacteriological count and the microscopic examination) that whiteness or creamy whiteness is a sign of cleanness, and that bread is one of the cheapest and best foods. Let those who need a mild laxative or

who are over-nourished or who want an occasional change from light bread, eat bran or graham bread, but let men of science not accept at face value all the claims of "braniatics" and certain not disinterested food manufacturers.

CHARLES H. BRIGGS
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MINNEAPOLIS, MINN.

IN the issue of SCIENCE for October 16 Dr. Wiley reviews a recent book by Sherman. In the course of this review Dr. Wiley takes occasion to digress from his subject to mention some things concerning butter which he states Sherman failed to mention in the book reviewed.

Dr. Wiley's statements are unjust to the dairy industry because they are inaccurate. The three statements to which I take exception are: (1) That the standard for butterfat has been reduced 4 per cent. in 20 years. (2) That 75 per cent. of the creameries neutralize the cream used for butter manufacture. (3) That the purpose of neutralizing is to make possible the use of cream otherwise unfit for butter manufacture.

His basis for stating the standard for butterfat has been reduced 4 per cent. in comparing the analyses of butter made for exhibition purposes 25 years ago when there was no legal standard with the legal standard at present, not the composition of butter as found on the market at present. It is a well-known fact that butter made for exhibition purposes has a somewhat higher fat content than the regular market product due mainly to lower salt percentage. For this reason the low water content of butter reported in 1902, which was based upon analyses of exhibition samples, was unquestionably not typical of the regular market product at that time. Analyses of 170 market samples reported in 1907 showed an average fat percentage of 82.35. Analyses by this division of 2,051 exhibition samples in 1923 showed an average of 83.46 per cent. of fat. At the same time 363 market samples averaged 82.35, or exactly the same as found in 1907. A total of 1,000 analyses of market butter in 1925 showed 81.31 per cent. fat. The most that can be said is that American market butter now averages about one per cent. less fat than in 1907 and closely approaches the composition of the competing product of other leading butter producing countries.

The statement that 75 per cent. of the creameries neutralize the cream before churning is based upon inaccurate information. As a matter of fact no statistics are available on this point and the basis of any statement made must be familiarity with conditions based upon a close contact with the industry.

Nearly one fifth of the creamery butter manufactured in the United States is made in Minnesota and this state stands far in the lead in this product. A close knowledge of conditions in this state makes possible the statement that out of about 840 creameries in the state a total of less than fifty neutralize the cream used. One fourth of all the creameries in Minnesota are making butter from pasteurized sweet cream, that is, fresh cream in which no fermentation of any kind has developed to any appreciable extent. The other creameries develop some acid fermentation in the cream as has been done for centuries. A considerable number of this group use pure culture starters as an aid in securing the desired fermentation.

While we do not commend the practice followed by some creameries of reducing the acidity of the cream by the use of lime, the so-called neutralization, we deny the implication that cream so treated is injurious to health or that it is otherwise unfit for butter manufacture. The cream which is neutralized has undergone ordinary acid fermentation with some development of yeast after a relatively high acidity is reached. It is well known that these types of fermentation are not ordinarily accompanied by injurious products and not the slightest evidence has ever been presented that cream of this kind is in any way detrimental to human health. The writer has used dried buttermilk from such cream as a sole feed for young calves without the least evidence of trouble, in fact less sickness was experienced than usual when ordinary skim milk is used. Large quantities of the same product are used as a food for chicks with excellent results.

The purposes of neutralizing cream are two-fold, the first is to prevent excessive loss of fat in the buttermilk, the other is to increase the keeping quality of the butter. It has been known for several years that free acid in butter regardless of origin has an unfavorable effect upon the keeping quality. The quality of the fresh butter is not appreciably improved as a result of neutralization of the cream from which it is made.

C. H. ECKLES
CHIEF OF THE DIVISION OF DAIRY HUSBANDRY,
UNIVERSITY OF MINNESOTA

I APPRECIATE the opportunity the editor of SCIENCE gives me to reply to Dr. Briggs and Dr. Eckles.

