

conditions of the supposed compacted continent of Gondwanaland, which he thought must necessarily have been a desert and therefore could not have nourished an ice sheet.

Prof. Sollas confessed himself attracted by the theory but doubtful as to proofs. He was not greatly impressed by arguments based on the similarity of the geological formations on the opposite sides of the oceans, the most remarkable of which was perhaps that cited by Mr. Wright. A certain uniformity is to be expected in rocks derived from the same Archæan base. The explanation on the whole was out of proportion to the points of correspondence cited.

Dr. Harold Jeffreys stated that the rotational force which could be invoked to explain the movements of the continents was very small and quite insufficient to produce the crumpling up of the Pacific ranges. The ocean floors also presented a difficulty, for, being composed of basaltic rock, they would be less radioactive and therefore stronger than the continental crust. The withdrawal of India northward and its gathering up into the Himalayan folds were moreover not easily accounted for.

Prof. Gilligan said that, as the great piles of Palæozoic sediments in Europe and America reached their maximum thickness on the borders of the Atlantic, it seemed necessary to assume the presence of a continent occupying the northern part of the ocean. The time-honoured conception that the earth shows a tendency towards a tetrahedral form was also in conflict with this new hypothesis.

Dr. G. C. Simpson thought the theory was a wonderful one from the meteorological point of view, as it explained the marked changes of climate given by the geological record and in particular the ex-centric position of the Quaternary ice-sheets with reference to the pole.

Prof. Marshall, of Wanganui, New Zealand, pointed

out that the movement of that country was to the east and not to the west. Speaking from personal knowledge of a number of the Pacific Islands and referring to the evidence they afforded as to the composition of the floor of the ocean, he said it was a mistake to suppose that the igneous rocks exposed in these islands were entirely basaltic. Alkaline rocks were also represented, but, so far as he was aware, siliceous rocks of continental type were unknown.

Dr. F. E. Wright spoke briefly, and Prof. Boswell referred to the forthcoming English edition of Dr. Wegener's book as affording an easy means of becoming acquainted with the leading features of the subject.

The president, Prof. Kendall, in closing the discussion said he had many years ago examined the question of a land connexion across the Atlantic, especially in its bearing upon the distribution of fishes and reptiles. The practical identity of the Old Red fish faunas of the Orkneys and N. America seemed to show a very close connexion, and the similarity extends to the Carboniferous. Divergence, especially in the reptiles, is marked in the Trias and probably complete throughout the Jurassic. Unfortunately the reptiles require two barriers, one of land to stop the migration of the marine forms, and one of sea to inhibit that of the land forms. The evidence adduced by Martin Duncan and marshalled by Gregory proved a connexion between Europe and America during the Oligocene. He had long ago found it necessary to abandon a belief in the absolute permanence of ocean-basins.

The discussion as a whole was interesting as bringing out the extreme divergences of opinion produced by viewing the hypothesis from different aspects, astronomical, physical, meteorological, and biological, but it becomes very apparent that the surest test of its validity lies in the domain of geology.

W. B. WRIGHT.

The National Research Council of America.

THE National Research Council of the United States corresponds to the Department of Scientific and Industrial Research in this country. It owes its being, as does our organisation, to the very urgent need, which the war made patent to governments, of an organised and systematic attempt to foster scientific research, to extend its industrial applications and, by co-operation and co-ordination, to do this on a national scale. The sixth annual report of the National Research Council, for the period ending June 30, 1921, shows clearly the extent to which this organisation has been carried in the United States. There are divisions based on political classification, *e.g.* Federal, foreign and States relations; on functional classification, *e.g.* educational relations, research extension and information service; and, finally, on a scientific and technological classification, *e.g.* physical sciences, engineering, chemistry and chemical technology, geology and geography, medical sciences, biology and agriculture, anthropology and psychology.

A popular chemical exhibit "to show the American people what the chemist has done and may do for them," prepared by the Chemical Warfare Service of the United States Army, was held in Washington, and arrangements have been made to install it as a permanent exhibit in the United States National Museum.

The division of educational relations has given special attention to the study of the detection and encouragement of students of superior ability, and

is co-operating in this investigation with the division of anthropology and psychology.

Among the projects of the division of research extension may be mentioned the following: An underwriting fund of 200,000 dollars is to be raised for the compilation of critical tables of physical and chemical constants. Measures are afoot for the establishment of a Crop Protection Institute; an Alloys Research Association; a school for tanning to be affiliated to an established university; a Textile Research Institute; and a Horological Institute of America, which will be concerned primarily with the scientific phases of time keeping with special reference to the mechanical devices necessary.

The research information service has for its purpose "to promote scientific and industrial research in this country through the operation of an active exchange for all kinds of scientific and technological knowledge." It prepared for publication Bulletin No. 9, Funds Available in 1920 in the United States of America for the Encouragement of Scientific Research, giving an account of medals, prizes, grants and research scholarships and fellowships amounting in value to approximately 36,000,000 dollars annually. In addition to research in personal records the service has a catalogue of 20,000 chemists and mining engineers, and a file of current investigations.

From the division of engineering a report embodying the results of the investigations on fatigue phenomena of metals will be published shortly. The results indicate that a rise of temperature test may

furnish a trustworthy accelerated test for fatigue resistance. It is stated that "this report contains the most valuable and complete information ever published on this subject." We shall await its appearance with much interest.

