

LETTERS TO THE EDITORS

The Editors do not hold themselves responsible for opinions expressed by their correspondents. They cannot undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.

IN THE PRESENT CIRCUMSTANCES, PROOFS OF "LETTERS" WILL NOT BE SUBMITTED TO CORRESPONDENTS OUTSIDE GREAT BRITAIN.

Camouflage in Modern Warfare

RECENT articles and correspondence in *NATURE*¹ have painted a gloomy and even alarming picture of the inefficiency of the departments in Great Britain responsible for camouflage. We are led to suppose that the work is mainly entrusted to artists who cannot be expected to understand what they are doing, instead of being under the control of properly qualified scientific men who are familiar with the "fundamental biological principles" involved. We are left with the impression that the work is being carried out with a degree of incompetence which can only lead to disaster, and although it is not specifically stated, there is a strong suggestion that since modern camouflage was brought into being a quarter of a century ago by an eminent zoologist, and since biologists have made an intensive study of the methods by which animals conceal themselves, it follows that camouflage is a special province of the biologist to whom alone the ultimate control can safely be entrusted.

Whilst I am sure that the authorities are fully aware of the debt that they owe to biologists in the past and would welcome their further help and co-operation, I do not believe that the most urgent problems which are still awaiting solution are of a biological character at all, but are rather questions for the engineer, the chemist and the physicist. The "fundamental biological principles" seem to me to be neither profound nor difficult to understand; in fact they are so fundamental that the average artist or physicist can grasp them without any great intellectual effort. It remains to discover how to apply these "principles" to the practical problems of camouflage and to put accumulated experience to the best possible use—and this is where the artist comes in. Whether he stands back from his easel to view his work or whether he goes up in his aeroplane, the successful application of the "fundamental principles" is ultimately a matter of experience and of trial and error, for the simple reason that one objective is as different from the last as one man's face is different from another's.

I am in close contact with the work of the Civil Defence Camouflage Establishment and it may perhaps be a surprise to readers of the articles in *NATURE* to learn that this Establishment is under the control of a distinguished physicist and that biology, engineering, physics, and chemistry are all represented on the Camouflage Committee; it is my own belief that progress can only be made by the co-operation of workers in every field and that it would be absurd to stake a claim for the paramount importance of any particular branch of science. Camouflage to-day is practised by all and sundry, and it is not surprising that we find many examples which look absurd; and often are absurd. It does not seem to matter much what the omnibus companies do to the tops of their buses; it gives us

something to laugh at or to grumble about. Of course, what really matters is what important camouflaged objectives look like *from the air*; and this is quite a different story.

There has been no civil aviation in Great Britain since the outbreak of War and members of the Fighting Services and Civil Servants are precluded from any public expression of opinion. If I were an expert in these matters (and I make no such claim) I would not venture to praise or to censure the work of the camouflage departments for one simple reason—that as I have not seen it from the air my opinion would be of little value.

T. R. MERTON.

Winforton House,
Hereford.
August 17.

¹ *NATURE*, 145, 949 (1940); 146, 112 (1940); 146, 168 (1940).

SINCE the appearance on June 22 of a leading article entitled "Camouflage in Modern Warfare" in *NATURE*, the War has entered upon a new phase, in which the enemy has repeatedly sent large formations of bombers in search of targets over Great Britain. Now more than ever before in our history has camouflage become a matter of national importance. Prof. Merton complains that the above article presented "a gloomy and even alarming picture of the inefficiency of the departments in Great Britain responsible for camouflage". Complacency and mutual congratulation will not help to remedy matters in these stirring times.

Biologists do not claim that camouflage is their exclusive province, and they are well aware that a satisfactory solution to problems of visual concealment and deception on a gigantic scale can only be achieved by their co-operation with experts in other fields—architects, structural engineers, chemists, physicists, psychologists. But the fact remains that the most effective camouflage yet devised is that displayed in the coloration of various wild animals; that in this field man has lagged far behind the inventiveness of Nature; and that while the biologist knows how these results have been achieved in Nature and how they could be applied to war purposes, the non-scientific camoufleur frequently does not and to that extent he is groping in the dark.

Prof. Merton remarks that the "fundamental biological principles" upon which visual concealment depends seem to him not difficult to understand. Nor are they: and no doubt there are authorities at the War Office who could understand them. Yet there is little indication at present that those responsible for the camouflage of heavy-calibre guns, and of tanks, transports, and other army vehicles are even making an attempt to do so. Moreover, it appears that they refrain from accepting advice on these matters.