drical lattice as a set of congruent two-dimensional lattices inscribed on a set of cylindrically curved surfaces and mutually ordered with respect to the cylinder axis, there being equal and uniform normal spacings between each successive pair of such surfaces; he then developed a classification of such lattices which is a cylindrical analogue of ordinary space-group theory.

Dr. D. E. Corbridge reported on his structure analysis of the fibrous 'Kurrol' salts, which are long-chain metaphosphates; they are insoluble and exhibit colloidal behaviour. In the case of rubidium metaphosphate, the unit cell is monoclinic and contains continuous chains of composition $(PO_3)_n^{n(-)}$ spiralling around the screw axes with a repeat pattern every two PO_3 units; similar structures have been found for the potassium and cæsium salts. Dr. Corbridge pointed out some interesting structural resemblances between the metaphosphate chain and long-chain anions found in certain silicate minerals which also form helical structures.

An interesting and stimulating evening discourse was delivered during the conference by Prof. A. R. Ubbelohde, whose subject was "Crystallography and the Phase Rule". The next conference of the Group will be held jointly with the Low Temperature Group of the Physical Society; it will take place in Oxford during April 11–13 and will be devoted to low-temperature crystallography. U. W. Arndt

DENSITY OF THE LUNAR ATMOSPHERE

SOME of the values of the density of the Moon's atmosphere obtained by observers in the U.S.S.R. are discussed by E. J. Öpik, of the Observatory, Armagh, in a paper in the *Irish Astronomical Journal* (3; March 1955). The Russian workers determined the relative polarization of the diffuse light of the sky near the horns of the lunar crescent and they arrived at a value approximately $0 \cdot 5 \times 10^{-4}$ of the terrestrial atmosphere, but A. Dollfus in 1952 found a value 10^{-9} for the upper limit (*C.R. Acad. Sci., Paris*, 234, 2046; 1952). J. N. Lipskij carried out a detailed investigation and arrived at a value of the order 10^{-4} (*Pub. Sternberg Astro. Inst., Moscow*, 22, 66; 1953), but Öpik's examination of the matter shows that the values obtained by the Russian observers must be far too big.

In his investigations, Öpik completely ignores any possible absorption by the hypothetical lunar atmosphere, which is too thin to cause absorption effects, and hence the surface brightness in a given direction will be proportional to the intensity of illumination and to the illuminated air mass per unit cross-section along the line of sight. On this assumption, he shows that the surface brightness of the earth-shine at quarter phase is at least thirteen times as great as that of a vertical column of the lunar atmosphere illuminated by the Sun, and this result is used to determine the upper limit to the mass of the lunar atmosphere. It seems highly probable that any lunar atmosphere (if such exists) will be practically free of dust, and Raleigh scattering of light by the gas molecules prevails. It is assumed that the scattering power of the lunar atmosphere is about the same as that over high mountain tops, such as Mount Whitney (4,420 m. above sea-level), and C. G. Abbot's observations on Mount Whitney (*Ann. Astrophys. Smithsonian Inst.*, 3, 145; 1913) showed that the surface brightness of a sunlit atmosphere at sea-level, but of a degree of purity equal to that on Mount Whitney, is $8 \cdot 02 \times 10^{-7}$. The surface brightness of the earth-shine, measured by Öpik in 1924 and by Danjon in 1936, is about 25·84 mag., from which it is easily found that the surface brightness of earth-shine is $4 \cdot 61 \times 10^{-11}$. The ratio of the lunar to the terrestrial atmospheric masses in vertical columns of unit cross-section is therefore less than $4 \cdot 61 \times 10^{-11}/13 \times 8 \cdot 02 \times 10^{-7}$—that is, less than $4 \cdot 42 \times 10^{-6}$—making use of Öpik's figure thirteen, as already explained earlier.

It appears from this investigation that the mass of the lunar atmosphere is less than 1/226,000 of the terrestrial, and with the smaller gravity on the Moon, the pressure and density of the lunar atmosphere cannot be more than one part in 1·3 millions of those of the terrestrial atmosphere.

INSECTICIDES AND THE BALANCE OF ANIMAL POPULATIONS

DR. H. E. HINTON, of the Zoology Department, University of Bristol, has recently directed attention to the dangers involved in the indiscriminate use of insecticides (*Sci. Prog.*, 43, No. 192; October 1955).

Much has been written on the kinds of direct injury that can be done to crops and other useful plants by insecticides, while individuals using poisons are materially concerned with any damage they may do to farm animals, crops and ornamental plants. They are not always as interested in the damage they may do to wild animals and birds, and they occasionally tend to dismiss injuries to their operatives as unavoidable occupational hazards. For example, in Argentina the incidence of dermatitis in workers exposed to BHC was once as high as 25 per cent. Fish are said to be as sensitive to DDT as insects; but the possibility of producing damaging concentrations in water as the result of normal control operations is slight.

In 1952 many instances of death or serious injury following the use of DDT, BHC and other chlorinated hydrocarbons had been reported. The chlorinated compounds which are fat-soluble and chemically stable tend to accumulate in the fatty tissue; this explains why animals with a large amount of fat tend to be less susceptible to acute poisoning than under-nourished ones. It has been shown that, in mammals, accumulation occurs at all ordinary levels of intake, and rats may accumulate DDT in the fat body until there may be as much as thirty times the level of intake. More DDT may accumulate in the fat body than is required for a lethal intravenous dose without the mammal showing any obvious signs of poisoning. Elimination occurs slowly; but sudden starvation may release enough DDT to affect the animal seriously. It is also known that there are great seasonal differences in the susceptibility of insects to chlorinated compounds, and there is good evidence that these seasonal differences are related to the amount of depot fat present. Many investigators believe DDT should not be used on dairy cattle and animals that are to be eaten because it accumulates in the milk and fatty tissues.