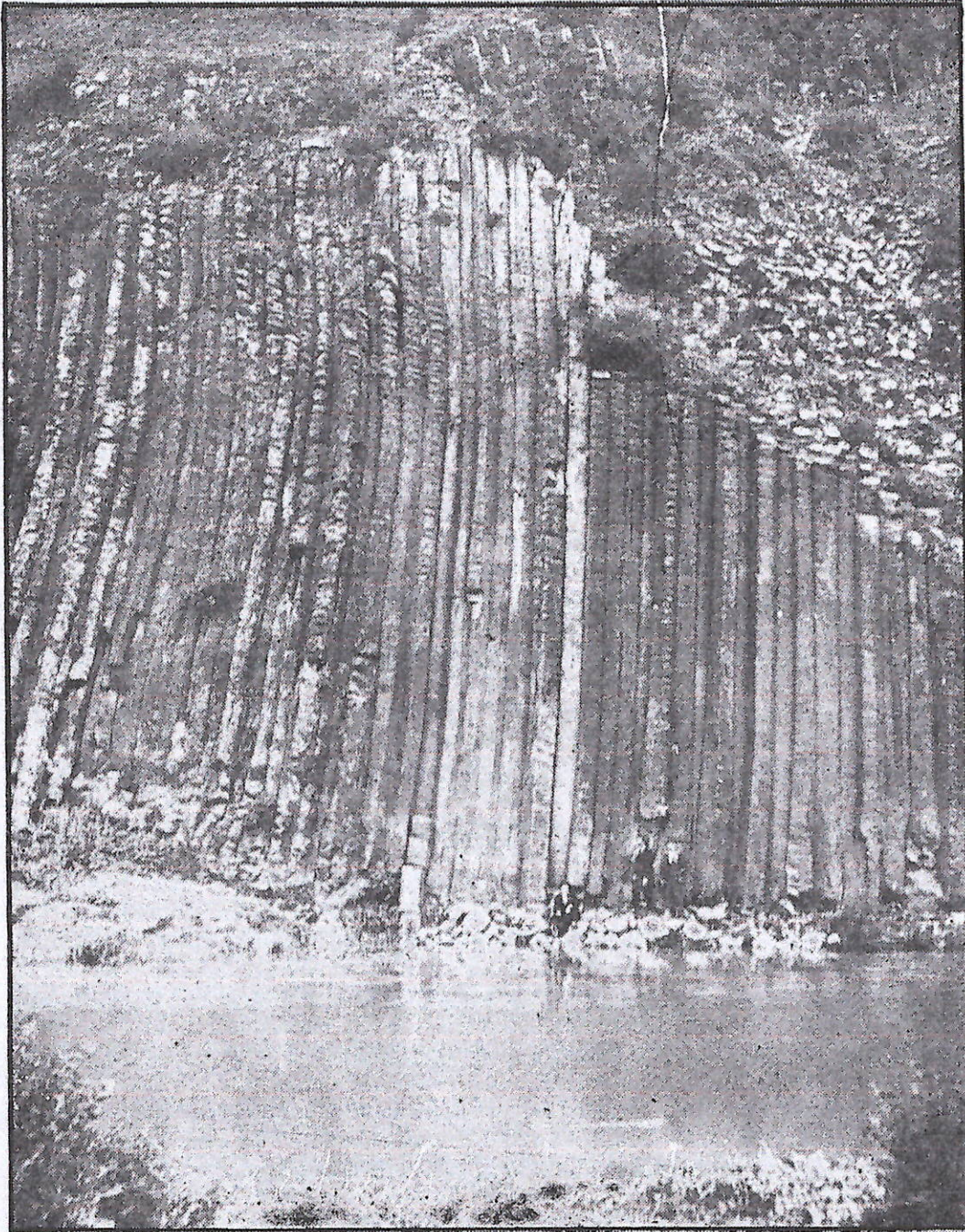


EXCURSION TO SYDENHAM.

To the traveller by the Bendigo train the locality around Sydenham station, formerly known as Keilor Road, does not look very promising for an excursion by members of this Club, but on Saturday, 29th September, about fourteen members and friends detrained there to visit the basalt columns situated on the western branch of the Saltwater River, about two miles north of the station. Looking at a map of the County of Bourke it will be noticed that the Saltwater River forks about six miles above Keilor. The left or eastern branch, heading from near Lancefield, and flowing through Bulla, is generally known as the Deep Creek, while the right or western branch, rising in the Dividing Range west of Macedon, is known under a variety of names, such as Gisborne Creek, Macedon River, Jackson's Creek, and Saltwater River. About two miles above the junction, in a bend of this branch which adds a north-easterly prolongation to section 29, parish of Maribyrnong, the cliff with the columns is situated, though, being on the opposite bank of the stream, it is really in section 10 of the parish of Tullamarine. The district was geologically surveyed by Aplin some forty years ago, and though on the Quarter Sheet No. 7, S.E., he made the note "Symmetrical basaltic columns 50 to 60 feet in height," the spot seems quite unknown to Victorian geologists, notwithstanding that it is not more than 16 miles by road from Melbourne, and within easy walking distance of a railway station. Leaving the station and making our way across the plain, from a slightly more elevated portion a number of volcanic hills or vents were seen to stretch across the north-western and northern horizons, no doubt the sources of the extensive basaltic formation over which we were walking, and which extends right down to the shores of Port Phillip. Crossing the Mt. Alexander road about three-quarters of a mile on the Melbourne side of the Holden Inn, we followed a well-used track leading down into the valley, and ending nearly opposite the cliff. Though the valley is almost destitute of trees, yet in the springtime, when the grass paddocks and the crops on the hillsides are vividly green, it affords many pretty bits of scenery, being really a deep, winding gash cut through the basalt of the Keilor Plains. We estimated its depth by barometrical readings at about 170 feet, and the bed of the stream as being about 220 feet above sea level.

