

knows of the two places. Does the sort of coal make a difference, or the length of time it is kept before consumption? Or is much of the London dirt dust from other sources than coal fires, dispersed more widely than in the damper Manchester atmosphere?

A. E. BOYCOTT.

Medical School, University College Hospital,
London, W.C., August 28.

PROF. BOYCOTT'S statement is rather surprising; but I cannot think that the explanation is to be found in the larger amount of domestic smoke in Manchester. One would rather expect the reverse, and I can only suppose that the difference between Manchester and London dirt is due to the larger amount of dust not arising from smoke, as Prof. Boycott suggests. Any difference in the quality of coal used in Manchester and London would scarcely have the effect he describes.

The point is an interesting one and I think could be settled by microscopic examination of specimens from the two towns. Soot is easily identified in this way.

J. B. COHEN.

Thwaite Cottage, Coniston Lake, Lancashire,
September 1, 1922.

Waterspouts.

WATERSPOUTS on Lake Victoria are very commonly seen from Entebbe, but at a long distance away, and though I have worked on the lake shores for nearly four years it was only two days ago that I first saw one near enough to be of real interest.

I was in camp on the north end of Bugalla, the largest island of the Sese Archipelago. The camp lay about 300 yards from the shore of a small bay. At daybreak on June 30 there were very lowering black clouds and every indication of an immediate heavy storm. While looking out from the tent I suddenly saw that a waterspout was travelling obliquely towards us, and as it eventually came to within about 100 yards of the shore a very good view was obtained for about five minutes before it came to an end.

The pedicle arose from a well-marked circular area on the water, which was otherwise only faintly rippled by the preliminary puff of wind before the approaching storm.

This circular area was evidently very violently disturbed as a cloud of vapour, greatly agitated, rose from it for a little distance.

The pedicle was extremely narrow at its lower end, and not quite straight, being sinuous in outline. It broadened out gradually into a column which went up into the low cloud; the core of this column was much less dense than the periphery, and the violent upward spiral ascent of the water could be clearly seen.

So far I have described nothing unusual, but the following was quite new to me and seemed of great interest.

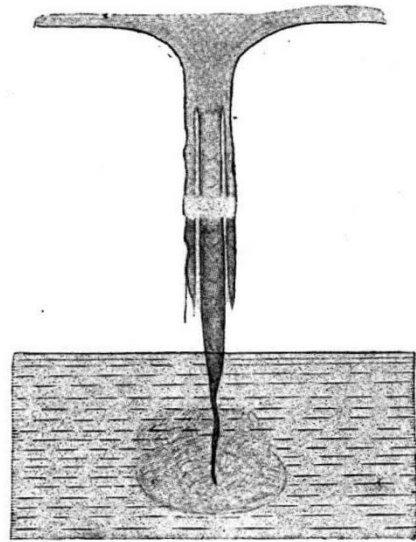
Surrounding the central core, but separated from it by a clear narrow space, was a sheath, the lower end of which faded away some distance above the water. The profile of this sheath was undulating, it being thicker in some places than others. A curious point is that this sheath *seemed* to pulsate rhythmically, but I could not say whether the appearance of pulsation might not have been an illusion caused by waves travelling up its outer surface.

This pulsation gave an uncanny suggestion of a live thing, which was aided by the violent spiral movement upwards in the central core, the clouds of vapour boiling round its base, and the movement of

the whole across the water—indeed, we watched it spellbound until the pedicle dissolved away at the bottom, and the ascent of the part above brought the phenomenon to an end.

My wife watched with me, and is in entire agreement about the curious appearance of pulsation of the outer sheath.

Fig. 1 is a reproduction of a pencil drawing which



may give some idea of what we saw. I cannot estimate the height to which the column rose. Its cessation was followed by violent rain and thunder.

G. D. HALE CARPENTER
Uganda Medical Service

Entebbe, Uganda, July 1.

DR. HALE CARPENTER'S letter brings out one feature which has never, to my knowledge, been noted in a waterspout, namely, the sheath, separated from the main body of the whirl by a clear space. Wegener, in his book on "Wind- und Wasser-hosen in Europa," gives illustrations of a large number of waterspouts, but in no case is there mention of two trunks one within the other. The nearest approach to the phenomenon noted by Dr. Hale Carpenter is the not infrequent occurrence of waterspouts which show two clearly defined parts, an upper thick column with a lower whirl of much smaller thickness.

The accepted explanation of waterspouts is that they consist of whirls in rapid rotation with a discontinuity at the outer boundary. The rotation produces a rapid lowering of pressure within the whirl, and consequently a lowering of temperature, which may easily be sufficient to bring the air in the whirl down below its dew point. This is sufficient to explain the main features of the typical waterspout. The amount by which the temperature is lowered decreases outward from the "axis" of the whirl, while the difference between the air-temperature and dew point normally increases downward from the cloud level. The thickness of the visible column or zone of condensation therefore diminishes downward, giving the form of an inverted cone of irregular shape. Near the water the air is again near saturation, and the difference between air temperature and dew point is small, so that the base of the whirl is