in essential details, cannot be reproduced or turned to use by other workers.

To describe a spray as "ammonium polysulphide (0·5 per cent)" without giving the composition of the ammonium polysulphide solution which was diluted 1 in 200; to give "lead arsenate, 4 lb. per 100 gallons" without particulars of the arsenic content of the paste or powder used; to state "1 per cent White oil emulsion" without giving the characteristics of the oil, are examples of this indifference on the part of the biologist. Such cases of inadequate description are to be met in almost every horticultural periodical, and even in research station reports. As the materials examined are of variable composition, the results are about as valuable as an estimate of size by the familiar method of comparison with a lump of chalk.

It is true that in some cases it is impossible to give sufficient details of composition because analytical methods are not available or our knowledge of the active constituents is insufficient. May not this be due in turn to an absence of demand on the part of the biologist for more accurate knowledge of the materials he finds of use? H. MARTIN.

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Wye, Kent.

Synthesis of Munjisthin.

MUNJISTHIN, a dihydroxyanthraquinone carboxylic acid occurring in *Rubia tinctorum*, *Rubia sikkimensis*, and *Rubia munjistha*, has been synthesised by us in the following way:

2 chloro-6-methoxy toluene (Ullmann and Panchaud; *Annalen*, 350, 108; 1906) is condensed with phthalic anhydride in presence of aluminium chloride giving 2′ chloro - 3′ methyl - 4′ methoxy - benzoyl - 2 - benzoic acid (M.P. 202° C.), which on treatment with sulphuric acid gives 2 chloro - 3 methyl - 4 methoxy anthraquinone (M.P. 197° C.). On demethylation with anhydrous aluminium chloride this gives 2 chloro - 3 methyl - 4 hydroxy anthraquinone (M.P. 324°-325° C.). On oxidation with nitrous acid in presence of boric and sulphuric acids according to the method of Farbenfabriken vorm. F. Baeyer and Co. (D.R.P. 273341) the chloro-hydroxy-methyl-anthraquinone is converted into dioxyanthraquinone carboxylic acid (M.P. 231°) (cf. Ullmann and Schmidt: *Ber.*, **52**, 2111; 1919), the melting point of which is not depressed by admixture with natural munjisthin obtained from *Rubia munjistha*.

The paper is being communicated to the *Journal of the Indian Chemical Society*.

Three years ago one of us (P. C. M.) had the pleasure of communicating to NATURE (Nov. 19, 1927, **120**, 729) the "Synthesis of Rubiadin".

P. C. MITTER.
HAROGOPAL BISWAS.

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Calcutta, Sept. 18.

Experiments on Binaural Sensations.

IN experiments carried out in this Institute we have investigated some of the points raised by Mr. Humby in his letter published in NATURE of Nov. 1.

Differences either of intensity or of phase (time) may be concerned in binaural localisation of sound. It is true, as Mr. Humby says, that it is difficult to design apparatus for phase variation in which intensity changes are completely eliminated; on the other hand, it is possible to determine these changes, and even to balance the effect of a phase shift against that of a difference of intensity.

We have carried out experiments of this kind and find that the variation of intensity required to counterbalance the effect of a given phase (time) shift is very much larger than that which is unavoidably associated experimentally with that shift.

J. H. SHAXBY.
F. H. GAGE.

Physiology Institute,
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Newport Road, Cardiff, Nov. 4.

Liquid Drops on the Same Liquid Surface.

IN two previous papers,[1] I have mentioned that water at ordinary temperature is not a suitable liquid for forming "liquid drops floating on the same liquid surface". In August 1930, however, I observed at Den Kund (Dalhousie hills), at a height of about 1000 ft. above the sea-level, that water is quite a suitable liquid for easy formation of either primary [2] or secondary drops. The life of these drops is also found to be longer. The splashing gives easy formation of secondary drops of quite a long life. The temperature of the water was about 34° F. The surface tension of water at this temperature is 76·53 dynes per cm., and viscosity 0·0179 c.g.s. units.

L. D. MAHAJAN.

Physics Laboratory, Mohindra College,
Patiala, India, Oct. 4.

[1] (*a*) "Liquid Drops floating on the Same Liquid Surface", J. B. Seth, C. Anand, and L. D. Mahajan, *Phil. Mag.*, Feb. 1929. (*b*) "The Effect of the Surrounding Medium on the Life of Liquid Drops floating on the Same Liquid Surface", L. D. Mahajan, *Phil. Mag.*, London, 1930 (in the press).

[2] See *Phil. Mag.*, London, Seventh Series, No. 42, Feb. 1929, page 248.

Upper and Lower Palæolithic Man at Kirmington, North Lincolnshire.

As the result of recent investigations carried out by me at Kirmington, I am able to state that the uppermost or 'Brown' Boulder Clay contains flint artefacts of Upper Palæolithic types, whilst from the immediately underlying Glacial (cannon-shot) Gravels I have recovered a series of derived flint implements of Early Mousterian type. Similar implements, in a still more derived condition, I found in the shingle gravel which overlies the estuarine warp.

These observations, which I propose to describe in full at a later date, confirm the conclusions arrived at by Lamplugh and by me with regard to the sections at Danes' Dyke on Flamborough Head. The variableness of the "Brown Boulder Clay" at Kirmington might profitably be studied by geologists.

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Traces of Metals in Animal Tissues.

To the various elements referred to by Messrs. H. M. Fox and Hugh Ramage in their interesting letter published in NATURE of Nov. 1, there are three which may still be added.

Vanadium is stated to occur in considerable quantities in certain Ascidians; arsenic—sometimes in not inconsiderable amounts—is almost ubiquitous; and I have myself recently observed the unexpected presence of antimony. With regard to this last-mentioned element, I hope to publish a communication as soon as the work is completed.

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