The basalt of the plains is a thin sheet, and cliff sections show that it flowed over almost level sands, probably of Miocene age. These sands in their turn lie on an almost level surface of up-turned Palæozoic rocks, which are either Silurian or Ordovician, it is not known which. Where the valley displays sections of this nature there is nothing very striking about the basalt—it



Negative by J. SHEPHARD.

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BASALT COLUMNS. SYDENHAM.



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resembles the rock shown commonly to the west of Melbourne. In some places, however, the lava has filled in old valleys formed by the ancient streams, and where these old river courses have been cut across by the present stream we see, in favourable spots, phenomena such as are displayed at the present locality. As the river bed is still occupied in places by basalt which is in its natural position, it is clear that the Saltwater River is flowing here at a higher level than it was before the lava outflow, and it will also be noticed that fully 200 feet in thickness of lava is exposed in section.

As will be seen from the photographs the most peculiar thing about the basalt where its thickness is greatest is the fact that it is divided into columns. In the present case single columns are shown 60 feet in height and about 18 inches in diameter. Where the stream strikes the base of the cliff, so that a good fresh face is maintained, the columns are as clean cut as with a saw. In other places, where the columns are not so freshly exposed, they are cut into short lengths by transverse joints, and the slightly weathered blocks look like piles of cheeses. The unweathered columns are marked by transverse banding, so that, as was suggested by Mr. G. Sweet, F.G.S., with whom I visited the section early in the present year, they look like piles of earthen tiles which have become fritted together by overheating in a kiln.

Columnar structure is common in igneous rocks, and its cause is not difficult to seek. To take the present case—basalt is a rock made up of a number of interlacing crystals, the nature of which we need not at present consider. In the molten condition the different minerals are mixed into practically a homogeneous mass. As cooling takes place these minerals separate out from the common mass, and as crystallization is accompanied by diminution in bulk, a shrinking takes place in the rock. Besides this, there is the simpler contraction caused by mere cooling. It is owing to the shrinking caused in these two ways that the divisional planes are produced. If the sheet is thin and exposed on its upper surface to the atmosphere the cooling is comparatively rapid, and the divisional planes are irregular. In thicker sheets, especially at the base of the flow, and in dykes, the divisional planes are usually more regularly developed, and a columnar structure arises. The transverse joints in the columns are produced by the same cause.

Owing to the way in which the columns are formed, they stand at right angles to the cooling surface, which in the present case is formed by the sides of the valley trough in which the lava flowed. Some of the columns in the photographs are seen to be vertical, while others are horizontal where they abut on the steep sides of the old valley. In some cases, owing to the fact that the present stream cuts the course of the old one obliquely, the ends

of the columns are seen jutting out from the cliff face, which appears as though covered with tiles. But space forbids a discussion of many other interesting points which were noticed during our excursion.

Several members devoted themselves more or less to botany, and Mr. C. French, jun., who acted as botanical leader, reports that fully fifty species of plants were noticed in flower, of which the most interesting collected were *Zygophyllum billardieri*, *Dodonaea viscosa*, *Euxtaxia empetrifolia*, *Cassia eremophila*, *Acacia acinacea*, *Calycotrix tetragona*, *Eucalyptus melliodora*, *Helipterum anthemoides*, *Nicotiana suaveolens*, and *Myoporum deserti*. The ferns *Cheilanthes tenuifolia* and *Grammitis rutifolia* were also noticed growing in the interstices of the basaltic columns and among the rocks.

T. S. HALL.

A TRIP TO THE RICHMOND RIVER DISTRICT.

BY A. CAMPBELL, JUN.

PART II.—BUTTERFLIES AND BIRDS.

THE tropical and semi-tropical regions of the world are famed for the glory of colouring and the luxuriance of their insect and bird life. The "Big Scrub" is no exception. Of insects we find the butterflies the most attractive, while some of the birds are of wonderful plumage, and several families, besides numerous individual species, are not known in the more temperate zones. Butterflies are seen in myriads on a bright day, with gay colouring and quick flight searching in and out among the blossoms. The well-known family of *Papilio* is perhaps the best represented as far as numbers go; but the Richmond River district can claim a species peculiar to itself, *Ornithoptera richmondia*, which is a large insect, measuring from $4\frac{1}{2}$ inches across. The male is very beautiful, with its broad markings of brilliant green and velvety-black, set off with a yellow abdomen, while the female, which is much the larger, is a sooty black, with whitish patches on the fore wing and dull gold and silver on the hinder. The genus is named from its heavy flight, which is supposed to resemble that of a bird. The female is quite a common object during the early summer months, pursuing its solitary way over the fields or feeding, with hundreds of other smaller butterflies, on some flowering scrub tree; but the male does not usually put in an appearance until late in December, when an exceptionally hot day will free them all from their chrysalids, hanging suspended among the creepers or in the branches of the trees, and on the morrow their dazzling green and black forms are seen everywhere. This is the conclusion I came to from my own experience, for on New Year's Day there was a lull in the rains and the day dawned fair;