ball were observed with some care it seems desirable to put the case on record.

The two ladies were sitting at table about 8 p.m., with the window open. It was raining heavily at the time, and there was no wind. Stormy clouds were about, but it was not unusually hot. Thunder and lightning at the same time were afterwards reported from London—a distance of, say, 50 miles—but there was no thunderstorm at Eastbourne. There had been no rain during the few preceding days. As one of the ladies took up a knife to cut bread the ball of light was seen to flash past the knife (without touching it) on to the table, travelling a distance of about 9 in. at an average height of about 3 in. from the table, but moving towards the latter.

When the ball touched the tablecloth it "went out with a spitting sound," leaving no mark or trace of any sort. Until it touched the cloth there was no sound, and the whole thing was over in such a "flash of time" that it was impossible to say how fast the ball travelled. There seems to have been an impression that the ball came from the direction of the open window, but it was only under dependable observation during its 9-in. path from the bread-knife to the tablecloth.

As to the appearance of the ball itself, it was "about the size of a pea, the light encircling it being about the size of a golf ball. The light was white and intensely bright, like electricity." "Too dazzling to see through."

A. P. CHATTOCK.

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Where did Terrestrial Life Begin?

FOR a long time now the idea has prevailed that life began in the sea or in the mud of the seashore, and many interesting articles have been written to describe the emigration of sea-creatures and water-creatures to the land, but there are some difficulties in the way of this theory which do not seem to have been noticed, and on broad general grounds it is, perhaps, more probable that life began on mountain-tops.

Life became possible on the earth only after it had cooled to a certain point, and surely that point was reached much sooner on hilltops than in the sea or on the seashore. It must be remembered that the sea when first formed would have a temperature of more than 100° C., since the condensation of volcanic steam must have taken place under a massive atmosphere of carbon dioxide. This heavy atmosphere would not only raise the boiling point of the sea, but would greatly retard its cooling, which would in any case be a very slow process, since the sea-bed would be hot and the sea deep, and a bad conductor. Would not the mountain-tops have become cool and habitable centuries before the temperature of the sea fell to 111° F. and became a fit abode of life? Further, it is almost certain that the first life was green chlorophyll-carrying cells which would require sunlight, and sunlight would pierce the heavy and cloudy atmosphere of steam and carbon dioxide, and would reach the hill-tops long before it reached sea-level.

For these reasons it seems that life is more likely to have made its first appearance on the mountain-top of the Polar regions than in sea-mud or sea-water.

RONALD CAMPBELL MACFIE.

DR. MACFIE'S suggestion that life originated on the mountain summits is new, and entitled to careful consideration. If the early earth, when its atmosphere was laden with carbon dioxide and steam, had been windless, then the mountain summits would have stood like islands above a sea of hot mist, and they would have been the only situations possible for the development of life; but as any wind would have at times submerged the mountain summits beneath the lower atmosphere, they would have been subject to violent fluctuations in temperature and moisture which would have been unfavourable to primitive life. It may be doubted whether life could have appeared on the earth until later, when the temperature and the atmosphere were more similar to those which have existed throughout all the time of which there are contemporary geological records as to climate and geographical conditions.

In the discussion on this question in a chapter of "The Making of the Earth" I laid stress on an equable environment as an essential condition for the development of Protobion, the most primitive form of life. If that view be sound, then life was not likely to have developed until a considerably later stage on the earth than that at which the conditions stated by Dr. Macfie would have held. His letter involves the issue whether the first life was semi-aquatic or terrestrial. On his assumption that it is "almost certain" that the first life consisted of cells containing chlorophyll it would certainly have begun on land. But such an organism would be more complex, and, therefore, probably later in development than some simple form of amœboid or mycetozoon, to which strong sunlight would have been less beneficial, and for which the unchanging environment on the muddy shores of a primeval lagoon would appear to be a more suitable medium than a mountain summit.

J. W. GREGORY.

Rainfall and Drainage at Rothamsted in 1921.

IN view of warnings that are being issued by various water companies that waste of water should be avoided, the rain and drainage figures of the Rothamsted Experimental Station for 1921 are of considerable interest and significance. The drainage gauges were built in Barnfield in 1870 by Lawes and Gilbert, and contain undisturbed soil which is kept bare; each gauge measures 1/1000 acre. The soil is a rather heavy loam with a reddish subsoil over chalk.

	Rainfall	Percolation.		
	1/1000 acre gauge. Inches.	Through 20 inches of soil. Inches.	Through 40 inches of soil. Inches.	Through 60 inches of soil. Inches.
For year 1921	16·093	5·766	5·984	5·479
Average for 50 years ...	28·692	14·834	15·482	14·659

The significance of these figures is that not merely is the rainfall and drainage the lowest since the records started, but that whereas in a normal year about 50 per cent. of the rainfall evaporates, during the past twelve months as much as 63 to 65 per cent. evaporated. This is partly accounted for by the excess of sunshine, which at this station amounted to 159 hours above the average, or about 26 minutes a day.

The number of days on which rain fell (0·01 in. or more) during the past twelve months is 119; this compares with an average for sixty-eight years of 174.

It is interesting to recall the fact that the year 1902, which hitherto gave the lowest percolation figures, was followed by the wettest year on our records, when the heavy rain-showers gave a drainage of 24 in.

W. D. CHRISTMAS.

Rothamsted Experimental Station, Harpenden, January 16.