

tant, and merely announcing the results of researches which are too restricted or evidently unfruitful.

These publications must be, as I have said, international in so far as collaboration and content are concerned. The collaboration of neutral countries ought to be desired and sought, and, in the future, even German collaboration might be accepted, if the authors should wish to become acquainted with, and appreciated by, the scientific men of the nations of the Entente as well as of their own group of nations. Thus these publications would have the effect of taking away from Germany that monopoly of science at which it has arrived during fairly recent years with so much success. We would thus show it the value of the scientific contributions of other nations, and this would lower its immoderate and ridiculous pride which has been one of the causes of the present war. This, moreover, would be without taking the least hostile action against German science.

It may perhaps be permitted to the writer of this letter to recall how, before the war, amicable proposals were made to him from Germany—both by contributors and by other authorised representatives of German science—that, in the international scientific review which he has the honour of editing, the supplement which contains French translations of all articles written in German, English, or Italian, and published in the text in those languages, should be replaced by a supplement containing German translations of the English, French, and Italian articles. Evidently this international review seemed to then, conducted as it was, and is, by non-Germans, a kind of menace to their scientific hegemony, which they were trying to consolidate more and more. Thus, they tried to arrange that it should at least have a German air and colour to take away its dangerous look of a standard of revolt against German hegemony.

The hour has come to create and develop as much as possible in the principal branches of science, under the ægis and direction of the Entente, international scientific publications and reviews which should be fitted to destroy finally a monopoly which, if it foments sentiments contrary to the establishment of international relations founded on mutual esteem, constitutes a very grave danger for the progress of science. These suggested periodicals will thus contribute to re-establish on bases of independence and equality that equilibrium of nations which will be the greatest guarantee of a peace that is just, long, and to the benefit both of our present Allies and of our present enemies.

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(Editor of *Scientia*).

#### Stability in Flight.

IN his paper on "Forced Oscillations of a Disturbed Aeroplane" (*Aeronautical Journal*, October-December, 1916), Dr. Brodetsky shows, on theoretical grounds, that among the chief conditions of safety and stability in windy weather are: (1) a small tail, or small ratio of tail/main-plane, and (2) comparatively small wings, or small ratio of total area/load. In a former paper by Prof. Bryan and Dr. Brodetsky (*ibid.*, April-June), the fact that long tails are on the whole disadvantageous is demonstrated. All these conclusions seem to agree well with what we may very easily observe in birds. Those birds the flight of which is what one might call skilful, or agile—that is to say, those which can rapidly dodge and steer, or which do not mind flying in high and shifty winds—are (I should say) all characterised on the whole by small tails and comparatively small and narrow wings. These features are conspicuous in many of our shore birds, sandpipers and the like, and the birds are equally con-

spicuous for their extraordinary stability, whether against wind or in their own sudden and acute changes of course. Seagulls, solan-geese, albatrosses, and swallows share, more or less, in the same structural characteristics. Powerful or long-continued flight is evidently quite a different thing. Thus the pigeon is a splendid flyer for mere distance, and even for speed; but it goes straight ahead, and its large tail and large rounded wings give it only a moderate "stability." In like manner a multitude of little birds, robins and the like, which we are apt to think of as bad or unskilful flyers, turn out to be very good flyers indeed upon their migratory journeys, when all they have to do is to pursue an even course in high and relatively calm regions of the atmosphere, and also (as we may suppose) in carefully selected weather. On the other hand, the really long-tailed birds, such as the magpie and some of the foreign jays, trogons, etc., are all very poor flyers, and are for the most part birds of the sheltered woodlands.

Another case in point is that of the hawks and falcons. The broad-winged hawks, such as the buzzards and the kestrel (the latter with its long tail, which it uses effectively for another purpose), were all despised of the falconer; the kinds with long and narrow wings, like the merlin and the peregrine, were the ones he prized.

I am curious to know what experts think of another matter, namely, the long, outstretched legs of such birds as the stork and heron. One used to be told that these serve as a rudder, making up for the insignificant size of the tail, but this explanation seems far from satisfactory. I imagine the long legs act as a very useful counterpoise to the long neck and bill; that they help to adjust the position, longitudinally, of the centre of gravity (which Borelli says ought to be directly under the articulation of the wings); and further, that the lengthened axis so formed, from beak to outstretched toes, may play the part of a sort of balancing pole, and contribute very materially to the creature's longitudinal stability. In any case, it is certain that these long-legged birds are extraordinarily graceful flyers, remarkable for their perfect balance and quiet, easy motions.

D'ARCY W. THOMPSON.

#### An Explosion Effect.

A RECENT explosion has, like all other similar occurrences been productive of many curious results, but one that I have noted seems worth special mention. There is a row of large houses in an exposed situation, directly facing the centre of explosion, but about three miles from it, and in front of one of these houses is a medium-sized pond. In this row most of the houses have escaped, only two or three broken or cracked windows being noticeable among the lot, with one exception. That exception is the house facing the pond, which, so far as glass is concerned, is wrecked. From appearances it might have been played over with a machine-gun. One house near, and also facing the pond, has only one window damaged, but in this case the sashes are destroyed as well as the glass. It appears that nearly every window situated on a line crossing the pond from the explosion centre has suffered extra violence. I believe similar results have been noted before over water, but this seems a very striking instance. I should, perhaps, add that the glass destroyed was of indifferent crown quality, whereas the other houses appear all to have thin plate-glass; but much crown glass has escaped damage in other positions, where heavy plate has gone to pieces, so I think it clear that the pond, and not the quality of the glass, was the contributory cause.

C. WELBORNE PIPER.