features are also exhibited in the slow oxidation of phosphorus trioxide, and it has been suggested that the phenomena of the glow of phosphorus are due to the trioxide formed in a preliminary non-luminous oxidation. Again, phosphine does not react with oxygen at ordinary pressures, but on reducing the pressure an explosion occurs.

With the view of elucidating these difficulties the nature of the light emitted in these oxidations is being studied spectroscopically. It was recently shown (Emeléus and Downey, J.C.S. Trans. 125, 2491, 1924) that the light from glowing phosphorus, and that from the element burning normally, give the same spectrum. This is continuous in the visible region, and has five bands in the ultra-violet between $\lambda = 2370$ Å.U. and $\lambda = 3290$ Å.U. These observations have now been extended with the following results: the light from glowing phosphorus trioxide, and from spontaneously inflammable phosphine burning in oxygen, give this same spectrum. In the first case the strongest three of the five ultra-violet bands have already been identified. There is little doubt that the remaining bands will be shown on lengthening the exposure. In the second case all five bands have been observed, in addition to bands generally attributed to water at about $\lambda = 3060$ Å.U. and $\lambda = 2800$ Å.U.

The fact that the light from glowing phosphorus and that from phosphorus trioxide both give the same spectrum supports the analogy between these two oxidations, already well established in other respects. These observations, however, cannot be taken as proof of the identity of the chemical processes. They indicate rather that there is some radiating system involved in them all, which gives rise to a definite band spectrum. Such a system may well have a connexion with the chemical anomalies common to the low temperature oxidation of these phosphorus compounds.

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The Structure of the Mercury Line 2536.

AN investigation of the fine structure of the 2536 line of mercury has just been completed as a preliminary to the continuation of the work on the controlled orbital transfers of electrons in optically excited mercury vapour described recently in the Proceedings of the Royal Society. It has been found that the structure photographed by Prof. Nagaoka is not the true structure at all, but an absorption spectrum, or perhaps more exactly a structure caused by the self reversal of the true components, resulting from the circumstance that he worked with an Arons-Lummer type of lamp, in which the light of the arc is obliged to pass out through a column of non-luminous mercury vapour, before entering the interference spectroscope.

The true structure has been observed with a water-cooled vertical quartz mercury arc, the discharge being pressed against the wall of the tube adjacent to the spectroscopic train by a very weak magnetic field. There are five components of uniform intensity, four at sensibly equal intervals, the fifth having a slightly greater separation. The observations were made by two quartz Lummer-Gehrke plates crossed in the usual manner. On passing the light through a cell 1 cm. in thickness containing mercury vapour in vacuo at room temperature, each one of the interference points doubles by reversal and we have a row of ten dots. On increasing the thickness of the absorbing layer some of these coalesce, and we end up with a structure sensibly the same as that described and figured by Nagaoka: I say "sensibly" as there appears to be a slight difference between the absorption of mercury vapour in a separate cell, and that of the vapour in the neck of the Arons lamp, which is in a state of ionisation from its contact with the arc. The effect of magnetic fields on the components has also been studied.

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Les rayons γ de haute énergie et leur effet photoélectrique.

DANS une lettre récente à la NATURE (Feb. 14, p. 226) Mr. D. H. Black attire l'attention sur un rayon γ du thorium B d'énergie élevée. Son interprétation dans le spectre naturel indique sa conversion en rayon β par son action sur les niveaux K et L d'un élément de nombre atomique 82 ou 83.

Ces faits sont à rapprocher de ceux que M. Jean Thibaud a signalés il y a quelque temps (*Comptes rendus*, tome 178, 1924, p. 1706; tome 179, 1924, pp. 165, 815, 1052, 1322). M. Thibaud travaillant dans mon laboratoire a pu obtenir les spectres excités photoélectriquement par des rayons γ dans les éléments les plus divers; il a montré qu'on observait la conversion de rayons γ de près de deux millions de volts sur les niveaux K et L d'atomes lourds (uranium, plomb, platine, tungstène). En particulier un rayon γ de 1,775,000 volts, émis par le radium C, se convertit sur des niveaux L, d'énergie *140 fois moindre*.

L'effet photoélectrique des rayons γ de haute énergie se produit avec une intensité remarquable sur les niveaux K d'éléments plus légers, tels que le cerium, l'antimoine, l'étain, l'argent et même le cuivre et le fer.

M. Jean Thibaud a vérifié très exactement, en étudiant le déplacement des diverses raies photo-électriques lorsque l'on fait varier le nombre atomique du "radiateur" secondaire, que la relation quantique d'Einstein était aussi bien valable pour les quanta très élevés que pour les plus faibles. Il a montré enfin l'identité des spectres β naturels et des spectres β excités pour Ra B+C, Th B+C+C″, Ms Th 2 et confirmé ainsi l'origine secondaire des spectres naturels de ces éléments.

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Radio Reception on Frame Aerials.

I WAS much interested in Mr. Cowper's letter in NATURE of February 21 on radio reception on frame aerials. For some time I have been quite sure that the usual estimates of probable signal strengths are much too low.

On a four-valve (1 H.F. Det. 2 L.F.) it is possible, on a roughly constructed frame 16 inches square, of 30 D.C.C., to receive all B.B.C. stations at loud-speaker strength. The tuning is very acute, and, as Mr. Cowper mentions, with special arrangements for reaction control. This was with B.T.H. B.5 (0·06) valves. I have never tried for American stations, but have no doubt they could be heard.

The station was on the south side of a sheltered valley and the apparatus about 6-8 ft. above the ground. The first station I ever heard was Manchester, so loudly that, until the announcer gave the name, I was quite sure it was either Plymouth, 25 miles, or Bournemouth, 90 miles, distant.

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