Now, turning to Mr. Dixon's letter (p. 149), it does not seem to me that he is perfectly candid. He accuses me in his concluding paragraph of an unfair practice by omitting the word "direct," but no such word occurred in his letter on p. 103, to which I was replying; nor is what he now says consistent with the surface meaning and intention of the second paragraph in his former epistle, so far as I can judge. A withdrawal of that hasty and misleading paragraph is what I had expected from him.

In the first paragraph to his recent letter he explains why he considers that the fact that potential energy belongs to a system is hostile to the idea of identity, but his proof does not appear to me valid unless the phrases "belongs to" and "has no local habitation within" are considered identical. If he can show that a given portion of potential energy "has no local habitation within a system," he will undoubtedly be usefully attacking the proposition that it possesses identity, but I do not see that he has even attempted such a proof at present.

OLIVER LODGE.

## Popular Botany.

I VISITED Tyne Dock yesterday, in order to attempt to solve the question put by Mr. A. W. Bennett in your issue of the 1st inst.

The plants which caused the fatality grow in a small hollow close to a newly-opened road. The surviving child is but five years old, and therefore much too young for any evidence of hers to be convincing.

There seems little doubt, however, that the hemlock, *Conium maculatum*, brought about the death of the other two children. Large quantities of this, looking very attractive just now, are growing on the spot, together with smaller quantities of *Heracleum sphondylium*, *Anthriscus sylvestris*, and a very few plants of *Bunium flexuosum* at the margin of the hollow. No other umbelliferous plant is growing near. Yesterday, troops of children were gathering the young and pretty leaves of the hemlock, and making them up into bouquets with grasses and flowers.

The children, who died from the effects of eating the plant were aged respectively four and five years, and probably, in common with thousands of others in the district, would not recognise cabbage if they saw it growing, which very likely they never did. I have met many very much older children here who are as ignorant of common garden and field plants.

Gateshead-on-Tyne, June 12. JOHN BIDGOOD.

## The Big and Little Monsoons of Ceylon.

IT is well known to all Anglo-Indians, even the least scientific, that the summer monsoon is ushered in by two periods of rain-burst, called respectively the chota and burra barsât. The former occurs sometimes in April or May, and the latter in June or July, the precise dates varying not only with the locality but with the year. The chota barsât only lasts a few days, and is looked upon as the advance guard of the burra barsât, or great rains.

The conditions which tend to produce the chota barsât have not, so far as I am aware, been studied in detail, but are probably similar in character though on a smaller scale, and more local than those which regulate the inception of the burst of the monsoon, as it is popularly termed. It can be readily understood that as soon as the solar rays are sufficiently powerful to heat up a portion of the land area, and by lowering the pressure to determine an inrush of surrounding marine air, condensation and precipitation will occur much in the same way as in the burra barsât when the air over the whole peninsula has become heated, and the saturated air from the equatorial Indian Ocean rushes in in a large and continuous stream towards the low pressure area thus formed. In the former case the conditions are not only more local and ephemeral owing to the small amount of vapour formed over a comparatively cool sea, but are mixed up with the residue of the cold weather disturbances, which are due to anti-monsoon conditions.

Mr. Blanford, in his admirable monograph on the rainfall of India, has compared the direct solar action which sets the monsoon in action to the pull of the trigger, by which the intrinsic latent energy of the resulting air-stream is shot forth. In the case of the chota barsât the comparison holds equally good only the resulting charge is feebler.

Now it has been recently maintained that while the distribution of temperature anomalies in the Indian peninsula regulates the inception of the little monsoon and its accompanying chota barsât, it is only when the central Asian plateaux become warmed up so as to produce an inflow beyond the Himalayan barrier, which must consequently affect the upper as well as the lower atmospheric strata, that any general deep movement of the equatorial vapour-laden air occurs on a scale sufficient to produce general monsoon rains. That in fact there are two movements, one in the lower air, and the other in the air above the first 5000 or 6000 feet, and that it is only when the two occur coincidently that we get the grander phenomena which accompany the burst of the big monsoon, as they term it in Ceylon. Some such theory appears necessary to account, not merely for the peculiar suddenness of the burst, but also for its variable date of arrival in different years. Until, however, we know more of the meteorological conditions of Central Asia and Thibet, this hypothesis must remain in a tentative state. Meanwhile, however, it is undoubtedly valuable to find that these two periods of rain-burst are not only distinct enough to be referred to under separate names over a large part of India, but in Ceylon are considered so important as to have their dates separately recorded by the Marine Master attendant at Colombo. In the excellent Ceylon *Mercantile and Planting Directory*, edited by the late Mr. A. M. Ferguson, and now carried on by his successor, Mr. J. Ferguson, a list is given of the dates of commencement of the little and big monsoons, from 1853 down o 1892 inclusive.

As a general result it is found that the average dates for the little and big monsoons are April 20 and May 19, and that when nothing particularly abnormal occurs, the big monsoon may be expected to follow the little one in about a month.

There are, however, considerable variations from this normal, the little monsoon date ranging through 52 days, and the big monsoon from May 1 to June 19.

On looking over these variations it struck me that they would probably be found to correspond to some extent with the rainfall of adjacent localities in India, especially the Carnatic. The result of a comparison of the anomalies is shown below—

| | CEYLON.[1] Date of arrival of the big monsoon, before or after its average date, May 20. + Before − after days. | CARNATIC.[2] Mean rainfall anomaly in inches (40 stations). Inches. |
|---|---|---|
| 1864 | + 5 | − 5 |
| 1865 | −11 | − 5 |
| 1866 | − 2 | − 4 |
| 1867 | −30 | − 9·4 |
| 1868 | −14 | − 4·6 |
| 1869 | −28 | − 0·3 |
| 1870 | + 9 | + 1·8 |
| 1871 | + 7 | + 5·5 |
| 1872 | +18 | +11·5 |
| 1873 | − 4 | − 0·1 |
| 1874 | +15 | + 7·3 |
| 1875 | − 8 | − 5·2 |
| 1876 | −17 | −13·2 |
| 1877 | + 4 | + 8·3 |
| 1878 | + 1 | 0 |
| 1879 | 0 | + 2·3 |
| 1880 | + 5 | + 7·0 |
| 1881 | − 9 | − 2·1 |
| 1882 | 0 | + 4·4 |
| 1883 | +10 | + 5·2 |
| 1884 | + 5 | +11·6 |
| 1885 | −16 | − 1·1 |

A mere glance at these figures shows at once a remarkable parallelism both in signs and numbers. Thus in eighteen years the signs are alike, neutral in three, and unlike only once. As it is well known that the rainfall of the Carnatic was found by Mr. Blanford to vary in a cycle of eleven years, closely corresponding with that of the sunspots,[3] the same ought to hold for the anomalies in the dates of arrival of the big monsoon at Colombo. As a matter of fact the relation appears to be still

[1] From the Ceylon Directory, 1892.

[2] From the Rainfall of India, Part II., Indian Meteorologieal Memoirs, 1887.

[3] Mr. Blanford computed the probability of such a cycle as compared to an invariable average to be as 655 : 1. Indian Meteorological Memoirs, vol. iii. part 2, p. 244.