

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

between the limits of 100 and about 180 or 200 km. radius. Confirmation of the existence of a "Silent Region" was therefore once more obtained. Also, the times which the sound waves took to reach various distances are in most cases longer than they would be for normal propagation through the surface air.

The accuracy of the time standard of the average non-scientific observer is not likely to be high, but when the British observations are classified with reference to apparent velocities of propagation, there appears to be some evidence that these tend to group themselves about points corresponding to velocities of 257, 335, 370, and 508 metres per second. The second group corresponds very closely to propagation through the surface layers of air, due allowance being made for temperature and wind. In view of the uncertainty as to the accuracy of the observed times, it is doubtful whether the observations of the third group are to be regarded as truly distinct from those of the second, but it is just possible that this velocity is to be explained by the assistance of a strong north-easterly wind, and, though there is no actual measurement, it is not improbable that such a wind may have existed somewhere about the three- or four-kilometre level. At a height of one kilometre the mean wind over south-east England was north-easterly 15 m/s, and at a height of two kilometres E.N.E. about the same velocity. A *ballon sonde* reaching 9 km. indicated a resultant drift for the whole trajectory from about N.N.W., and a cirrus cloud observation obtained in Holland indicated an apparent velocity equivalent to 33 m/s from W.N.W. at a height of 10 km.

Of special interest are the first and fourth groups with velocities centring at 257 and 508 m/s respectively. Five of the seven observations indicating the latter velocity were made at very considerable distances from Oldebroek, namely at Newcastle, Bolton-le-Moors, Skipton-in-Craven, Northallerton, and Guernsey. Prof. E. van Everdingen is of opinion that such observations and the proven existence of the "Silent Region" afford very strong evidence of the co-operation of the hydrogen atmosphere. The view that the appearance of silent regions is to be ascribed to a change in the constitution of the atmosphere at great heights was put forward by Von dem Borne in 1910. Making certain assumptions as to the constitution at great heights, he calculated that the shortest possible distance at which sound rays, curved back by this high atmosphere, could reach the surface was 114 km., the ray becoming horizontal at a height of 75 km. Actually no case of so short a distance has yet been found. In 1915 van Everdingen, taking Wegener's hypothesis as to the occurrence of geocoronium in the atmosphere and his percentage values as to constitution, showed that it gave no better a result. On testing various hypotheses, the best results appeared to indicate a percentage of hydrogen at surface level of 0.0001.

In addition to the observations discussed above collectively, certain special observations were made in this country. The Acoustical Research Section of the Signals Experimental Establishment contributed most valuable records obtained by means of hot wire microphones at Woolwich and at Biggin Hill, Kent. These were described and discussed in detail by Major W. S. Tucker in a paper to the Royal Society of Arts on November 29. In the case of the Biggin Hill record he attributes the first effect (indicating a velocity of nearly four times that of sound in air) to propagation through the water and the ground.

At Eskdalemuir Observatory at 17 h. 29 m. G.M.T. a small upward movement of about one-thirtieth of a millibar on the microbarograph record was followed about 13 minutes later by an approximately equal

one in the opposite direction. On the traces of the other instruments, including the seismographs, no evidence of an explosion effect is to be found. Mr. J. J. Shaw (West Bromwich) could also find no evidence on his seismograms, but stated that at the critical time many thousands of pedestrians and heavy vehicular traffic (the returning crowd from a football match) were passing his house.

The collected observations of the various European countries are now being investigated by Prof. van Everdingen of the Dutch Meteorological Service.

University and Educational Intelligence.

AMONG University Extension agencies the Summer School plays an increasingly important part. This year eleven universities and university colleges in Great Britain were responsible for at least fifteen summer schools, not counting those organised by joint committees for tutorial classes in connexion with the Workers' Educational Association. In the United States, summer courses are provided in numbers and on a scale far in excess of anything that has been attempted elsewhere. The Bureau of Education, Washington, has published a Bulletin on the subject (1922, No. 31) in which are shown the student enrolments in last year's summer schools of the twenty-seven universities and colleges which sent representatives to the meeting of the Association of Summer School Directors. The largest were: Columbia 11,809, Chicago 6458, California 6176, Wisconsin 4547. Fourteen other institutions had enrolments exceeding 1000 each. On the other hand, many of the best known, including Yale, Princeton, Vassar, and Brown, do not receive summer students: Yale experimented with the system for three years and then gave it up. Some of the most conservative colleges, while not undertaking summer schools of the ordinary type, have opened their doors in the summer for conferences and for special classes designed to establish contact with industrial workers. Many hesitate, as do universities in this country, to increase their commitments in this direction for fear of financial difficulties. State universities regard the matter in a different light, and find that this and other forms of extension work help to justify in the eyes of the taxpayers their large demands on the public purse. In general the courses are devoted principally to the liberal arts and sciences and to education, but some schools of law, medicine and dentistry offer courses which count for their degrees, and in a few institutions engineering and architecture courses are provided.

FROM the Royal Technical College, Glasgow, we have received a copy of their annual report on the work of the session 1921-22. Owing to the cessation of special classes held at the request of the Ministry of Labour under their "Interrupted Apprenticeships" Scheme, the number of students was slightly lower than in 1920-21, but compared with 1913-14 the year's enrolment shows an increase of 150 per cent. The research work carried on in the college is extending rapidly in volume and importance, especially in chemistry, metallurgy, and engineering. Much of it is undertaken at the instance of industrial research associations by the associations' own workers under the supervision and guidance of the professors concerned. The course for the diploma in chemistry, recently extended from three to four years, includes in its final year three months devoted to experimental inquiry, on which a thesis is required to be written. This plan has been an unqualified success, the report says, from an educational point of view, and some of the theses presented last year were of such intrinsic