

I found that when copper was made the cathode in 10 per cent nitric acid at low current densities (about 5 ma. per sq. cm.), its potential oscillated continuously in periods having a duration of about 1 second and an amplitude of about 0.1 volt. No gas was evolved. This case is complementary to that reported by Butler and Armstrong; for, whilst their observations refer to an anodic process in a reducing solution, mine are concerned with a cathodic process in an oxidising solution. I assumed the periods to be connected with the formation of reduction products of nitric acid—probably ammonia.

Regarding the cause of the periodicity, my experiments on anodic reactions (described fully in "Protective Films on Metals". London: Chapman and Hall) showed that the phenomenon appears when the electrode has almost equal chances of being 'passive' or 'active', or, in general, of being coated or not with a more or less protective film. The phenomenon also appears at the cathode when two reactions are equally probable, and all the evidence points to a critical concentration of ions which must be attained in order to effect the change from one state to the other; a fresh period begins each time the critical concentration is reached by diffusion.

The existence of periods at both anodes and cathodes may be expected by analogy, therefore, when the oxidising or reducing tendency of the electrode is approximately equal to the reducing or oxidising power of the solution. Two years ago I commenced preliminary experiments with the intention of leading to a general study of the cathodic reduction of oxidising solutions and the anodic oxidation of reducing solutions from this point of view, but the work had to be discontinued.

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<sup>1</sup> NATURE, 129, 613, April 23, 1932.

#### Dependence of Angle of Contact on the Constitution of Adsorbed Organic Compounds

IN the course of an investigation conducted on behalf of the Broken Hill South, North Broken Hill, Zinc Corporation, Electrolytic Zinc, Mount Lyell, and Burma Corporation Mining Companies, measurements were made by two of us of the effect of xanthates on the angle of contact at a line of triple contact, mineral-water-air. These have been reported in Technical Publication No. 461 of the American Institute of Mining and Metallurgical Engineers. A trace of potassium ethyl xanthate, dissolved in the water, leads to an angle of contact which is independent both of the concentration of the xanthate and the nature of the mineral. Another compound containing the ethyl group, sodium di-ethyl dithiophosphate, leads to an identical angle of contact. At the time of publication of the above paper it was uncertain whether this was merely a coincidence.

Under an arrangement with the University of Melbourne, the measurements have now been extended by the third author (E. E. W.) to include several other organic types. It has been proved that several ethyl derivatives containing the -SH group lead to this same angle of contact ( $60^\circ \pm 2^\circ$ ). Moreover, each alkyl or aryl group exhibits a characteristic angle of contact, which apparently is independent of the nature of the polar group of the adsorbed molecule.

During the course of this work the contact angles at the surfaces of a large number of minerals and metals have been investigated.

It is inferred that the mineral or metal surface is covered by a unimolecular film of the thio-compound, in which the alkyl group is oriented outwards, and

that the alkyl groups are packed as closely as their size will permit.

Details of the investigation will be published elsewhere.

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#### Rediscovery of *Caloprymnus campestris* (Marsupialia)

SINCE Sir George Grey sent the three original specimens to the British Museum, in 1843, this interesting marsupial, one of the 'Rat-Kangaroos' of the subfamily Potoroinæ, has been completely lost to science. There is a somewhat doubtful record of it in 1878, but no specimen of the animal exists in any museum in Australia, and there was much to justify the generally accepted view that the animal was extinct.

Following the preliminary announcement by me in September last<sup>1</sup> that *Caloprymnus* was still extant, field work was undertaken in the locality of the first occurrence, with considerable success. The animal has now been shown to have a wide but sporadic distribution in the great area of sandhill and gibber plain country enclosed by the Diamantina and Cooper Rivers between latitudes 24° and 29° south (approximately).

Evidence obtained indicates that *Caloprymnus* has had a long and probably uninterrupted tenure of the area, but that normally its occurrence is very sparse. The passing of drought conditions has apparently provided a stimulus, resulting in a considerable local increase in its numbers.

A series of specimens in several developmental stages was secured, and a restatement of the characters of the animal and of its habits and economy is being prepared. The locality from which Sir George Grey's specimens come is uncertain. Any information on this and allied points, by students in England who have had access to Grey's papers, especially his correspondence with Gould, would be welcomed by me.

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The University, Adelaide,  
April 12.

<sup>1</sup> *Trans. Roy. Soc. S. Aust.*, 55, p. 162.

#### Heterospory and the Angiosperms

PROF. RUGGLES GATES in his interesting letter on this subject<sup>1</sup> compares the size of the microspore and megaspore *mother-cells* in Angiosperms, and finds that the former are in some cases larger than the latter. But is the size of the *mother-cells* material to the question? Surely it is the relative volume of the mature and functional microspores and megaspores which determines heterospory. In the heterosporous Pteridophytes there may be little or no difference in the size of the respective *mother-cells* up to the time of their division.

As a palæobotanist, I have no prejudice in favour of the origin of the flowering plants from heterosporous Cryptogams. The fossil evidence so far lends no support to this classical hypothesis. But it does seem to me that the existing Angiosperms (and Gymnosperms also) do, as a matter of fact, show in general a marked heterosporous differentiation, if one compares their pollen grains and embryo sacs when functionally mature.

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East Oakley House,  
Basingstoke, May 31.

<sup>1</sup> NATURE, 129, 793, May 28, 1932.