farms, and must be reduced to something like 97 grs. for the ration "as purchased." This, however, is about the amount consumed by the more poorly fed among the population—by the agricultural labourer, for instance. One would have expected the average for the whole country to be appreciably higher. On the other hand, the value 4129 calories (3875 "as purchased") seems high for the energy ration, and the proportion it bears to the figure for protein is exceptionally high. We cannot but think that Prof. Thompson has failed to make sufficient allowance for the starch, and especially for the fat, which, while appearing in the market returns, is diverted to industrial uses and never reaches the mouth of the consumer. If the figure for protein accurately represents the available supply and measures our consumption before the war it would seem that there is not much room for economy in the amount eaten.

Prof. Thompson, in considering the possibilities of economy, emphasises, however, a point upon which most writers have insisted: "The British nation as a whole relies too much on flesh meat for the protein element of its food. This is the most costly of all the common articles of diet to produce." He has himself shown, "from calculations based on average results, that an acre of land, if used for grazing sheep or cattle, produces per annum not more than 260 oz. of protein, and 290 kilolitre calories of energy. Whereas, if used for tillage, the same area of land produces in wheat 19 times as much protein, and 15 times as much food energy; in beans 20 times as much protein, and 9 times as much food energy; in peas 10 times as much protein, and 4 times as much food energy; in potatoes 17 times as much protein, and 30 times as much food energy."

"Economy practised in the direction indicated would entail no loss of efficiency, and would work out to the economic advantage of the country as a whole. It would also have another indirect result. The food of Great Britain is brought from the ends of the earth, the charges for transit adding considerably to its cost. A man of twelve stone weight requires, as already stated, nine times his own weight of food every year, or three-quarters of his own weight every month. This entails in freight charges an outlay which adds considerably to the food item in a working-class budget. Every additional ton weight of home-produced food should reduce this sum, if freight charges be justly apportioned."

## THE FUTURE OF CHEMICAL INDUSTRY.

AT a recent meeting of the New York Section of the Society of Chemical Industry, Dr. Baekeland was awarded the Perkin medal for his discoveries in technical chemistry. Dr. Baekeland, in acknowledging the honour, gave an interesting account of the introduction of the well-known Velox paper into photography, and the successive steps in the production of bakelite—an artificial resin of great hardness and durability, which has found a variety of important applications.

The portion of the address which should command most attention at the present time is not so much the account of the inventive skill, tenacity of purpose, and never-failing resourcefulness, associated with a highly-trained scientific mind, which have brought Dr. Baekeland's investigations to a successful issue, for these are qualities which have been shared by most of the great inventors; but his views on the present and future condition of the chemical industries of the United States. For these conditions are not unlike our own, and we may well learn a lesson from one who by education and experience in the laboratory and in the works is so well equipped to speak with authority.

Dr. Baekeland points out that the country has enough capable chemists, but that there are conditions under which the best chemists cannot succeed, for success depends just as much on the kind of men who are at the business end of the new chemical enterprises. "It will certainly do no harm," he says, "to many of our new chemical enterprises if among their directors they have at least some chemists as well as purely business men or bankers and lawyers." "Why should a chemist," he asks, "if he is intelligent enough to master the most intricate problems of chemistry, not be able also to learn how to exercise enough common sense and good judgment to help to discuss and devise successful business policies?" He points out that all the largest chemical enterprises of the world have always had prominent chemists among their directors, and the policy of these enterprises has not been left entirely in the nands of a set of purely business men who remained wilfully ignorant of the essential technical parts upon which their enterprise was based. He refers also to the industrial part played by the German banks, who, with a staff of scientific advisers, have mastered the art of nursing new chemical industries.

A successful industry, he says, must be built upon sound scientific knowledge, which consists in the putting into practice principles of efficiency and introducing knowledge where ignorance formerly existed, with its usual accompaniments of waste and slovenliness. It does not mean merely dividends for its stockholders or wages for its workmen. Dr. Baekeland looks with considerable apprehension on the future of some of the ventures which are being started now by men who are merely trying to make money quickly, who look upon their chemists merely as temporary tools, and see in their enterprise only a pretext for realising their greedy ambitions.

Finally, Dr. Baekeland touches upon the educational question. He exonerates the chemist for the part that chemistry has been forced to play in the war by showing how war is ages older than science and has been born of greed, iniquity, and lust for power. It is the main inheritance of the aims and thoughts of the past, rendered respectable by a rather large share of our so-called classical literature, together with our awe for tradition, which keeps us in the cold, relentless grip of the wrong ethics of bygone ages.

J. B. C.

## RECENT WORK ON GENETICS.

DR. L. DONCASTER'S work on sex-limited colour-inheritance in cats is well known to students of heredity, the typical "tortoiseshell" coat being almost always characteristic of a female. An account of the microscopic structure of a testis from a tortoiseshell male which after repeated matings failed to beget kittens is given by Dr. Doncaster and Mr. D. W. Cutler in the December number of the *Journal of Genetics* (vol. v., No. 2). The tubules were absolutely devoid of spermatocytes and spermatozoa, while the interstitial tissue which is supposed to be concerned with the secretion of the sexual hormones was exceptionally well developed. The belief that the rare tortoiseshell tom-cat is normally sterile is thus confirmed, though the records of breeders show that a fertile male of this colour has been known. The conclusion drawn, therefore, is the possibility that "the abnormal transmission of a sex-limited colour-factor to a male may sometimes cause the animal to be sterile, and in other cases not have this effect."

