

paramagnetism would be consistent with the existence of change (1) with or without (2) and (3). A knowledge of the actual magnetic moment would probably enable a definite decision to be made as to the reality of changes (2) and (3).

If diamagnetism were found and the films of iron, cobalt, and nickel are really of a similar nature, then it would be very probable that all three changes had taken place. The metallic ions would then be in states which might correspond to that of iron in, say,  $K_4Fe(CN)_6$ , cobalt in most co-ordination compounds of trivalent cobalt, and nickel in, say,  $Na_2Ni(CN)_4$ .

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#### The Action of 'Antiknocks.'

THE following conclusions, amongst others, have been reached during an investigation on the effect of 'antiknocks'—such as lead tetraethyl—on 'knocking' in petrol engines:

(1) Antiknocks do not influence detonation in rapid combustion mixtures (*Proc. Roy. Soc.*, 114, 137, 1927).

(2) They function in the initial stages of the combustion as negative catalysts. In the slow combustion of a hydrocarbon, aldehydes are produced which readily form peroxides, which auto-catalyse or induce oxidation of the earlier stages. If these are removed, combustion proceeds more slowly. By reason of such effects on the processes of slow combustion preceding ignition, 'antiknocks' influence greatly the igniting temperature, particularly in the case of aldehydes. Similarly they effect those same processes which occur at a flame front in a comparatively slow burning mixture.

(3) Those metals which give effective organo-metallic antiknocks are found to be capable of forming higher oxides. Such metals as potassium, which form peroxides in equilibrium with other oxides at about 400° C. are very effective. Non-oxidisable metals such as gold are ineffective. The unstable peroxide formed in the combustion of the fuel and the metallic peroxide are considered mutually to destroy each other. The rate of destruction of the positive catalyst is greater than its rate of production, so that combustion is delayed. The metal atoms in a state of incipient oxidation are thus the effective anti-catalysts.

(4) A purely organic antiknock like aniline is effective for the same reasons; only those types of organic substances are effective as antiknocks as have been shown to be effective in retarding the oxidation of certain aldehydes at normal temperatures in the liquid phase. The mechanism adduced to explain their action in such circumstances by Moureu and Dufraisse is similar to that which we have given above. Such organic antiknocks themselves undergo combustion and are destroyed, a larger quantity of the negative catalyst being therefore required for the same effect..

(5) Both for 'ignition' and 'knocking' there is a condition of sensitiveness to change of reaction rate, and the effect of 'antiknocks' is in general much the same on the two phenomena. The views given are supported by the effect of such substances (aldehydes, organic peroxides, etc.) which promote knocking or favour ignitibility.

These conclusions elaborated and the experimental data which suggest them, will be detailed in papers which it is hoped soon to publish.

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#### Electron 'Reflection' in Vacuo.

IN the *Proceedings of the Cambridge Philosophical Society* (Pt. 5, vol. 23), just received, there is an interesting article by Mr. C. F. Sharman on the application of the magnetic spectrum method to the study of secondary electron emission.

Several investigations of this type are now and have been for some time in progress in this laboratory, and we hasten to point out that at least one of our results obtained within the last six months has a bearing on Mr. Sharman's work. We find, in accord with him, that a fraction of the electrons emitted from a filament and accelerated towards a reflecting plate under potential  $V$  are 'reflected' with energy corresponding to that full potential  $V$ , and that energies immediately less than about 12 volts below  $V$  appear to be absent in most of the spectrum photographs taken. Generally speaking, there is a continuous spectrum starting at  $(V - 12)$  and extending down to lower energies in an impartial manner. One of the two hundred or so photographs so far obtained is here reproduced (Fig. 1) with a potential scale in

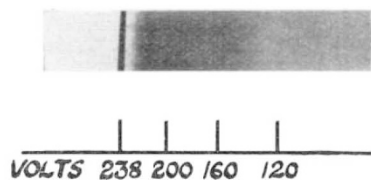


FIG. 1.

volts added for comparison. The sharp-edged black line in the spectrum at 238 volts shows the 'reflection' (from a copper target in this particular case) of the full energy electrons; there is then a white space, and thereafter a general reflection of all energies below about 226 volts. We think that this gap of 12 volts is in all probability real and not instrumental, as Mr. Sharman suggests. Our experimental results are in agreement with a short note by J. Becker (*Phys. Rev.*, 1924), in which during an investigation into the photoelectric emission from various surfaces a very similar effect was recorded.

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#### Is Darwinism Dead?

REFERRING to the correspondence in *NATURE* of Feb. 19, p. 277, Mr. H. Belloc writes to say that his statement regarding the impossibility of birds having been evolved from a reptilian form was based on Prof. L. Vialleton's "Membres et Ceintures des Vertébrés Tétrapodes" (1924), not, as Sir Arthur Keith had supposed, on that author's "Eléments de Morphologie des Vertébrés" (1911). The mistake seems to us to be immaterial to the question at issue—namely, "Is Darwinism Dead?"—and we suggest that it would not have occurred if Mr. Belloc had followed the usual practice of giving references to his authorities.

As to the particular point under discussion, it has been referred to the leading authority upon the subject, who replies: "It is absolutely certain that the birds came from reptiles."

EDITOR, NATURE.