

the enterprise may be obtained. The whole was a triumph of self-registration devices. Contributions of instruments were made by educational and other institutions in many parts of the United States. There were tubes of spore cultures, three spectrographs, one for ozone, one for sky and one for horizon; three electroscopes for cosmic ray ionisation, one exposed, one inside 4 in. of lead shielding and another weighing 600 lb. with a 6 in. covering of lead. These were contributed by Millikan and Neher. A contribution by Swann and Locher was a counter apparatus arranged for recording cosmic ray intensity from four different directions from the vertical to the horizontal. There were coarse and inter-range barometers for recording pressure variations automatically at high altitudes, and a dozen or more parachutes for men, heavy instruments and gondola.

Besides a perfect barograph record of the event which shows that a minimum pressure of 60 mm. was reached, electroscopes records of cosmic ray ionisation from ground-level to 60,000 ft. were obtained. These have led Millikan to the conclusion that the only source of the observed cosmic ray energies now in sight is matter annihilation: most of the ionisation observed at sea-level is due to incoming photons produced during the destruction of matter in higher altitudes. Records of sun and sky brightness, internal and external temperature, the altitude of the inversion of the temperature gradient between 20,000 ft. and 38,000 ft., were also obtained. Capt. Stevens concludes by saying, "our most cheering thought of the recent ascent is that we feel we have successfully solved the problems of living and working efficiently in the stratosphere . . . not a single piece of scientific equipment attached to the gondola failed us during the flight; every instrument worked exactly as planned".

The mishap was due to a rip in the lower part of the balloon which was first noticed at the highest altitude. The men owe their lives to the perfection of the carefully designed scalloped band attached to the balloon fabric to which the gondola was roped. This band held the balloon steady in a drop of about 55,000 ft. in about 1½ hours and kept the rips from extending.

### Inheritance of Anatomical Structure in Plants

THERE have been very few investigations of the inheritance of anatomical structure in plants. A recently issued work by E. W. Sinnott, Helen Houghtaling and A. F. Blakeslee\* is a contribution to this subject, based on a comparison of the vascular anatomy in, (a) the polyploid forms of *Datura* ( $n$ ,  $2n$ ,  $3n$ ,  $4n$ ), and (b) the 12 trisomic ( $2n+1$ ) mutants and such of their secondaries as were available. Among the few earlier studies, the authors have overlooked the work of Penhallow on the anatomy of a hybrid *Catalpa*, and the papers of Gates and Bartlett on cell measurements in tetraploid *Oenothera*.

The flower pedicel was chosen for anatomical study, as comparable material could most easily be obtained from this region. Seventeen anatomical traits of this structure were quantitatively studied. In the polyploid series, as in previous results, there was progressive increase in size of the structure and its constituent cells, but not always in the proportion

expected. The cortex was relatively large in the haploid, and relatively small in the  $3n$  and  $4n$  mutants, the smaller cortex being due to fewer cells. These facts, and others from the heteroploid series, lead to the conclusion that cell size and cell number are independently controlled.

There were certain exceptions to the increasing cell size in the polyploid series. The pericycle fibres remain of the same size, perhaps because they are frequently found to be multinucleate. The leaves increase in thickness, due to increase in cell size and elongation of the palisade cells, those of the tetraploid having at least twelve times the volume of those in the haploid. Similarly the petiole in cross-section is about sixteen times as large in the tetraploid as in the haploid, the same applying generally to the cells, which therefore show a geometric rather than an arithmetic ratio of increase.

In the heteroploid series, all having 25 chromosomes, the anatomical differences were equally marked and were due to the genic constitution of the extra chromosome. Certain of the primaries, such as 'spinach', were even larger than the tetraploid, this being due almost entirely to larger cell size. Different elements of the anatomy show considerable independence in their response to the presence of specific chromosomes. The conception of genic balance applies very well to some of the secondaries in comparison with their primaries, but this is by no means always the case, and various attempts are made to explain aberrant results. Curious facts which emerge are that the starch grains, especially in the secondaries, may have a very large or very small mean size, and that while the style of the flower has two vascular bundles in the  $2n$ ,  $3n$  and  $4n$  forms, in the haploid it always has five or six.

### University and Educational Intelligence

CAMBRIDGE.—Prof. R. H. Tawney, of the University of London, has been appointed Alfred Marshall lecturer for 1934–35.

Dr. T. S. Hele has been appointed assessor to the Regius professor of physic.

Trinity College announces the offer of a research studentship open to graduates of other universities who propose to go to Cambridge in October next as candidates for the degree of Ph.D. Dominion and Colonial exhibitions are also offered to students of Dominion and Colonial universities who wish to go to Cambridge next October as candidates for the degree of B.A., M.Litt., M.Sc., or Ph.D. Further information can be obtained from the Senior Tutor, and applications should reach him by July 1, 1935.

MANCHESTER.—In connexion with the meeting of the Chemical Society to be held in the University on November 9 and 10, a reunion dinner of past and present members of the Department of Chemistry has been arranged; arrangements are in the hands of Drs. G. N. Burkhardt and C. E. H. Bawn of the Chemistry Department. A party of a hundred fellows of the Chemical Society will visit the Shirley Institute of the British Cotton Industry Research Association on November 9.

The following resignations and appointments have been announced this session:—Mr. F. W. Priestley has been appointed lecturer in veterinary bacteriology in succession to Mr. C. A. McGaughey, resigned. Dr.

\* The Comparative Anatomy of Extra-Chromosomal Types in *Datura stramonium*. By Edmund W. Sinnott, Helen Houghtaling and Albert F. Blakeslee. (Publication No. 451.) Pp. iii+50+19 plates. (Washington, D.C.: Carnegie Institution, 1934.)