This number of the journal contains also an impor-

tant paper by Dr. E. A. Cockayne on "Gynandromorphism." Insects with the secondary sexual characters of both male and female variously combined in a single individual are favourite curiosities among collectors. Dr. Cockayne is able to describe the internal reproductive organs and the genital armature in several specimens of these abnormalities. He divides such insects into three groups:—(1) Genetic hermaphrodites, with both ovaries and testes and the genital armature of both sexes represented—these are often laterally divided into a male and a female half, though the symmetry is rarely exact; (2) primary somatic hermaphrodites, which have either ovaries or testes, but both male and female structures in the armature; and (3) secondary somatic hermaphrodites, unisexual as regards the whole reproductive apparatus, but with secondary characters of both sexes in the wings, feelers, or elsewhere. The great majority of the observed cases fall into the second of these divisions. Dr. Cockayne accepts the view that sex is a Mendelian unit character, and suggests that in the "halved" gynandromorphs there must be an irregular division of the sex-determining chromatin in the first cleavage of the zygote-nucleus, while in the other types there may be "a failure in the normal process of fusion of the sex-chromosomes of the spermatozoon and ovum" or "a difference in the potency of the factors for sex occurring in the two parents."

The heredity of bone-fragility in man is discussed by Profs. H. S. Coward and C. B. Davenport in Bulletin 14 of the New York Eugenics Record Office. From a number of family histories it appears that this condition (osteopsathyrosis) behaves as a Mendelian dominant often correlated with a blue colour in the sclerotic coat of the eye, but not complicated by special association with either sex-factor. A man and woman, both free from the condition, need not fear, therefore, that it can be transmitted through them to offspring, even though they may have brothers or sisters affected.

G. H. C.

## *UNIVERSITY AND EDUCATIONAL INTELLIGENCE.*

IT is announced in the issue of *Science* for April 7 that Harvard University has received a bequest of 10,300*l.* from the estate of Mr. J. A. Beebe, and one of 10,000*l.* from the estate of Mrs. W. F. Matchett; the income of both is to be used for general purposes.

IN the House of Commons on May 9, Sir Philip Magnus asked the Prime Minister whether having regard to the general demand that had been expressed for an exhaustive inquiry into our present educational system, particularly with regard to the claims of science to occupy a more important place in the curriculum of our schools, he could make any statement as to the proposal for the appointment of a Royal Commission to consider and to report upon the question of the organisation of education in this country. In reply, Mr. Asquith said:—"When the Government are in possession of the results of the various inquiries they have set on foot it will be possible to decide whether any useful purpose would be served by setting up a Royal Commission."

THE growing unrest in the minds of thoughtful persons on the subject of public education finds expression in a leading article of the current issue of the *Times* Educational Supplement, which, during the last twelve months, has consistently pleaded for a more liberal conception of the aims of education in the elementary school and of the necessary extension of the compulsory period of school attendance until the age of fifteen, so as to make effective for all children the elements at least of a secondary education from the age of eleven. As in many other matters of high importance, the events of the war have brought into clear vision many national shortcomings, not the least of which is to be found in the domain of education, alike in respect of means and method, subjects of instruction, the length of the school life, and the care of the adolescent. It is clear that the nation cannot hope to maintain and advance its position as a civilised Power of the first rank unless the mental and moral training of its future citizens receives the devoted attention of the best minds of the nation, whose advice and guidance shall be accepted independent of any merely pecuniary considerations. The issue is vital to the national well-being. Bodies like the Royal Society, the British Science Guild, the Teachers' Guild of Great Britain, various education authorities, and teachers' associations are all moving for an inquiry at the hands of men of high responsibility, eminent in the world of science and industry, and of men known for their devotion to the educational well-being of the nation. No mere departmental committee, however reinforced, will meet the grave responsibilities of the problems involved. Even in the stress of an unparalleled war—indeed, because of it—it is essential that immediate steps be taken to review our whole system of education and to find a remedy for the crying evils that beset it.

IN an article in the current *Fortnightly Review*, by Mr. Archibald Hurd, we are invited to consider "The German Peril after the War," and its bearing upon the economic well-being of the British Empire. Much in the way of abuse is poured out upon the entire German nation, who are characterised as the "best-educated and most unmoral people of Europe, whose guile, lack of principle, and innate baseness we have only been in a position to comprehend since this war opened." When the war is over and victory has been achieved, "Germany with its vast population of from 60,000,000 to 70,000,000 will remain . . . with its vast resources organised, prepared to reassert its position in the world." We shall then embark upon an economic struggle scarcely less deadly in its effects than the war in which we are now engaged. It is admitted that German education—skill in applying the fruits of scientific discovery—energy, enterprise and power of organisation have brought her into strenuous rivalry with Great Britain, but it has been accompanied apparently with a Machiavellian ingenuity of means and purpose unrivalled in the world's history. "Germany has had a monopoly in explosives, chemical dyes . . . and many other essentials of modern industry, including laboratory and optical glass." "Our sick could not be tended because she controlled essential chemicals," and "in a hundred and one trades Germany has had complete control." The trend of the article favours fiscal measures as the most effective palliative, yet at the same time the nation is urged to reform its system of education and to co-ordinate science and industry. The author, however, fails to realise the true source of Germany's great economic position, namely, her educational efficiency.

A WHITE PAPER issued on April 25 contains reports of the Advisory Committee on grants to Welsh universities and colleges, and of the Departmental Committee on the National Medical School for Wales, which were both made in 1914, and Treasury minutes thereon, one of which is dated April 18 last. This minute points out that a Royal Commission has now been appointed to inquire into the organisation and work of the University of Wales and Welsh colleges, and goes on to say that the Treasury is prepared to concur in the recommendations of the Advisory Com-