

The researches have also been extended to the study of the effects of cooking or storing food in different other types of metallic vessels.

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Some Exceptionally High-Sounding Balloon Ascents at Poona and Temperatures in the Stratosphere over the Tropics.

DIRECT observations of temperature in the upper atmosphere above 25 km. are very scanty. From an analysis of temperatures obtained from sounding balloons in different parts of the world, it is known that at a height of about 25 km., temperature all over the earth is more or less uniform being about -55°C . Experiments on the reflection of explosive sounds from the upper atmosphere which have been carried out in recent years in Europe have led to the conclusion that temperature again rises to that near the ground at a height of about 40 km.

Special efforts at increasing the height reached by sounding balloons have been made by A. Wigand¹ of the Deutsche Seewarte, Hamburg, who has recorded five ascents which went above 25 km., the greatest height reached being 35.9 km. Wigand found that there was only a very small increase of temperature between 25 km. and 35 km., the value at the highest point being near -46°C .

The accompanying figure which gives the height-temperature curves obtained from three ascents made at Poona in 1931-33 shows that in the tropical stratosphere, the temperature goes on increasing with height up to about 30 gkm.² and that even at 34 gkm., there is no evidence of any large rise of temperature. All the ascents were made within one hour before sunset so that the top part of the records would have been traced after sunset and would not have been affected by insolation. The temperature at the highest point was -49°C . No experiments have been made in the tropics on the reflection of sound waves from the

¹ A. Wigand, *Beitr. zur. Phys. der fr. Atmosphere*, 17, p. 286, 1931.

² 1 gkm. at the latitude of Poona = 1.021 km.

stratosphere; but if it is assumed that the height of reflection is about the same as in temperate latitudes, the rate of rise of temperature should be very high immediately below the reflecting layer.

In a recent communication to *Nature*³ Messrs. F. W. P. Götz, G. M. B. Dobson and A. R. Meetham have stated that observations at Arosa in Switzerland on the spectrum of the light received from the clear, blue zenith sky as the sun is rising or setting show that the average height of ozone there is about 20 km. which is much lower than the previously estimated heights (40-50 km). This conclusion gives support to the view⁴ that the persistent

rise of temperature between 18 and 25 km. in the tropical stratosphere is due to the presence of ozone. Attention may also be drawn to the fact that while in temperate latitudes, the temperature of the tropopause increases when its height lowers and *vice versa*, the height of the tropopause in the tropics does not show any tendency to rise above 17-18 km. in spite of large variations of temperature.⁵

The sounding balloons used in the above flights were made of 'Vulpro' tissue,⁶ at the Upper Air Observatory, Agra.

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Vertebral Centra of *Typhlops braminus*.

MOOKERJEE in his note 'On the Peculiar Apertures in the Vertebral Centra of *Typhlops braminus*'⁷ states that he 'could

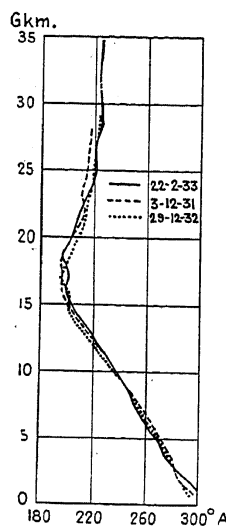
³ F. W. P. Götz, G. M. B. Dobson and A. R. Meetham, *Nature*, Aug. 19, p. 281, 1933.

⁴ K. R. Ramanathan, *Nature*, June 1, p. 834, 1929.

⁵ *Memoirs*, Indian Meteorological Department, 25, Part V, fig. 9, 1930.

⁶ G. Chatterjee, *Nature*, Nov. 23, p. 793, 1929.

⁷ *Proc. Zool. Soc.*, Part 2, 1933.



not get any reference to their presence in any of the previous literature'. Owen refers to these apertures in his *Comparative Anatomy of Vertebrates*, Vol. I, 1886. He mentions, speaking of the vertebræ of Ophidia, at page 53 of the book, that 'a vascular canal perforates the under surface of the centrum and there are sometimes two or even three smaller foramina.' Mookerjee's

observations confirm Owen's statement for Typhlopidae.

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[Mr. L. S. Ramaswami of Bangalore has, in a communication sent to us, drawn our attention to the same reference.—ED., *Cur. Sci.*]

Research Notes.

Silicosis.

SILICOSIS is mainly a lung disease counting a high toll among the gold miners, sand blasters and quarry-men. Silica enters the lungs in large amounts as fine dust particles causing there the development of fibrotic nodules extending, in course of time from the midline to the periphery, inducing in men a pre-disposition to tuberculosis. A review of the theories on silicosis along with the rôle of silica in the system is presented by Dr. King (*Canadian Chem. and Metallurgy*, 17, 146, 1933). According to Hefferman, silica gets embedded as the hydrosol in the phagocytes which become consequently vacuolated and die, the process spreading from cell to cell. The mechanism of this dehydration is not adequately studied. Policard considers a mineral impregnation to take place resulting in a sort of mummification of the protoplasm. According to King the silica content of the urine is influenced by the nature of the diet being larger when animals are fed with oats, cabbages, etc., and smaller on a diet of white bread and tomato juice. Silica is present as an invariable constituent of the protoplasm in the white and yolk of the eggs of birds, and other embryonic mammals. Direct administration of silica as finely powdered quartz into the stomach results in an enhanced output of this material in the urine. This value is still more abnormal when it is employed as neutralised sodium silicate. Silicic acid in saline, in dilute solutions, when given intravenous continuously for several hours, produces very high values in the urine. When this is, however, replaced by a fine suspension of particulate silica, much of this constituent is not detected in urine, but the urine becomes bloody resulting in anuria followed by death. The kidney had, however, a normal silica content while the

spleen had a figure far above the normal. Organic derivatives of silicic acid affected the composition of the blood and urine without evil effects, suggesting a high tolerance of silica in this form. The author finally concludes that the increased output of silica is not apparently through the kidneys.

Corrosion of Tin and Iron.

CORROSION of tin and iron in tin cans used as containers for acid foods such as fruits is the theme of a contribution by Lipsett (*Canadian Chemistry and Metallurgy*, 17, 171, 1933). In tin cans the iron is protected by a coating of relatively inactive metals such as tin, but where this coating has worn out, corrosion sets in causing pinholes. The occurrence of these spots in tin containers is explained as due to electrochemical action, the dissolution of iron at the anode taking place consequent on the evolution of hydrogen at the cathode and in view of the limited exposure of iron, the attack is strong resulting in the formation of a deep hole. Thus one would conclude that tin cans do not serve as ideal containers. The observed facts are quite contrary to our expectations for which an explanation has been sought in this communication. The coating of tin has a protective action on the exposed pinholes but the element that seems to suffer due to corrosion is tin itself. It is common nowadays to use enamelled tin cans to preserve coloured fruits, since their colour is bleached badly in these containers. Strangely enough, such decolorisation is hastened in the well lacquered holders. A third anomaly is traceable to increased acid content of the fruits whereby less damage is caused to the tin, in striking contrast to the general view that corrosion is accelerated by increased acidity. Explaining the first