

height, measured respectively 0.065 by 0.051 inch, 0.437 by 0.562 inch, and a spherical one had a diameter of 0.5 inch." Such large hailstones are, I believe, rarely met with in storms near London. This one seems to have been confined to a comparatively small area, the hail falling in its greatest severity at Leyton, and not extending much beyond Walthamstow, Stratford, West Ham, and here.

B. J. HOPKINS.

Forest Gate, E., June 22.

"An Alphabet of Motions."

I HAVE lately found the following extract in Arthur Young's "Travels in France, in 1787," which I fancy is not generally known. It occurs in Betham Edwards's late edition (Bell and Sons), at p. 96.

"In the evening to Mons. Lomond. . . In electricity he has made a remarkable discovery. You write two or three words on a paper; he takes it with him into a room and turns a machine inclosed in a cylindrical case, at the top of which is an electrometer, a small fine pith ball; a wire connects with a similar cylinder and electrometer in a distant apartment; and his wife, by remarking the corresponding motions of the ball, writes down the words they indicate, from which it appears he has formed an alphabet of motions. As the length of the wire makes no difference in the effect, a correspondence might be carried on at any distance."

J. S. DISMORR.

Stewart House, Wrotham Road, Gravesend, June 24.

On a Cycle in Weather Changes.

IT is known that Prof. Brueckner, of Berne, in a work on "Klimaschwankungen," published a short time ago, offers a large amount of evidence for the view that our globe is subject to a weather-cycle of about 35 years, a series of cold and wet years, or warm and dry ones, recurring at about that interval. Has it been noticed in this connection that Bacon, in one of his essays (No. lviii. "Of Vicissitude of Things"), makes reference to such a cycle? The passage is as follows:—"There is a toy which I have heard, and I would not have it given over, but waited upon a little. They say it is observed in the Low Countries (I know not in what part) that every five-and-thirty years the same kind and suit of weathers comes again; as great frosts, great wet, great droughts, warm winters, summers with little heat, and the like, and they call it the *prime*. It is a thing I do the rather mention, because, computing backwards, I have found the same concurrence."

A. B. M.

THE FORECAST OF THE INDIAN MONSOON RAINS.

AFTER an interval of twelve more or less prosperous years, following on the memorable Madras famine of 1876-77, and the drought and fearful mortality of North-Western India in 1877-78, India seems once more to have entered on one of those prolonged series of adverse seasons which put a severe strain on the protective powers of its Government, and, despite all human precaution, bring suffering, disease, and premature death to thousands of its industrious peasants, and to even larger numbers of the impoverished outcasts who form the lowest fringe of its teeming population, fighting the precarious battle of their life at all times on the verge of destitution. The drought in Ganjam in the autumn of 1889 has been followed by the failure of the late autumnal rains over the central districts of the Carnatic towards the close of last year, and the too familiar machinery of relief works for the able-bodied, and doles of food to the helpless indigent, has been in active operation for several months past in the districts around Madras. Another monsoon, another season of those periodical rains on which depends the fate of millions, is now due and overdue, and there comes from India an ominous note of warning that there is reason to fear that more than one great province of the empire, or certain portions of them, may again this year lie parched and barren, their young crops withering and shrivelled under the dry west wind,

while, month after month, men scan with ever-growing anxiety the pale dust-obscured sky and scattered ball-shaped clouds that never mass themselves to rain-clouds, but mock their hopes with the promise of showers that never fall to moisten the sun-baked soil.

And this warning, alas! is no mere guesswork of credulous and speculative minds, such as in these latitudes certain of our would-be weather prophets love to put forth at hazard, to furnish the topic of a day's gossip to the million, or haply to win for themselves a summer day's reputation with the uninstructed, in the event of a successful issue. Certainty, indeed, there is not and cannot be till science shall have extended its domain far beyond its present limits; but, in India, the stately march of the seasons is but little obstructed by the vicissitudes of fugitive cyclones and anticyclones, that originate we know not how, and disappear by some concurrence of causes equally beyond our ken. In the tropics, and in the realm of the monsoons, all weather phenomena are more massive and slower in progress, and each great change of seasons is heralded by signs which, if we can as yet but vaguely interpret them, are at least recognizable as such, and, with a certain allowance for possible error, must be accepted as timely monitors of what is likely to follow. These it is that, whether rightly or wrongly deciphered, furnish the basis for the present warning. To those who, like the present writer, have followed for many months past, not without anxious interest, the telegraphic and other reports periodically transmitted from India, it comes as no surprise, but as a confirmation of misgivings long entertained though only now backed by the warranty of full official evidence. The events of the next three months may yet belie the present indications, and that they may do so is still our fervent hope; but it would be folly to ignore them, and to shut our eyes to the probabilities that they seem to portend.

For the last eight years it has been one of the duties of the Indian Meteorological Department, some time early in June, to prepare, for the information of Government and the public, a forecast of the probable character of the summer monsoon, based on the reports of the snowfall on the Himalaya and the western mountains, and on the indications afforded by the weather of the previous winter and spring. The possibility of framing such a forecast was in a measure foreseen by the Famine Commissioners appointed by the Home Government after the disastrous famines of 1876 and 1877, of which Commission General R. Strachey, the true founder of the Meteorological Department of India, was the scientific member; and it is in no small degree due to the weighty advocacy of this Commission that the Department owes its present extension and importance. Mr. Eliot's forecast for the coming season is now before us. It sets forth at length the general and special grounds on which he bases his conclusions; and these, though duly guarded by the reminder of their essentially empirical character, and of the unavoidable imperfection of our information regarding certain important data, are expressed in terms that leave unhappily no doubt of the adverse character of the outlook.

Attention was first directed to the apparent connection of the Himalayan snowfall with the prevalence of dry land winds in India, in the year 1877, and about the same time the late Prof. S. A. Hill and Mr. Douglas Archibald showed that, as a general rule, an unusual cold weather rainfall in Northern India was followed by a deficient rainfall in the ensuing summer monsoon. In a paper published in the Proceedings of the Royal Society in 1884, these two classes of facts were shown to be merely different phases of the same phenomenon, and a summary was given of all the evidence on the subject that had been accumulated up to that date. Since then, there has been but one year of heavy Himalayan snowfall, viz. 1885,