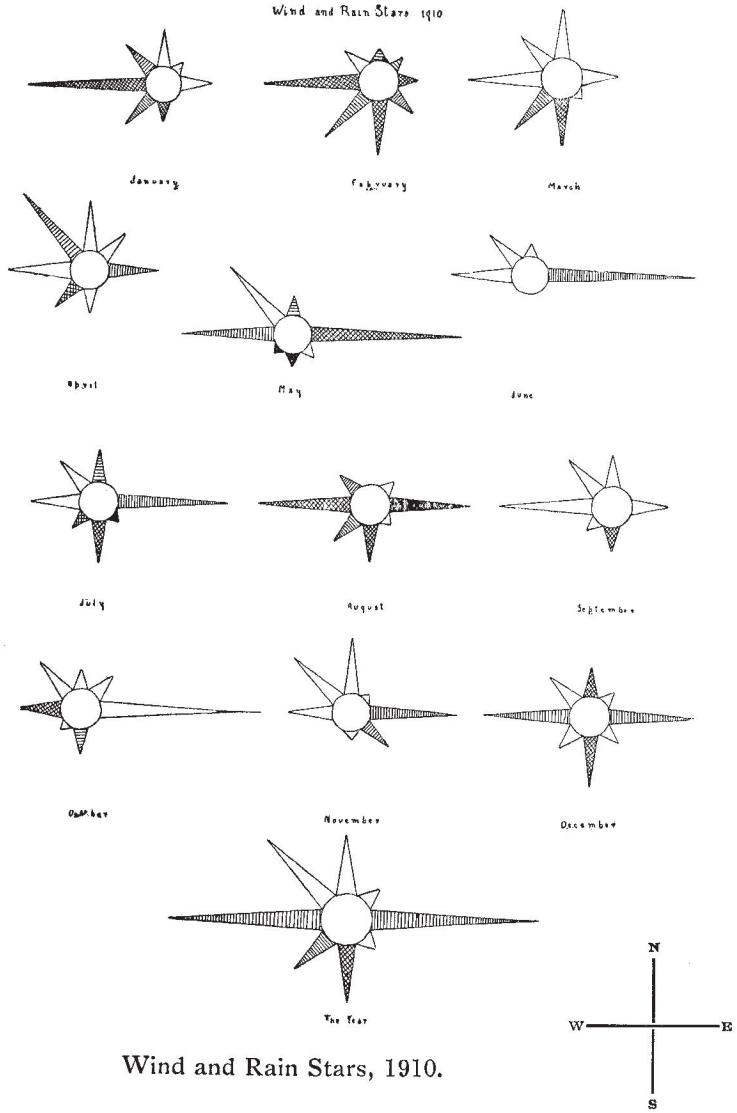


Wind and Rain Stars, 1910.

The wind stars are intended to show the amount of rain and wind which belong to each point of the compass in each month of the year.

The length of the ray indicates the number of times that the wind has been elsewhere blowing from that quarter, the observations being taken twice daily.

The shading indicates the raininess of the wind, under ·06 being white; ·25 and over, black.

J. N. M.

THE COLUMNAR SANDSTONES OF KILCHATTAN BAY.

By W. J. Millar.

[Read 29th November, 1910.]

The Columnar Sandstones are situated a short distance (about four or five hundred yards) to the S.-E. of the Pier at Kilchattan Bay. They are first noticed on the shore, but can also be traced inwards to the rocky cliffs rising above the old sea beach terrace line. On the shore they form a bold face to the sea, as shown on the fine photograph taken by Dr Berwick, and exhibited in the Rooms of the Society.

They are also well exposed on the face of the cliff. The old sea beach is covered with grass, but underneath there is little doubt that the Columnar form exists, as, at the time of the laying of a water main, the trench ran through the Columnar structure.

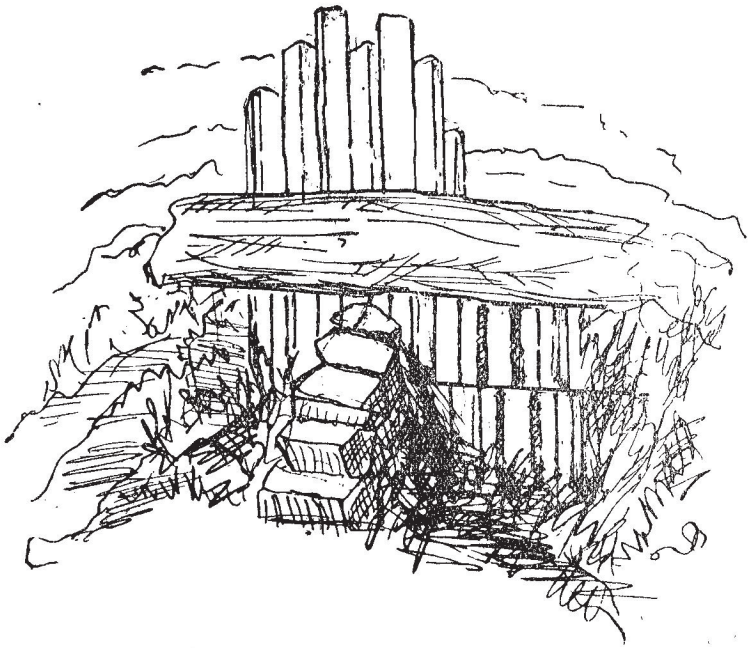
The long axes of the columns are nearly vertical; the diameters vary from 4, 5 or 6 inches to about an inch. From four to five sides appear to be the usual figure of the sections. The five-sided figures are more or less irregular on the side, but some of the four-sided sections are pretty equal in the size of their sides.

