

has come from Spain and Africa instead of from the Atlantic, as in the west. But as the result of observations of temperature in the upper air I have latterly thought that Mr. Harries's suggestion is correct, and that the high temperature is due to a descending current. So far as my recollection goes, the phenomenon occurs when an anticyclone is situated over France or the south-east of England, and not in cyclonic conditions such as have prevailed during the past week.

Whatever the cause may be, the temperatures and pressures of the air from 2000 ft. to 25,000 ft. are most highly correlated; from 10,000 ft. to 20,000 ft. the correlation coefficients between temperatures and pressures at the same height are as high as 0.80 to 0.90, and even at 2000 ft. the temperature is far more dependent upon the pressure at 30,000 ft. than it is upon the direction of the wind. Above 35,000 ft. the correlation is negative. It seems pretty clear that this close connection between temperature and pressure must be due to vertical currents induced by the distribution of pressure; it is too close, and above 30,000 ft. of the wrong sign, to be accounted for by the mere adiabatic compression and expansion without change of height, and it may well be that on some occasions the descending currents reach the surface and produce a high temperature, although in general the temperature at the surface is not much influenced by the pressure.

W. H. DINES.

Benson, January 10.

#### Cyclones.

"J. S. D." in his interesting article in NATURE for January 2 last, makes the following statement:—"Thus the cyclone was looked upon as a warm column of rising air with spirally inflowing winds at its base; the anticyclone, conversely, contained a cold core of descending air. Now we know that the opposite is in reality the truth; the cyclone has a cold core, the anticyclone a warm one." I think it should be pointed out that this pronouncement is only correct for the troposphere, but not for the stratosphere.

Modern methods of sounding the atmosphere have shown that the Arctic and Antarctic cyclones have warm centres in the stratosphere, and Dines (Met. Office Pub., 210b, p. 50) shows that this is true of travelling cyclones also.

Too much importance has been attached to the temperature distribution in the lower portion of the troposphere. Modern discoveries have merely located the hot core of the cyclone in the stratosphere instead of in the troposphere, leaving the temperature theory still the cause of the cyclonic circulation of the wind and the force that lifts up a cool central column of air from the ground.

I think it will be found that the energy of cyclones can be maintained on the temperature theory with a very slight interchange of air between the stratosphere and troposphere in the case of the polar cyclones, and in the case of travelling cyclones by the bodily rising of the air in the central regions during their comparatively brief life.

R. MOUNTFORD DEELEY.

25 Beaconsfield Villas, Brighton, January 4.

MR. R. M. DEELEY is quite right in pointing out that it is only in the troposphere that depressions are relatively cold and anticyclones warm. It is in this region that the striking contrast appears between the old preconceived theory which postulated a warm core and the results of modern observation. The mechanism by which a cyclonic depression is maintained in being

forms one of the great unsolved problems in meteorology. Some years ago the suggestion was put forward by Mr. W. H. Dines that the driving force of the depression was to be looked for in the level at the base of the stratosphere. According to this view, a very slowly descending, and therefore warmed, column of air in the stratosphere is just such an integral part of the whole system as the rising, and therefore cold, column in the troposphere, but neither the one nor the other is to be regarded as the cause of the depression. Mr. Deeley may be right in his view that the warm column in the upper layers is the fundamental cause, but this view is not at present generally accepted.

J. S. D.

#### The Brussels Natural History Museum.

To many of your readers who appreciate the value of the collections in the Brussels Museum, the following extract from a letter written by Dr. Dollo on January 5 will be welcome news:—"Mais je vous avais écrit également une carte postale illustrée, représentant notre Galerie des Vertébrés vivants et fossiles de la Belgique, pour vous dire que tout était bien ici, que notre Musée est intact, qu'il n'y manque absolument rien, et que nous étions saufs!"

A. C. SEWARD.

Downing College Lodge, Cambridge,  
January 12.

#### BORINGS FOR OIL IN THE UNITED KINGDOM.

THERE is no need to labour the importance of liquid fuel in our national economy and existence. The growing needs of our Navy and Air Service, and the difficulties of transport during the war, have driven home the lesson and rendered imperative the demand that we should increase to a maximum the output of liquid fuels in the British Isles. The present production, mainly from the Scotch oil-shales and some of the coal-tar distillates, is very inadequate, and the country has had to depend almost entirely on foreign supplies. Such a state of affairs is obviously deplorable, and if remedies are possible the neglect to apply them would be highly culpable. Two methods of alleviating the situation have been suggested, and both are being tried. The first entails the extensive retorting of British oil-shales and cannels to produce oil by destructive distillation; the second involves the drilling of wells in selected areas in a search for free crude petroleum in commercial quantities. With the first method the present writer is not here concerned; it is the attempt to find oil in the free state which forms the subject of the ensuing remarks.

The generally received opinion, that Nature, so lavish in her gifts of coal and iron to these favoured islands, was unaccountably frugal with petroleum, has not been accepted by all. A small minority has urged, and recently with insistence, that the assumption is based largely on the absence of definite intelligent exploratory drilling—that we are, in fact, in the same position as the United States before the Drake well of 1859, ignorant of the great stores of wealth lying available below the surface.

If this view be sound its importance cannot be