"KAMES AND DENUDATION."

SIR,—In last month's GEOLOGICAL MAGAZINE (which it happened I did not read until to-day) there is a descriptive paper on Kames and Eskers in Norfolk and Cumberland by Mr. T. V. Holmes, in which he describes certain conclusions regarding subaerial denudation arrived at in my paper on the kames in this neighbourhood, published in the GEOLOGICAL MAGAZINE six years ago, as "an instructive example of what invincible determination on behalf of a favourite agency can effect where zeal is untempered by discretion."

Leaving aside for the present the general question of the origin of kames, permit me to point out certain facts which prove that accumulations of sand and gravel do not enjoy that immunity from the action of atmospheric erosion which the theories of some geologists seem to demand.

In describing the Newport Kames I grouped along with them (for reasons which it is unnecessary to enter into now) what is known as the 100-feet terrace. Whatever view Scotch geologists may take of the origin of kames, they are at one as to the terrace having been laid down in the depths of the sea, indeed extending for miles over all the low-lying grounds of the North-east of Fife, perfectly flat and even-bedded it stands patently and undeniably a raised sea-bottom. but it is no longer the continuous plain it must have been when first elevated above sea-level. In the neighbourhood of the lofty kames and in many other parts it has been eroded into mounds, cones, and ridges quite undistinguishable in form from the kames and even the broad flat remains of it, which form its most striking characteristics, when examined closely, are seen to be worn into considerable hollows by the action of the rainfall.

Now when this comparatively recent accumulation of sand and gravel is so worn by atmospheric denudation, it seems to me impossible to conceive that similar formations situated nearly 800 feet above the sea-level, which Mr. Holmes says can be seen in Cumberland, can have remained practically unaffected by its ceaseless action throughout the much longer period which must have elapsed since Cumberland was submerged to 800 feet.

Yet Mr. Holmes seems not only to deny, but to ridicule the idea that rain and rivers must have played the most important part in giving their present shape to such loose aggregations.

This may not be "zeal untempered by discretion," to quote Mr. Holmes's elegant phrase; but it seems to me to be a striking example of the *un*scientific use of the imagination. JAS. DURHAM.

NEWPORT, FIFE, *4th, November*, 1883.

OBITUARY.

REV. PROFESSOR DR. OSWALD HEER, OF ZURICH.[1]

IN Dr. Oswald Heer, who died on the 27th of September, at the age of 75 years, we have lost the greatest of Fossil Botanists, and

[1] A brief notice of Dr. Heer appeared in our November Number, p. 528.—EDIT.

one whose place it will be hard to fill. He possessed a power almost of divination which led him from the first sight of fragments of a leaf to assign genus and species to it, and his determination in hundreds of cases was confirmed by the subsequent discovery of flowers and fruit. We may say that our knowledge of the Arctic Secondary and Tertiary Floras is entirely due to Heer's labours, and Heer's leaf-determinations.

He was born near a celebrated fossil locality in the Canton Glarus, well known for the remarkable Fossil Fishes which are met with in its Eocene slate-quarries. His father, a Lutheran pastor, who had been a schoolmaster, tried to keep the boy at Latin and Greek; but he spent all his spare time in collecting all the insects and plants within his reach. He bribed his schoolfellows to add to his collections, by giving them singing lessons on Sundays. He was once lent a book on Natural History, the whole of which he copied out!

From the splendid collections made by young Heer in these and later years in the Miocene Tertiary deposits of Oeningen, near Lake Constance, and sent chiefly to his father's friend, Prof. van Breda at Harlem, in Holland, he maintained himself and paid his University fees.

In 1828 he entered the University of Halle, where he was to study theology; but he associated mainly with naturalists, among whom were Junghuhn, also Burmeister of Buenos Ayres, the last of whom alone survives him. When he left the University in 1832, he was ordained, and he had to choose between accepting the post of pastor at Schwanclen and that of Curator of the Entomological Collection of Escher and Zollikofer in Zürich. He chose the latter, and at Zürich he worked for half a century. He speedily became connected with the University, and was Professor of Botany to the well-known "Polytechnicum" from its first establishment in 1855. Here his lectures were delivered regularly, and were not even suspended when he was confined to his bed. Some idea of his marvellous energy can be formed from the fact that the Royal Society's Catalogue assigns 95 titles of separate papers to him up to 1874. His first papers were on Entomology, and his first great work was "On the Fossil Insects of Oeningen and of Radoboj in Croatia." He soon however took to Palæophytology, and his name will best be known by his books on this subject, namely:—

1. "Flora Tertiaria Helvetiæ" (1855—59), 8 vols. and 156 plates.
2. "Die Urwelt der Schweiz," 1865, and Second Edition, 1879. French Translation by Gaudin 1857. "Primæval World of Switzerland" (English translation), 1876.
3. "Flora Fossilis Arctica," 1868—83, 7 vols. and 398 plates.
4. "Flora Fossilis Helvetica," 1876, 1 vol. 70 plates.

When we consider that for the greater part of the last ten years Heer worked in his bed or on his sofa, the list we have given of his publications seems simply marvellous. He leaves to all his friends the memory of one of the most instructive of companions and the most genial of men.—R.H.S.