As the whole of this denudation, which otherwise would go unnoticed and unmeasured, must have taken place since last spring-tide, we see what an enormous mass of sand has been moved since that time. The greater part of this no doubt does not get beyond the reach of the tide, and is blown on to the higher parts of the shore, to be perhaps again washed into the sea. Moisture is essential to the production of these little ridges—shall I call them "Eolites"?—and it is instructive to observe on the extreme upper and *dry* part of the shore that the effect of the wind is to cause ripple marks at *right angles* to its direction, and almost undistinguishable from true water ripple marks. I estimate that the denudation has been fully $\frac{1}{4}$ of an inch or 33 cubic yards per acre in about a week, or say 2000 tons along our two miles of shore. It would be interesting to know if any geologist has ever unearthed a fossil answering this description.

[See a letter from Mr. Joseph Duff in GEOL. MAG. 1865, Vol. II. p. 136, on Carboniferous Sandstone with surface-markings (Plate IV.), also one from the late Alexander Bryson, Esq., F.R.S.E., on Surface-markings on Sandstone (with a Woodcut), *op. cit.* p. 189. The wave-like and rippled arrangement of the surface of the sand in the Sahara caused by the prevalent N.E. winds has frequently been alluded to by travellers. See Élisée Reclus "The Earth," Section I. English edition, edited by H. Woodward, F.R.S., 1871, p. 93.—EDIT. GEOL. MAG.]

V.—NOTES ON SOME SARSDEN STONES.

By Prof. T. RUPERT JONES F.R.S., F.G.S.

I. *Concretionary with Calcareous Cement.*—Last autumn the Rev. John Adams, of Stockcross, kindly took me to see the interesting specimen of Sarsden Stone *in situ* at Langley Park, north of Newbury, Berks, which he described in the "Transact. Newbury District Field Club," vol. i. 1871, p. 107, and in the GEOL. MAG. Vol. X. p. 200; and which has also been described by Mr. W. Whitaker in the "Memoirs Geol. Survey," vol. iv. p. 193. This concretionary Sarsden Stone, belonging to the "Woolwich and Reading" series, consists of quartz grains with a *Calcareous* cement. This is an unusual circumstance for "Sarsden Stone"; and points to the former presence of Shells, perhaps, or of calciferous waters, in that portion of the Lower Eocene series. A somewhat similar quartzose sandstone, but with smaller and more uniform globules held together by carbonate of lime, occurs in the Hastings Sandstone at the East Cliff, Hastings; and another in the Triassic series of Brunswick. In the concretionary sandstone from Langley Park, the lines of stratification are clearly apparent here and there on the weathered sides of the globular, botryoidal, and mammillary masses. These do not show a distinct radiate structure, such as is more or less visible in those from Hastings and Brunswick; and these, again, are of course less radiate within than the far more purely calcareous concretions of the Magnesian Limestone of Durham.

II. *Root-marked.*—In a piece of the usual hard siliceous quartzose

Sarsden Stone, of the "Bagshot" series, from the gravel near Frimley, Surrey, I find remarkably clear indications of vertical rootlets,—that is, numerous, irregularly tubular cavities, sometimes furcate, more or less occupied by ochreous matter, which breaks with a kind of thready structure, and leaves linear impressions, like those of woody fibres. Seven of these root-marks, passing through a slab more than an inch thick, are exposed in a fracture six inches long; and the upper and lower surfaces of the slab are irregularly pitted by having been weathered and worn at and around the exposed ends of the tubes. These are more open and trumpet-shaped on one surface than on the other, towards which latter is directed the occasional branching of the rootlets.

Similar vertical root-marks are found, as is well known, in other sandstones; notably in those of the Estuarine series in the Lower Oolite of Yorkshire; and in those of the coal-bearing sandstone of Höganäs and Helsingborg in South Sweden. Such rootlets, in a carbonized state, are seen in the clay-seams underlying the lignites of the "Bracklesham" Series[1] in Alum Bay, Isle of Wight. Vertical root-marks, but usually very long and thin, are also seen in the Hastings Sandstone. (Geologist, vol. v. 1862, p. 136, fig. 9.)

The definite disclosure of the vertical tubular Root-marks on the Sarsden Stone above mentioned tends to explain the cause of some of the varied pittings seen on many weathered blocks of this stone; and I find that, on fracture, some at least of such weathered pittings are succeeded downwards in the stone by obscure, discoloured, vertical lines, which are probably due to the imperfect mineralization of the contents of original root-holes.

It would be interesting to know with what marine or estuarine plants, *Zostera*, *Potamogeton*, etc., such vertical root-marks in these old sandstones and clays originated.

VI.—A Chapter in the History of Meteorites.

By Walter Flight, D.Sc., F.G.S.,
Of the Department of Mineralogy, British Museum.

(*Continued from page* 560.)

1866, June 9th.—Knyahinya, near Nagy-Berezna, Unghvár, Hungary.[2]

Shortly after this remarkable shower of meteorites had taken place two very full reports on the occurrence were drawn up by von Haidinger. It is computed that over a very limited area more than a thousand stones, weighing in all from 8 to 10 cwt., must have fallen. The largest found is now preserved in the Vienna Collec-

[1] The root-marked Sarsden Stone came probably from the Upper Bagshot Sand: a rather higher stage than that of the white clays here alluded to.

[2] A. Kenngott. *Sitzber. Ak. Wiss. Wien*, 1869, lix. 873. *Phil. Mag.*, 1869, xxxvii. 424.—J. V. Schiaparelli. Entwurf einer astronomischen Theorie der Sternschnuppen. 1871. Stettin: Nahmer. Page 267.—E. H. von Baumhauer. *Archives Néerlandaises*, 1872, vii. 146.—See also W. von Haidinger. *Sitzber. Ak. Wiss. Wien*, liv. 200 and 513.—G. Rose. *Monatsber. Ak. Wiss. Berlin*, lxvii. 203.