This patch of Columnar form is part of the Upper Old Red Sandstone which is seen all along the shore from Craigmore to, and beyond, Kilchattan.

The colour of this rock is generally a fairly dark red with white patches at times.

The Columnar portion is of a lighter colour, more of a greyish light red, and is very uniform in this tint throughout.

These Columnar Rocks are well developed on the shore, where they extend into the sea, but on the face of the cliff there is an interesting example, showing the columns in two distinct groups, one above the other; they are nearly vertical, but have a slight dip towards the north. The upper set is separated from the lower by a layer of the usual Red Sandstone of about two feet thick, not at all Columnar. The lower set is divided by a crack running at right angles to the line of the longer axes of the columns of that set, and it is interesting to observe that the columns above and below this crack do not exactly meet, but the upper ones are all shifted about one inch to the left hand. The rock and upper columns have apparently slipped along the line of the crack which runs in a slight slope at right angles to the dip of the columns. (See Fig.)



The forms of the sections of the columns exposed at this part of the coast can be well studied by walking along the side of the field dry stone dyke, which runs from the sea up to the cliff and terminating at the part above described, as it is largely built up of broken pieces of separate columns, of various shapes and sizes. It is quite usual to meet with a Columnar structure in the whin dykes, but in these cases we are dealing with an igneous intrusive rock which has taken any prismatic form it may have had when cooling. In the Columnar Sandstones we have a Sedimentary Rock, and the sections of the columns show no trace of fusion—indeed, quartz pebbles can still be seen in some of the sections exposed.

So far as I have been able to ascertain, the only other place in Scotland where we have a similar structure is at a quarry at Bishopbriggs, near Glasgow. In Geikie's Text Book of Geology, a drawing is shown of a Columnar structure in the Sandstone there, and the cause of this is attributed to the passage of a whin dyke; the heat from the eruptive rock is considered to have induced this prismatic form in the adjacent Sedimentary Rock.

I have examined the coast for some distance on each side of this patch of Columnar Sandstone at Kilchattan but have been unable to find any other example of such forms.

There are a great many whin dykes running through the rocks along the coast, and these show a tendency to cause a change in the Sandstones through which they pass, notably in the case of a dyke a little to the west of the Pier, which seems to have changed the Sandstone there to a greyer colour, and the pieces fracture into square or right angled forms.

There are no whin dykes just at the Columnar area, but, as the columns are more or less vertical, the heating agent must have been above or below, or perhaps in both positions. There are still towards the south-end of the island large overlying masses of basalt, and a short distance to south we find

great cliffs above the shore of Agglomerate, the site of volcanic activity in lower Carboniferous times.

Looking down upon the top of the Columnar structure on the shore we see a smoothed and fairly even surface well marked by the significant forms of the columns when thus seen end on. In other words, we have what is called a tesselated structure. Now, curiously enough, not far from where these Columnar Rocks appear, I noticed in a shallow patch of muddy water which had dried up that cracks appeared, giving various sided figures, just like the surface of the smoothed Columnar deposit. Again, in a paper contributed by the late Professor James Thomson, of Glasgow University, to, I think, the Philosophical Society of Glasgow, he describes a tesselated structure observed by him in certain liquids, and not only was the surface of the fluid marked out in these many sided forms (mostly five irregular sides), but these appeared to be more or less extended downwards into the fluid in column like forms. He says:—"The water viewed from above presented a tesselated appearance, considerably resembling such patterns as are exhibited by vertical basaltic columns when exposed to view in a horizontal section—such, for instance, as may be seen at the Giant's Causeway or at Staffa."

In the British Museum Report on the "Study of Minerals" we find the following:—"The graphite from New Cumnock in Ayrshire shows a Columnar structure, probably caused by the heat which came from a neighbouring dyke," and again the following:—"While the Columnar character of Gypsum, Marl, and Sandstone is due to shrinkage consequent on the loss of moisture, that of basalt is held to be due to shrinkage consequent on the cooling of the molten mass."

These Columnar Sandstones are so unique that their forms impress the beholder much more than the similar structure, more or less perfect, in many of the basaltic rocks of our island.

SEAWEEDS AND THE FORESHORE.

By John N. Marshall, M.D.

[Read 24th January, 1911.]

Seaweeds belong to the class of plants called *Algae*—a class which stands at the very bottom of the scale in the Botanical Kingdom. Their structure is comparatively simple, consistlng of layers of cells only slightly differentiated from each other, there being no parts like root, stem and leaf, such as we have in our ordinary flowering plants. Externally, no doubt, there is an appearance of what looks like a leaf and a stem, but these do not in structure correspond to the leaves and stems of flowering plants. The environment of these plants, viz., the sea, makes less demand upon them than does the environment of land plants. The buoyancy of the element in which they live enables them to dispense with a rigid stem, and their nourishment is effected more easily by the all-pervading and supporting sea water. They are therefore members of the great family of plants who have never really grown to man's estate. They have had fewer difficulties to contend with and they have retained simplicity of structure and plasticity of growth.

There is little mention of seaweeds in ancient times. Horace calls them "*Algae inutilis*," useless things cast up by the sea. In Scripture there is only one mention of them and that is when Jonah, during his immersion says that the weeds encompassed his head.

Their near relations on land are to be found in the green covering seen on any old wooden fence, and in fresh water, in the green stuff found in a stagnant pool.