

THE current Year Book, covering the period from July 1, 1965 to June 30, 1966 contains President Caryl P. Haskins' Report to the Trustees, comprehensive reviews of work in progress in the various research departments of the Institution, a list of officers and staff, administrative reports, articles of incorporation, and by-laws.

The Department of Terrestrial Magnetism reports its varied activities ranging from mathematics and computer studies, through several problems connected with geophysics and astrophysics, astronomy, nuclear physics, and on to basic programs in biophysics and microbiology.

The Geophysical Laboratory and the Department of Terrestrial Magnetism have co-operated for a number of years on a programme of rock dating by isotopic analysis of U/Pb, Rb/Sr and K/Ar systems found in minerals. This year the group attacked the problem of "continental drift" by the geochronological approach. The continental drift hypothesis, which has postulated that the existing continents were once a single land mass that split and separated into the present configuration, has gone through several cycles of acceptance and rejection. Because of the technique of palaeomagnetism which has provided a new tool, interest in the hypothesis has been revived within the last decade.

A favourite example of the continental drift hypothesis is to translate South America eastward to fit under the bulge on the west coast of Africa. Recently, the age of a persistent Precambrian rock belt, stretching east-west across South Africa at about latitude 30° S, has been determined as about 1000 million years. If South Africa and South America were once part of a single continent, the extension of the African belt should exist somewhere in the corresponding part of South America, i.e., coastal Uruguay and Argentina. Age determinations by the geochronology group during the year of the rock units in these areas believed to be originally opposite coastal areas of South Africa, show them to be between 1700 and 2200 million years. This fails to give encouraging support to the continental drift theory, though it cannot be taken as disproving it.

The report of Mount Wilson and Palomar Observatories contains measurements during the year of "red shifts" of new quasi-stellar sources, observed with the 200-inch. Included in this is the largest red-shift yet found, namely the quasar designated 1116 +12, with the value of  $\Delta\lambda/\lambda_0 = 2.118$ . The report from this depart-

ment also exhibits two remarkable solar photographs obtained during the year. The one shows the solar granulations on a small part of the sun, taken with the 150-ft. tower telescope. The other is a high dispersion spectrogram which brings out with exceptional clarity the differential velocities of the solar granules as revealed by the "wiggles" of the absorption lines brought about by Doppler effect. It has been estimated that the lifetime of individual granules is about 8 minutes.

The Plant Biology Department reports a remarkable effect of oxygen on photosynthesis in leaves. It was found that a 50% increase in the rate of photosynthesis of leaves of higher plants took place when the oxygen of the surrounding air was replaced by nitrogen, without changing the CO<sub>2</sub> pressure. This inhibition of photosynthesis by oxygen may have some significance to photosynthetic productivity in nature. This effect was high in higher plants, but completely lacking in algæ.

Progress of work on nucleic acid metabolism is reported by the Department of Embryology. One group has been filling in fundamental data on accumulation and rates of synthesis of the various classes of nucleic acids in successive developmental stages of the clawed toad *Xenopus laevis*.

The peculiar internal structure of lambda DNA and its relation to some of its functions continued to interest a group of the Genetic Research Unit. Results of study show that the right and left ends of the lambda DNA molecule differ by about 10 percentage units in GC (guanine-cytosine) content.

The basic structure of the chromosomes in higher organisms is a fundamental problem which still awaits a satisfactory solution. The simple explanation that one single DNA double helix per chromatid meets the conditions required for expression of the genetic code and the response of the chromosomes to mutagenic agents, has been found to be inadequate. For one thing, it ignores the complex organisation of the chromosome, which includes not only DNA, but also RNA, histones and non-histone proteins. The report of the Cytogenetics Laboratory on Chromosome Organization in Eucaryotes points out the need for more precise cytological, cytochemical and genetic data which will lead to a fuller understanding of chromosome organization at the molecular level including DNA, RNA and other associated constituents.