



## DOLLS FOR SCIENCE

A parade of Russian dolls, sixteen in all, has been brought from the Soviet Union to the University of Pennsylvania Museum, in Philadelphia. (See SNL, Feb. 10, '34 p. 83) Museum scientists explain emphatically that these are not toy dolls, but scientific reproductions, of a people. In careful detail, they show the clothing and the racial types of sixteen Soviet tribes. From left to right: Usbeck, Kalamik, White Russian, Samoyed, Georgian, Circassian, Great Russian, and Ukrainian.

entists as Wegener, Störmer, Humphreys, and Gutenberg, which indicated an oxygen content of not more than 19 per cent. The new results confirm the theory of some convection at that altitude, recently adopted by the physicists.

The samples of air were taken by means of glass bulbs suspended from the stratostat, opened and hermetically sealed by electricity while the stratostat ascended. Three of the four bulbs carried worked without a hitch.

The composition of the air 18.5 kilometers (11.7 miles) above the earth was found to contain moisture of less than 0.7 per cent.; 20.95 per cent. of oxygen and 78.13 per cent. of nitrogen; 0.92 per cent. of argon and other rare elements. At sea level the atmosphere contains 21 per cent. oxygen and 78 per cent. nitrogen.

A commission headed by Academician S. I. Vavilov analyzed the records of the stratostat on cosmic rays and Prof. Wangenheim announced that the cosmic ray findings provide grounds for a new theory of stratosphere structure.

In the lower spheres cosmic rays cause very little ionization in the air, forming not more than one to two ions a second in each cubic centimeter. The records of the stratostat at an altitude of 12 kilometers (7.5 miles) show 226 ions in a cubic centimeter per second; at 15 kilometers (9.3 miles) 342 ions; and at 17.7 kilometers (11.0 miles) 360 ions. These data are said to coincide with those of Prof. Piccard and to a certain extent confirm the hypothesis of the cosmic origin of these rays.

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## SEISMOLOGY

## Long Rise in Earth Level Preceded Great Indian Quake

THE LEVEL of the part of India where the disastrous earthquake of January 15 occurred has been rising at an average rate of .06 foot a year, or six feet a century, for the last seventy years at least. The earthquake was associated with this change of level, together with the unique state of internal stress which has hitherto occurred in this region.

Such is the conviction of Dr. J. de Graaf Hunter, former director of the Survey of India. He explained it at a geophysical discussion held at the headquarters of the Royal Astronomical Society in London.

Two years ago, when Dr. de Graaf Hunter was endeavoring to reconcile the numerous spirit-level observations made in Bengal between the years 1862 and 1930, he found evidence that the land was rising at a regular rate. He constructed a diagram in which lines drawn on a map of northern India indicated the various rates at which the rise of level was taking place.

The lines passing through places having the same rate of change ran approximately west-southwest to east-northeast. The line indicating zero change of level passed about fifty miles north of Calcutta. The line indicating the maximum change of .06 foot a

year ran about thirty miles north of Benares, and passed through the position calculated to be the epicenter of the January 15 earthquake. This position is latitude 26 degrees 8 minutes, longitude 86 degrees 3 minutes.

Other researches carried out by Dr. de Graaf Hunter during his directorship of the Survey of India, showed, as a main feature of the figures obtained for the "overloading" and "underloading" of the earth's crust in that country, that there is (or was before the earthquake) an area of about 100,000 square miles with a high average "underload." This "underload" was equivalent to a thickness of approximately 3,000 feet of surface rock, after allowing full isostatic compensations.

This region, whose crustal stress Dr. de Graaf Hunter believes to be unique when its large extent and great underloading are both considered, stretches roughly from the Himalayas to the Ganges, and from Meerut, near Delhi, to Jalpaiguri, near Darjeeling, and it includes the whole earthquake zone.

The earthquake of January 15 was the culmination of the long-continued stress due to this widespread underloading and to the consequent rise of level, Dr. de Graaf Hunter believes.

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