Owing to the very sudden increase in the destruction of marine piling in San Francisco Bay resulting from the attack of marine borers, which amounted in value to about 15,000,000 dollars in the last year or two, a marine laboratory has been established in San Francisco Bay and the National Research Council has taken measures for undertaking co-ordinated investigations on the problem. The report states: "This is one of the most important problems presented to the National Research Council since its organisation and one of the best illustrations of the important service which can be rendered by a national body of this sort. It is also an excellent illustration of the need for co-opera-

tion between the scientific and engineering groups."

The committee on ceramic research has selected the following four subjects to receive early attention: (1) A study of the elements which determine the plastic nature of clay; (2) a critical examination of certain methods used in silicate analysis; (3) a study of American pot clays and their proper compounding for the production of refractories used in the glass industry; (4) a study of the relationship between crazing and the expansion coefficients of bodies and glazes.

Enough has been indicated of the character of this sixth annual report of the National Research Council to convince, perhaps, even the warmest exponent of the theory of science for science's sake and of the inalienable right of the scientific spirit to go whither it will, that there is a vast field of scientific research meet for organised co-operation on national lines.

J. W. W.

International Contributions to Mendelism.

THE Dutch journal *Genetica*, under the editorship of Dr. Lotsy and Dr. Sirks, has published an excellent international number as a Mendel Memorial in connexion with the recent centenary celebrations in Brünn and Vienna. In a long and carefully written article, Prof. V. Häcker (Halle) reviews the present state of knowledge of Mendelian inheritance, especially as regards cytological interpretation and other aspects of general interest. Such a cautious and well-informed statement is most valuable at the present time. Dr. E. Fischer (Zürich) describes his large series of experiments in breeding the Silver-washed Fritillary (*Argynnis paphia*) and its dimorphic female, the well-known var. *valesina*. It used to be thought difficult to get such creatures to breed in confinement, but Dr. Fischer, following a technique which he describes, has raised several thousands as the result of various matings. Prof. R. Goldschmidt (Berlin) contributes an analysis, and suggests a factorial scheme which fits the numbers fairly well. There is a dominant *valesina* factor, V, which is not sex-linked, and the combinations VV, Vv, vv are possible both in males and females. Since, however, the males are all *paphia* alike, their genetic constitution can be decided only by experimental breeding. We are still as far as ever from understanding how it comes to pass that the males are thus uniform, though they may contain even two doses of the element which in a single dose suffices to give the dominant character to the female, a difficulty which has puzzled geneticists very long. There are many parallel examples in butterflies of di- and polymorphic females, though nothing analogous is ever seen in the males. The cytological scheme which so successfully represents the observed facts in colour-blindness and similar examples here apparently fails, and the special interpretations offered by Goldschmidt, though suggestive, are scarcely more than a restatement of the difficulty.

Prof. Ghigi (Bologna) discusses the origin of domesticated poultry, especially fowls and pigeons,

in the light of his breeding experiments. He leans to the conclusion, which other evolutionists have also reached, that it is most difficult to suppose, as Darwin did, that the various breeds of fowls are derived simply from *Gallus bankiva*, or the pigeons collectively from the rock-dove. The plausible suggestion is here made that the heavy breeds of fowls, which constitute the main problem, may have come from some partially flightless island form, taken bodily into domestication, since nothing of the sort now survives in a wild state. Some of the pigeons, he thinks, may be derived from crosses with *Columba leuconota*, which when bred with tame pigeons gives, as he found, at least fertile males. The effect of all these appeals to multiple origins, necessary as they now appear to be, is to weaken confidence in the classical deductions as to unlimited possibilities of variation under domestication apart from cross-breeding.

Other interesting papers are those of Prof. J. L. Frateur (Louvain) on compound characters, M. A. Meunissier (Paris) on the 3-podded and other varieties of peas, and Dr. Winge (Copenhagen) on some curious and complex phenomena in *Drosophila*, which favour the hypothesis already entertained by several biologists that mutation may sometimes be the consequence of a rare cross-over. Dr. Sirks (Wageningen) recounts his experiments with a new subspecies of *Linaria vulgaris*, giving a mixed F₁ generation in crosses with the wild type, an unexpected result which may be variously interpreted. A remarkable experiment is also described by Prof. J. Schaxel (Jena), who succeeded in grafting together limb-buds of the coloured and the white forms of Axolotl, producing limbs compounded of both elements so intimately associated that the name "Chimæra" may be applied to them, on the analogy of Winkler's famous graft-hybrids made between the tomato and *Solanum nigrum*.

This collection of memoirs reaches an unusually high level. All contain material of permanent value.

The Oldebroek Explosion of October 28, 1922.

IN NATURE of November 4, p. 619, a preliminary note appeared on the great explosion at Oldebroek. It is now possible to discuss more fully the results obtained.

About 140 reports were received from observers in the British Isles. Of these, nearly one-third stated that despite careful listening they heard no sound that appeared to be due to the explosion.

When the distribution of the positive and negative reports is studied, the most notable feature is the entire absence of positive reports from the greater part of the Midlands of England. With regard to Europe generally, it appears that the sound was reported so far off as 850 km. to E.S.E., 600 km. to S. and 700 km. to N.W. of Oldebroek, whereas no single trustworthy observation was reported in a zone