Dr. Briggs, I think, has presented the case in favor of white and bleached flour most admirably. As he says, it is difficult for one who has interested himself in the methods and details of milling to have sympathy with my statement that adding water to wheat is an adulteration. I may say that it is difficult for

one who has spent almost his whole active life in protecting the interests of the consumer against unwarranted practices by the manufacturer and dealer to have sympathy with the adulterators of flour from any point of view. Such adulterations add to the miller's profit without adding anything to the nutritive value of the flour. Bleached flour has been pronounced by the courts both adulterated and misbranded and has therefore no right to enter interstate commerce nor to be sold in the District of Columbia. In closing this discussion, I am content to submit the question to the readers of SCIENCE, a group of citizens well qualified to judge without prejudice. At the same time, I must admit that the dietitians of the country look with a very considerable degree of disfavor upon diminishing the nutritive value of flour in order to secure the greatest yield and the least nutritious product. Dr. Briggs asks: "What is nutritive value?" I answer, that nutritive value is to secure the largest amount of nutriment that nature has put in our foods. The millers are endeavoring to produce a food with a minimum content of nutritive value. Graham bread may not supply a sufficient amount of iron or iodine, but it does supply a sufficient amount of phosphorus and high grade proteins to give the maximum nutritive value to ground wheat. This is not denied in any place by Dr. Briggs. It is, of course, possible to supply some of the vitamins and minerals removed in the milling, by others existing in other kinds of foods. Is it reasonbale, however, to increase the demand for such foods as do supply these missing elements, when they could all be secured by eating our wheat in a form as nearly as possible to its natural composition? Not only does it cost a lot more money to make white flour a nutritious food, as Dr. Briggs admits, but it is a useless expenditure when we have to buy from other sources the very elements which the millers take out of the grain.

I take it that no better exposition of the merits of white and bleached flour can be presented than has been done by Dr. Briggs. I hope, however, that many other writers on health can give a better exposition of the merits of whole wheat flour than I have endeavored to give in the review of the books in question. I am quite content to leave the matter now to the judgment of the intelligent people of this country, and that includes all the readers of SCIENCE. I feel that the theories which I have endeavored to present are those which will commend themselves more and more to the sober judgment of the American people in general.

Dr. Eckles claims that there are three errors in my review of Sherman's book on the subject of butter. The first error is that the butter fat standard has been reduced by 4% in the last few years. He admits that the best butter made for exhibition purposes had a percentage of butter fat 4% higher than the standard at the present time. He also points out that 2,051 exhibition samples of butter in 1923 showed an average of 83.46% of fat, almost 4% above the present standard. His own statements, therefore, sustain my point.

The second error is that 75% of the creameries neutralized the cream before churning. My authority for this statement is found in the hearing before the Commissioner of Internal Revenue in a remark made by the attorney of the so-called neutralizers.

The third error pointed out by Dr. Eckles was that the purpose of neutralizing butter was to make it possible to use cream otherwise unfit for butter manufacture. I know by personal observation and study that this statement is positively correct. The authorities enforcing the food and dairy laws of Minnesota, the state in which Dr. Eckles resides, agreed with me in my statements respecting the butter made from neutralized cream. Dr. Eckles does not, therefore, represent the official opinion of Minnesota on this question.

All the butter made in creameries of neutralized cream enters interstate commerce with no statement of the origin or character. The people who buy creamery butter suppose they are getting the highest type of butter and they do not know until they eat it, or try to eat it, that some of it is the lowest type of butter.

The final solution of this problem is quite similar to that of white and bleached flour. Shall the manufacturers be protected in selling a depreciated article for the price which they get for the real genuine article? There is a tendency in some quarters of official life to protect the manufacturer while, under the food laws which Congress enacted, the first duty of the officials is to protect the consumer.

H. W. WILEY

## SCIENCE NOT IN IT

ON January 1, 1926, the *Washington Post* published a symposium on "The Helpful Achievements of 1925" composed of replies of a number of national and local business, professional and political leaders, to the question "What in your opinion has been the most helpful and outstanding development of the year 1925?"

It is worthy of consideration that no one of the fifty-eight distinguished men cited any scientific discovery among the achievements of the past year.

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