Since this more recent theory, in this way, gives us a conclusive physical reason of one of the most important phenomena coming into consideration in storms, I have allowed myself to designate it as the 'physical' theory."

Let us now consider the hypothesis that the maximum and minimum barometric pressures depend upon descending and ascending currents. Dr. Hann does not seem to confide wholly in the anticyclone hypothesis of areas of high pressure, though he still calls them anticyclones. He therefore devised another hypothesis to account for them—namely, that they result from an increase of pressure by the downward current which he supposes exists in these areas, and so regards them as the cause, at least mostly, and not as the effect of the high pressures. He still adheres to the old hypothesis that the zones of high pressure a little beyond the tropics in both hemispheres are caused by the crowding of the upper poleward currents into intermeridional spaces gradually becoming narrower toward the poles, and so by their being deflected down towards the earth's surface, although these high-pressure zones have long since been satisfactorily accounted for, without any mere hypothesis, upon true mechanical principles. Starting out from this hypothesis, he says that even beyond these zones there must be local obstructions and a damming up of the air in places in the higher latitudes, and a consequent deflecting of the currents down toward the earth's surface (*Zeitsch. für Meteorologie*, B. xiv., p. 39). This seems to be what is meant by the forms of motion, in the quotation above, to which is ascribed mostly the temperature relations in the barometric maximums and minimums. It does not appear, however, how the minimums of pressure can be explained by this hypothesis, for both ascending and descending currents require an increase of pressure at the bottom, where there are no lateral differences of temperature and density.

The preceding hypothesis, unlike many others, can readily be tested by means of the well-known formula showing the relation between pressure and velocity, which is based upon true and undisputed principles of mechanics. If there were a perpendicular wall around the globe on the 35th parallel of latitude, extending up to the top of the atmosphere, so that any poleward motion would have to be entirely stopped, and we suppose the upper half of the atmosphere between it and the equator to have a poleward motion toward this wall of 10 miles per hour, and that the whole is stopped, turned downward, and deflected back on the lower half of the atmosphere, the greatest increase of barometric pressure, according to the formula, which could arise from this, would be less than 0·004 of an inch. But a very small part only of the air in these high-pressure zones is stopped and turned downward, and the rest passes on to higher latitudes, so that the real effect must be very much less than this. But the observed excess of pressure in these zones is about 0·3 of an inch on the average. Hence the hypothesis could not account for the one-seventy-fifth part of it if all the kinetic energy were there converted into pressure; but considering the very small part which is so changed, it scarcely accounts for the one-thousandth part.

With regard to high-pressure areas being caused by descending currents, it would require a downward velocity of more than 170 miles per hour to cause an increase of 1 inch in the barometric pressure. The same effect would be produced by a horizontal current of that velocity if the kinetic energy were all converted into pressure by a total stoppage of the current; but where the velocity is only slightly hindered by a damming up through obstructions, the velocity would have to be many times more. Hence the hypothesis is entirely inadequate to cause even any measurable increase of barometric pressure.

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THE FLORA OF THE REVILLAGIGEDO ISLANDS.

THE somewhat peculiar flora of Lower California, as revealed by comparatively recent American explorations, aroused the curiosity of botanists concerning the probable composition of the vegetation of the Revillagigedo group of islands, situated between 18° and 19° N. lat., off the west coast of Mexico. During the spring of 1889, the United States Fish Commission steamer *Albatross* visited the two principal islands, Socorro and Clarion; and Dr. G. Vasey and Mr. J. N. Rose have just published the results of their investigations of a collection of dried plants made in these islands by Mr. C. H. Townsend, the ornithologist of the expedition. A less interesting flora could hardly be imagined, if this be a fair sample of it; but on this point the report in question affords no information whatever. Considering the distance of the islands from the nearest points of the continent, and the size of the principal island, a flora possessing some peculiarities might have been expected, and possibly the few dried plants brought away by Mr. Townsend by no means represent the flora, either as to quantity or as to quality.

Socorro is described as the largest of the group, about twenty-four miles long by nine broad, with elevations up to 2000 feet; and the position is given as 18° 43′ 14″ latitude and 110° 54′ 13″ longitude, being about 260 miles south of Cape San Lucas, Lower California, and nearly the same distance from the nearest point of the Mexican coast. Clarion, a much smaller island, in nearly the same latitude, lies about 4° to the west.

"The total number of species found on the two islands was twenty-six; eighteen are from Socorro, and twelve from Clarion Island, four of which they have in common." The sentence quoted is preceded by the statement that the flora of these islands is doubtless tropical and similar to that of Mexico; a statement that is a little ambiguous, because, although these islands are situated within the north tropic, the plants collected are mostly characteristic of warm temperate and sub-tropical regions rather than of the tropics. In this apparently poor flora, for there is no mention of the existence of any other plants besides those enumerated, are such widely-dispersed plants as *Portulaca pilosa*, *Waltheria americana*, *Tribulus cistoides*, *Dodonæa viscosa*, *Sophora tomentosa*, *Elytraria tridentata*, and *Lantana involucrata*. Ten of the others are undetermined species of common genera, and may be common species; three are described as new, one of which had been previously collected in Lower California—*Cardiospermum Palmeri*, *Perityle socorroensis*, and *Teucrium townsendii*. The Mexican *Aristolochia brevipes*, and the widely spread tropical American parasite *Phoradendron rubrum*, are also recorded as doubtful identifications, the material being too scanty to admit of certainty. This is all the information one can extract from the report; perhaps a more detailed account of the islands and their natural history may appear in some other publication connected with the expedition.

W. BOTTING HEMSLEY.

ON LOCAL MAGNETIC DISTURBANCE OF THE COMPASS IN NORTH-WEST AUSTRALIA.

AS the subject of how far the compasses of a ship, when near land, are affected by local magnetic disturbance has hitherto been more frequently one of controversy rather than a study of facts, it seems important that full publicity should be given to well-authenticated observations.

In September 1885, on board H.M. surveying-vessel *Meda*, when passing Bezout Island near Cossack, North-West Australia, a steady deflection of her compass of 30° was observed, whilst the ship was running over half a mile