of the structure". The X-ray powder photographs of a piece of mild steel show no change during the imposition of cyclic stresses of 9 tons to the square inch, up to 10^7 repetitions. This is just within the safe range of stress. But when the stress is increased to 9.7 tons, which lies outside the safe range, there is a gradual change. The X-ray photographs show that the crystal grains are being broken up into powder consisting of far smaller crystal portions, and the structure fractures after about half a million cycles or so. Thus the progressive deterioration of the specimen takes place only when a certain safe load has been exceeded.

In this case the appearance of the X-ray photograph indicates the condition of the material. In a number of instances the photographs are now used in this way; the spacings of the crystal planes which are determined by the positions of the lines are not in question. Thus the series of photographs of Fig. 6 shows the conditions of a steel at various depths below the surface when ammonia at 500°C . has been passed over it. The diffuse character of the lines shows that the

crystallites have been broken up. Close to the surface the fragments are so small that the material is practically amorphous. At the surface itself iron nitrides have been formed. The physical effect is a very marked hardening, as indicated by the hardness numbers in the diagram. The whole effect is contained within a quarter of a millimetre from the surface. These photographs are due to Dr. G. Shearer, of the National Physical Laboratory.

Diffuseness in the photograph may also be caused by any distortion of the lattice, such as occurs when a specimen is severely strained. This is found to be the case, for example, in the operation of wire drawing.

One of the most remarkable developments of X-ray crystallography is the advance in our knowledge of the internal condition of an alloy. The 'order-disorder' theory, as it is termed, has been especially studied in the Manchester laboratories, and has been described by W. L. Bragg⁴.

² NATURE, 133, 1051 (1936).

³ Proc. Roy. Soc., A, 154, 510 (1936), plates IX, X.

⁴ Proc. Roy. Soc., A, 145, 699 (1934).

Obituary Notices

The Right Hon. Lord Conway

LORD CONWAY, whose death on April 18 at the age of eighty-one years will be widely regretted, was a many-sided man. He had very varied interests. He was a professor and lover of art; he was a collector of art treasures; he was a politician; and he was a mountaineer. In no one line did he achieve real greatness. But he always and everywhere derived keen enjoyment out of life and he had the knack of conveying his enjoyment to others. Everybody liked him.

Perhaps it was in mountaineering that Conway found his chief enjoyment. Among the mountains his love of beauty found an ample field. As he climbed not as an exercise in gymnastics but in order to get the real feel of the mountains from close contact with them, he was able to develop his true fundamental self among them. He climbed the Alps "from end to end". But not content with them, he ventured farther afield and travelled among the supreme mountains of the world. In the full maturity of his climbing powers, he set out for the Himalaya in search of a fairly accessible 25,000 ft. peak. He was not the first from Europe to attempt Himalayan peaks. Some forty years before him, the Schlagentweits had climbed to at least 22,000 ft. and more recently Graham had reached 23,000 ft. on Kabra. But Conway's expedition to the Karakoram Himalaya was the first to direct the attention of the world to the glory of the Himalaya. He chose as the scene of his operation what is perhaps the finest part of the

whole range—the region of the Karakoram Himalaya. For sheer sublimity of natural beauty it is unsurpassed. It lies beyond the forest-class zone of lower altitudes. Here there is nothing but bare rock and ice and purest snow. All is of sternest grandeur. There are several peaks of 24,000 ft. and 25,000 ft. in height, four of 26,000 ft., one of 27,000 ft. and supreme over all, K_2 —28,250 ft.—second only to Mount Everest itself in altitude but far nobler in aspect.

Here Conway was in his element. It was not in his nature to strive after records on climbing. Indeed, years after, he took no interest in attempts on Everest; to climb a mountain merely because it happened to be the highest in the world made no appeal to him. What really moved him in the Karakoram region was the glory of the mountains. There where even the valley bottom was higher than the summits of the Alps—there surrounded by peaks of towering grandeur—he felt his whole soul uplifted towards them. He entered into the spirit of the mountain. In his writings he tried to convey something of his own enjoyment; and he was successful. Others responded to the call. Since his time, German, Italians, and French, as well as other British have gone there too.

Conway was also a man of deep religious feeling. No such true lover of beauty, and especially of sublime mountain beauty, could help being religious. He could not help being in love with such beauty, which aroused in him such an ecstasy of delight.

FRANCIS YOUNGHUSBAND.