oxide from the edge of the line for the metal is in both cases found to be about 7·5 volts.

As the two spectrograms reproduced in Fig. 2 were taken under identical instrumental conditions, they show the relative position and intensity of the lines of the K-series. All the lines of the α-group are for Al_2O_3 displaced towards shorter wave-lengths, as was first shown for the α_{12}-line by Bäcklin[1]. Al_2O_3 has a very strong β'-line. Finally, the β'''-lines of Al (metal) show the same structure as β, and therefore probably are transitions from the free electron levels. The corresponding lines with Al_2O_3, which do not show this feature, are displaced towards longer wave-lengths.

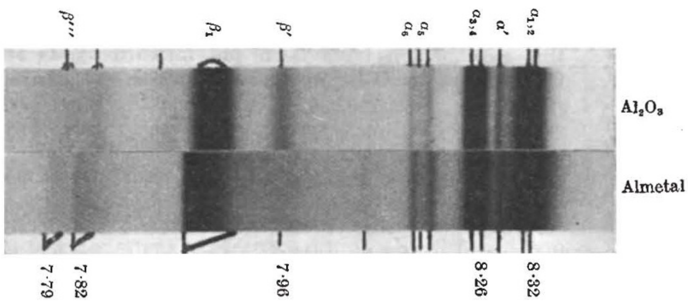

FIG. 2.

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[1] E. Bäcklin, *Z. Phys.*, **33**, 547; 1925. *Z. Phys.*, **38**, 215; 1926.

Spectrum of Sulphuryl Chloride

KRONIG, Schaafsma and Peerlkamp[1] have recently described measurements on the absorption spectrum of chromium oxychloride, which exhibits a somewhat unusual system of diffuse narrow bands in the region of 6000 A. The absorption spectrum of the closely related compound sulphuryl chloride has been studied using pressures of 1–100 mm. with an absorbing column of 50 mm. and over the range 5000–2000 A., and indicates certain features not unlike those reported in the case of chromium oxychloride. Between 3170 and 2800 A. a succession of about twenty narrow diffuse bands is observed (region A). These bands are not, except in the region of longer waves, equidistantly spaced, different intervals varying between 180 and 250 cm.$^{-1}$. In the intervals between the bands 1/2, 2/3, 3/4 (numbering from the long wave end), about four very faint absorption lines are visible, with equidistant spacing. There may be some definite pattern in the region as a whole, which more accurate analysis should reveal. From 2790 to 2730 A. there is a series of about eight similar absorption strips (region B) with markedly different frequency interval (c. 100 cm.$^{-1}$) from those in region A. From 2700 to 2620 A. occurs another much less intense series of some fifteen or more diffuse strips, with frequency separations of the order 100 cm.$^{-1}$ (region C). It is probable that the regions A, B and C are all related to the same electronic process. There are certain similarities in the system to that described in the spectrum of chromium oxychloride.

A system of bands degraded to the red and of much larger frequency intervals (c. 450 cm.$^{-1}$) begins at 2300 A. Thirteen of these bands have so far been observed. Numbering from the long wave end, the first few of these bands appear to show fine structure, but from the fourth onwards (c. 2200 A.) they are diffuse. This is an interesting result in connexion with the mechanism of the photochemical decomposition of sulphuryl chloride into sulphur dioxide and chlorine, a process which takes place under the influence of light of wave-length less than about 230mμ[2].

It is hoped to make more accurate measurements using greater dispersion and with a wider range of temperature and pressure, from which it seems probable that information will be gained in regard to the potential energy curves of the various levels in the sulphuryl chloride molecule and the mechanism of its photochemical decomposition.

The spectrum of thionyl chloride is also being studied in relation to the above.

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[1] *Z. phys. Chem.*, B, **22**, 323; 1933.
[2] Andrich, Kangro and Leblanc, *Z. Elektrochem.*, **25**, 229; 1919. Tramm, *Z. phys. Chem.*, **105** A, 356; 1922.

Ecology of Tropical Swamps

IN a recent issue of NATURE[1], R. M. Bond has published determinations of the dissolved oxygen in the water of a swamp in Haiti, and has attributed the contrast between the high values obtained and the low concentrations which L. C. Beadle and I found in swamp waters in the Paraguayan Chaco[2] to the results of differences in the amount of calcium carbonate in the soil below the swamps.

To me, such an explanation seems unnecessary. It appeared to me[2] (p. 251) that the lack of dissolved oxygen in the Paraguayan swamp waters was the result of several conditions, acting in combination. Among these must be included the hot climate, as Beadle has later shown[3] (p. 148), and this is confirmed by experience in temperate climates, possibly with the reservation that temperate waters of similar types may become deoxygenated in very warm, calm weather. Of the other conditions which cause the lack of oxygen in the tropical waters, it seemed clear that two, protection of the water from disturbance by wind and the absence of active photosynthesis, are necessary. They may be also sufficient. In the Paraguayan Chaco the first of these conditions is brought about by the dense growth of aerial plants at and above the surface of the water, and the second by the low concentration of phytoplankton in the water and by its slight illumination. This last condition itself results from the shade of the aerial plants and from the dark colour of the water. In the occasional places where these conditions did not hold, oxygen was found even in the lowest layers of the water[2] (p. 228).

Bond states that the water of the Haitian swamp was shaded in many parts by tall rushes and sedges, but that there was no growth of floating plants at its surface. It is also noted that the water was clear. In such a swamp it is to be expected that disturbance