Remarks on the distribution of Minerals in North Devon.—By Townshend M. Hall, F.G.S., &c.

THE district to which the following notes refer is contained in sheets 26 and 27 of the one inch Ordnance Survey Maps, and embraces an area of about 985 square miles, the northern boundary being formed by the Bristol channel, and that on the south by a line drawn through the town of Okehampton. The rocks composing this district belong to the Devonian and Carboniferous systems, with the exception of a small portion of new red sandstone and a patch of Greensand, occupying a few acres. The two older systems present a regular sequence of beds from north to south, which, interrupted by the granite of Dartmoor, are represented to a greater or less extent by a similar series in the southern portion of the county.

In the Greensand at Orleigh Court, near Bideford, manganese and iron oxides are found together with flint and chert. In the carboniferous series a line of intermittent beds of Anthracite runs from Barnstaple Bay to Umberleigh Station, a distance of 13 miles. These beds vary in thickness from 6 inches to 14 feet. Small strings of iron ore, occasionally mixed with oxide of manganese, are also rarely met with. The quarries of Venn and Swimbridge, in the Mountain Limestone, afford minute crystals of calcite; whilst, in a band of indurated shale near South Molton, Wavellite was first discovered, about the year 1785.

The upper Devonian, in North Devon, admits of the three following subdivisions:—

1. Pilton Slates.
2. *Cucullæa* Sandstone.
3. Pickwell Down Sandstone.

The Pilton Slates, which are very fossiliferous, contain copper ores in several localities, with galena and blende; but in the cucullæa sandstone, which is also fossiliferous, none of these ores have been found. The Pickwell Down sandstones are a series of red rocks, entirely destitute of organic remains; veins of hematite with oxides

of manganese are abundant, and have been worked in several localites. The northern boundary of this metalliferous deposit is formed by a narrow band of porphyritic felstone, which runs along the division between the upper and middle Devonian groups.

The middle Devonian, like the upper, consists of three subdivisions.

1. Morthoe Slates.
2. Ilfracombe slates and limestones.
3. Martinhoe or Hangman beds.

The Morthoe slates are unfossiliferous ; they are characterized by the abundance of quartz veins, which intersect the slates in every possible direction ; but I know of no instance of the occurrence of metallic veins. In the Ilfracombe beds argentiferous galena has been worked at Combmartin since the year 1294, and is associated with the ores of copper, small quantities of blende, and antimony. In the limestone bands Aragonite is not uncommon. The Martinhoe or Hangman grits contain beds of iron ore, in a line parallel to the strike of the rock.

The Lower Devonian is divided into (1) the Lynton bed, and (2) the Foreland Sandstones and grits. The first of these is fossiliferous, with a general absence of minerals ; in the Foreland beds, which are the lowest known members of the series, iron again appears.

Conclusions.

From the carboniferous district no general deductions can be drawn, since it is so deficient in mineral wealth ; but the Devonian beds ranging between Lynton and Barnstaple present several points of interest, which may thus be summed up.

Each of the eight beds, which have already been specified, have a distinct mineral character.

The greatest amount of resemblance is to be found in the Foreland, Martinhoe, and Pickwell Down series, as they are all characterized by the presence of iron, and the absence of organic remains.

The Ilfracombe and Pilton groups resemble each other in being fossiliferous, and in yielding lead, copper, and zinc. They each also contain calcareous bands.

From the Lynton, Morthoe, and *Cucullœa* beds no conclusions can be drawn, as they have no analogy either with each other, or with any of the other groups.

DISCUSSION.

Mr. J. H. Collins remarked that it was interesting to find the productiveness of the mineral lodes confined to certain beds in North Devon, as in Cornwall. In the neighbourhood of Truro, Mr. T. Clark had shewn that the productive portions of the lead lodes of West Chiverton and other mines were confined to certain beds of moderately hard killas.

Prof. Harkness said that he regarded the Pilton beds as the base of the carboniferous series and not Devonian at all. He thought they were the equivalents of the carboniferous slates of Ireland, in which the Irish wavellite occurred.

M. Moissenet thought the productive deposits occurred in certain beds rather than others, simply because those beds were more favourable for the production of open fissures, owing to peculiarities of mineral character.

Query.—Can any member give information respecting the minerals and ores, and their mode of occurrence in the Lötchenthal, which runs N from the Valais, Switzerland?

M. H.