

has scored its chief triumph off fats. Sheffield studies them rather than iron. Last, not least, one very expensive organisation of the Department of Industrial and Scientific Research has fats specially under its charge. It has a habit of putting its work out, and some has already been placed with the University of Manchester. So it is clear that even the university may be trusted with fat. Why, then, further workers and new buildings in a field already so fully occupied?

Every halfpenny spent thus wastefully by State agencies out of the grant from the State is money withdrawn from the schools of experimental science, to which the grant was primarily made, to enable them to prosecute original inquiry and train a research force for the service of the State. The future of higher scientific inquiry is being gravely imperilled by the bureaucratic machinery which is fast closing its clutches upon our scientific liberties. We are false to the trust that is imposed on us if we further countenance a system which not a few of us regard as indefensible. The nation cannot afford to waste money in any quarter to-day, nor should it be led into thinking that it is getting special service from a Department which is showing that it is technically unfitted for the work it has undertaken. I may instance particularly fuel research, upon which half a million sterling seems to have been spent without result, mainly because practical needs have never been taken into account and existing knowledge and experience put aside.

HENRY E. ARMSTRONG.

May 2.

#### The Anomalous Flocculation of Clay.

IN NATURE of May 1, p. 624, there appears a letter from Dr. A. F. Joseph and Mr. H. B. Oakley regarding the so-called anomalous flocculation of clay. We should like to point out, however, that it is doubtful whether the experiments referred to in the first part of the letter could be expected to show anomalous flocculation as ordinarily understood. In the first place, it has been suggested by Comber (*Journ. Agric. Sci.*, 1920, 10, 432; *loc. cit.*, 1921, 11, 460 *et seq.*; and *Trans. Faraday Soc.*, 1922, 17, 349) that the phenomenon referred to is dependent on the presence of colloidal silica in the outer surface of the particles, and the "highly purified clay" used by Dr. Joseph and Mr. Oakley might well have lost this coating. Further, the phenomenon is shown, not so much by differences in the minimum amount of ion required for flocculation, as by an increased rate of sedimentation when a sufficiency of the ion is present. It would be interesting to know whether the particular clay used would show the phenomenon of anomalous precipitation at higher concentrations of salts either alone or after the addition of colloidal silica.

It may be mentioned that with suspensions of kaolin we have obtained very marked anomalous precipitation in alkaline solution by calcium ions after the addition of small quantities of colloidal silica, although these suspensions did not exhibit this phenomenon when silica was not present. We have also observed a similar effect with caesium chloride, although in this case the phenomenon, under certain conditions, may be delayed for approximately 24 hours. Ammonium and potassium salts give similar results after still longer delays. The effect seems to be related to the precipitating action of the cations of these salts on colloidal solutions of silica at pH greater than 7,—a phenomenon which appears first to have been described by Pappadà (*Gazzetta Chim. Ital.*, 1903, 33, (ii.), 272). The nature of the precipitate in this anomalous flocculation is quite different

from that obtained at other concentrations of the ions and other reactions of the medium. For example, in the case of calcium chloride a voluminous and highly flocculent sediment separates in the first two or three minutes at concentrations exceeding  $39 \times 10^{-4} N$  and at pH 8-9. At the end of such periods there is practically no flocculation apparent at corresponding concentrations of the salt in neutral or acid medium, or at any reaction or concentration of salt when silica is not present.

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#### Major-General William Roy.

REFERENCE was made in NATURE of May 1, p. 630, to the life and work of Major-General William Roy. It is stated in the note in question that Roy entered the army at twenty years of age; his own statement is that a "body of infantry was encamped at Fort Augustus in 1747," when he was twenty-one, and that "as Assistant Quarter-Master it fell to my lot to begin . . . the execution of that map." It appears that he held a minor position in the Post Office at Edinburgh until 1747. As to the date of his joining the army, Mr. George Macdonald, in his valuable study "General William Roy and his Military Antiquities of the Romans in North Britain," published by the Society of Antiquaries in 1917, states that it is quite possible that Roy was not in the army at all during the construction of the map of Scotland. All that we know for certain on this point is that Roy was appointed Practitioner Engineer on December 23, 1755.

No mention is made in the note of Roy's archaeological work. As a fact, throughout the whole of his life he was deeply interested in the history of the past, and he is probably nearly as well known as the author of the "Military Antiquities" as he is as the founder of the Ordnance Survey. It may interest readers of NATURE to know that the terminals of the base which he measured on Hounslow Heath in 1784 were replaced by guns buried vertically, muzzles upward, in 1791, and that these guns still remain in position.

C. F. CLOSE.

Coytbury, Winchester, May 25.

#### Hydrogen as Anion.

WE are all so much entertained by Prof. H. E. Armstrong's broadside attacks that those of us who happen to come within his range must not complain; but I feel that I must protest against his criticism (NATURE, April 17, p. 553) of the beautiful experiment of Bardwell which proved that hydrogen is an anion in metallic hydrides (*J. Am. Chem. Soc.*, 44, 2499 (1922)). If Prof. Armstrong would read carefully Dr. Bardwell's paper he would see what pains were taken to separate the anode and cathode chambers, and since hydrogen was evolved quantitatively at the anode it could scarcely be due to liberated alkali metal unless this also were set free at the anode—which even a thorough-going opponent of physical chemistry would scarcely assume. This being so, it is perhaps unnecessary to mention the bald chemical fact that the alkali metals do not in any case react with metallic hydrides to set free hydrogen.

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Berkeley, California, April, 29.