cuts the surface of the solution may actually lie 1–2 mm. to the right of the origin.) Under an atmosphere of nitrogen containing only 0·1 per cent oxygen (Fig. 1b) zone C spreads over about 20 mm., and at higher dilution of oxygen (Fig. 1c) it extends much farther.

The curves do not depend on the rate at which the meniscus is lowered, and the change may be effected in steps. A very thin film of 'Vaseline', sufficient to make the silver surface repellent to the caustic solution, does not suppress the effect of the emerging area.

Curves similar to Fig. 1 were obtained also with the system nickel/potassium hydroxide/lead. In a neutral or acid system, for example, stainless steel (18 per cent Cr, 8 per cent Ni, 1 per cent Nb)/sodium chloride/iron or alloy (40 per cent Ni, 20 per cent Cr, 3 per cent Mo, 2 per cent Cu, balance substantially Fe)/sulphuric acid/copper, the corresponding curves tend to be erratic, often with maxima and minima superimposed, and they are sensitive to point-to-point differences in the condition of the emerging surface. Also, the currents i_C are smaller and the zone C is rather narrower than in alkaline systems.

The mode of action of zone C is not clear, but it must be assumed that oxygen is adsorbed there and that in the adsorbed state it is capable of diffusing towards the water line. The thin film of water present on the 'dry' area does not appear to hinder this mechanism.

It is well known that under a droplet of spray a metal often corrodes in the centre of the droplet (A), rather than suffering attack at the circumference (B). From the above experiments it must be concluded that outside the droplet there exists a 'halo' (C), about 1 mm. wide, which contributes to the corrosion by acting as a catchment area for oxygen.

Similar effects must also be expected during the electro-dissolution of hydrogen at a semi-immersed platinum anode, and possibly during the corrosion of metals semi-immersed in molten electrolytes, or of steel in the nearly anaerobic atmosphere of a boiler or condenser.

Likewise, in air-depolarized carbon–zinc batteries, or in fuel cells of the type oxygen/porous nickel/ potassium hydroxide/porous nickel/hydrogen, where the reacting gases dissolve electrochemically near a micro-meniscus inside each of the pores of the electrodes, the non-wetted part of the pore walls must play an important part as affecting the transport of the depolarizer.

I wish to thank The Mond Nickel Co., Ltd., for permission to publish this communication.

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Photographic Densitometry with the Two - Wave-length Method

THE appreciation of distributional error in the measurement of complex microscopical objects has led in recent years to the development of scanning methods of photometry and the two – wave-length method of microspectrophotometry. The two – wave-length method has been used successfully in a number of laboratories since its inception by Ornstein[1] and its elaboration by Patau[2]. It is based on an empirical correction for distributional error derived from transmission readings of the entire object taken with two wave-lengths which have been pre-determined to give true absorbances in the ratio of 1 : 2 for the chromophore being measured. The successful application of the method depends on the spectral characteristics of the chromophore, and on the presence in the object of suitable areas in which the chromophore is randomly distributed and can be measured for the selection of appropriate wave-lengths. Three types of material will not meet these requirements. They are objects without homogeneous portions, objects in which more than one independent chromophore is present, and objects in which the chromophore has too flat an absorption spectrum to supply the necessary ratio.

The photographic two – wave-length method is intended for objects falling into the above categories. The objects to be measured are photographed at a convenient magnification using monochromatic light. The resulting black and white negative is contact-printed, and the positive plate is developed with a coupling reagent. After bleaching and fixation, the positive transparency will be in one of a number of available colours and can be subjected to two – wave-length analysis. The spectral determinants are now those of the photograph, and are readily secured from a homogeneous portion of the plate. The readings may be carried out on a modified conventional spectrophotometer, or by inserting the plate into the optical train of a microspectrophotometer in the focal plane immediately below the eyepiece.

The method has been tested on photographs of stained material taken at 5893 A., or of unstained material taken at 2536 A. In the latter case, isolated rat liver nuclei have given modal distributions of total absorbance which fall in geometric progression and fit closely to the biochemical predictions of deoxyribonucleic acid content. The results with the stained material have been evaluated by measuring the same cells by the direct two – wave-length method and comparing the results with those obtained from the photographs. The two methods gave values for a population of cells which have similar variances, the same means, and a very close correlation between individuals. The photographic two – wave-length method has thus been shown to be comparable to the direct two – wave-length method.

The photographic two – wave-length method is potentially applicable to many forms of photographic densitometry, and should be of greatest value in those cases where discrete heterogeneous images are undergoing measurement.

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Sept. 13.

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