TRANSACTIONS

OF THE

GEOLOGICAL SOCIETY OF GLASGOW.

SESSION 1865-66.

XLV. *On the Occurrence of* Fossil Trees *imbedded in* Trappean Ash *in* Arran. By Mr. Edward A. Wünsch, Vice-President.

(Read November 9th, 1865.)

Abstract.

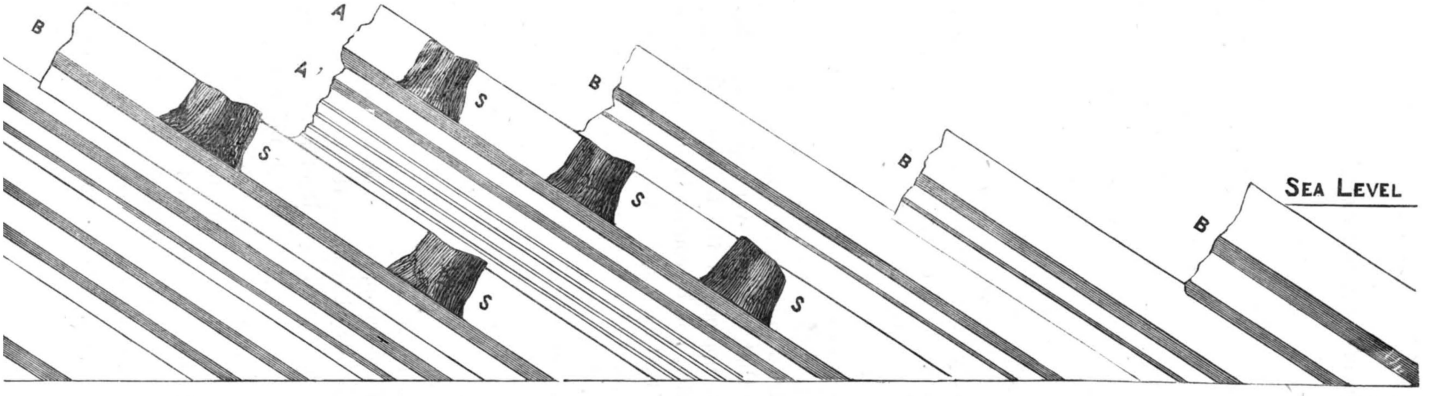
The Island of Arran must ever remain classical ground to geologists of all schools, and I am happy to be able to call the attention of students to a new feature in its already numerous attractions, by the discovery of many fossil trees on one of its most romantic stretches of sea-shore.

These fossils occur near the base of the Carboniferous series on the north-eastern shores of Arran, and the beds containing them have hitherto been classified by all geological authorities as trap dykes, or eruptive sheets of trap rock; only the facilities for investigation afforded by a long summer's residence in the neighbourhood, have enabled me to discover their true character. The portion of these beds which I have as yet been able accurately to survey, extends only to about 400 feet along the shore, and in this limited space are comprised no fewer than eleven distinct beds of trappean ash, with numerous sub-divisions of alternate layers of coal, shale, and ash; beds of the same character also extend in both directions along the shore, to probably a thousand feet in thickness. The strata are exposed from a few feet above high-water mark, down to low-water mark (and extend, doubtless,

to some distance under it), at an angle of about thirty-seven degrees, with the stems of trees imbedded in them at right angles —proving that the stems have retained the original position in which they once grew on a level plain, and that they have been since upheaved on the flanks of the granitic nucleus of the island. As many as twelve to fourteen trunks of trees have been observed on two or three different horizons, and within a very circumscribed area. The height of the trunks is limited by the thickness—about three feet—of the enveloping bed of ash, in which they seem to have been buried suddenly. At the same time, numerous branches must have been broken off, and covered up by the ash around the stems of the trees. These are all beautifully mineralised, and their structure, both internal and external, preserved in a remarkable manner. The large stems seem to consist of *Sigillaria*, with five or six internal piths clearly marked, showing the endogenous structure of the trees. The smaller branches have been identified as belonging to *Sigillaria*, *Halonia*, and *Lepidodendron*, with the exception of one of a new species, as yet undescribed. The structure of the plants points to their having grown in a marsh or estuary, at or below the sea level, and the layers of ashes in which they are buried, must have been showered forth by some neighbouring volcano, either subærial or submarine. The frequent repetition and alternation of these beds indicates a long-continued period of volcanic action, with intervals of repose, during which vegetation flourished, and vegetable matter accumulated—forming thin seams of coal, which had in turn been covered up by fresh showers of ashes, and to which again succeeded a fresh growth of vegetation. At the same time, the land must have been slowly subsiding, as is evidenced by the sedimentary character of the stratified layers of ash overlying each other. The specimens obtained from these beds on such a large scale, and in a perfect state of preservation, will enable the fossil botanist to throw further light on the structure of the plants of the Carboniferous beds, and will afford room for much careful microscopical investigation. Mr. E. W. Binney, F.G.S., of Manchester, who has devoted a lifetime to the study of fossil botany, has kindly undertaken this branch of the subject, and the Society may expect to be favoured with an interesting paper from him in due time.

The annexed diagrams show the alternations of strata and the position in which the trees occur.

Diagram showing Fossil Stems of Trees imbedded in Trappean Ash in Arran.



S—Fossil Stems imbedded in Trappean Ash, with Roots extending downwards into Shale.
A—Indurated Ash Bed, 3 feet thick, enveloping the Stems S.
A'—Thin Seams of Coal, Shale, and Ash, in alternate layers; total thickness, 4 feet.
B—Beds similar to A and A', with and without Fossil Stems.