

Nor is it that a selection of certain writers has been made, for numerous authors of many well-known works are only credited with one or two in the Derby Library Catalogue. The letter B is not a specially unfortunate one. Ancient Geography refers only to *Nature* and the *Quarterly Review* (one reference each). Gladstone and Hugh Miller are equally unknown. Less than a column contains all the references to Geography, while Geology has nine columns allotted to it. Under Astronomy the inquirer is referred to numerous papers where notices may be found of each of the planets and of many of the planetoids, but only fifteen *works* on Astronomy are catalogued. There is no work at all upon the Moon! Moreover, the references to works which are in this library are made with no discretion. "Barbarossa" does not refer the reader to Gibbon; "Borgia" only refers him to one article—on Lucrezia—in the *Nineteenth Century*! The spelling is not only unscholarly, but the correcting of proofs is careless. It were endless to point out the blunders everywhere; we need only refer to the name of Prof. Haeckel, spelt in four different ways upon pp. 41, 42 only! If some little town struggling against the smallness of the *id.* rate wishes to draw as much as possible from its Free Library with its motley collection of books contributed from various quarters, we can strongly recommend the *system* upon which this catalogue is drawn up. But that a place of the size and importance of Derby, whose rate also has been so helped by the munificence of Mr. Bass and others, should think it worth while to print and distribute a catalogue, displaying a knowledge and a collection of books in this rudimentary state, is beyond our comprehension.

THE population of Cascia (Italy) is being constantly disturbed by repeated subterranean shocks.

A VOLCANIC eruption is reported to have taken place from a mountain in the Caucasus, which has not shown any volcanic phenomena during historic times. It is the Karabetow mountain, near Temrink, in the government of Jekaterinodar (Caucasia). The subterranean noise was heard 4 versts away, the lava flowed for a distance of half a verst, and a large crater was formed.

NEWS from Belgrade states that some railway workmen have discovered a nearly perfect mammoth skeleton. It is being photographed on the spot, and will be handed over to the National Museum at Belgrade.

A NATURAL intermittent spring has recently formed in the Jachère (Hameau de l'Argentière, Hautes Alpes). At regular intervals of five and seven minutes it yields 10 litres of water each time. It is very remarkable that the first time it consists of lukewarm and colourless water, but the second of cold but wine-red water. MM. Chester and Hadley are now studying the phenomenon.

M. J. OLLER, the proprietor of the St. Germain racing establishment, is preparing to organise night races. He intends to build a central lighthouse, of which the rays will be directed on the contending horses, so that spectators sitting in the centre may follow the proceedings with as much accuracy as in open day.

AT the annual meeting for the distribution of prizes in Mason College, Birmingham, Prof. Tilden gave a sensible and interesting address on Technical Education, which has been published in a separate form.

THE Captain-General of the Philippines reports another destructive hurricane on November 5, and it is worthy of remark that since the previous hurricane, a few weeks ago, the cholera, which had been very bad, has nearly disappeared from Manila.

MESSRS. SONNENSCHN AND CO. announce the forthcoming publication of Dr. Coppinger's Notes of the four years' voyage from which the *Alert* has recently returned.

MR. MURRAY has issued a cheap edition of Dr. Blaikie's "Life of David Livingstone."

THE additions to the Zoological Society's Gardens during the past week include two Macaque Monkeys (*Macacus cynomolgus* ♂ ♂) from India, presented respectively by Mr. J. Knight and Mrs. Snell; a Sooty Mangabey (*Cercopithecus fuliginosus* ♂) from West Africa, presented by Lady Stafford; two Globose Curassows (*Crax globicera* ♂ ♀) from British Honduras, presented by Mr. R. W. Ryass; a — Buzzard ( — ) from Demerara, presented by Mr. G. H. Hawtayne, C.M.Z.S.; three Common Chameleons (*Chameleon vulgaris*) from Egypt, presented by Mr. W. J. Ford; a Hawk's-billed Turtle (*Chelone imbricata*) from West Indies, presented by Mr. W. Cross; a Pig-tailed Monkey (*Macacus nemestrinus* ♂) from Java, a Black Wallaby (*Halmaturus ualabatus* ♀) from New South Wales, a Greek Land Tortoise (*Testudo graeca*), South European, deposited; an American Bison (*Bison americanus* ♀) from North America, a Capybara (*Hydrochærus capybara* ♀) from South America, two Eastern Goldfinches (*Carduelis orientalis*) from Afghanistan, two Brent Geese (*Bernicla brenta*), a Red-throated Diver (*Colymbus septentrionalis*), British, purchased; three Capybaras (*Hydrochærus capybara* ♂ ♂ ♀), a Bluish Finch (*Spermophile caeruleus*) from South America, received in exchange.

#### GEOGRAPHICAL NOTES

AT the opening meeting of the Geographical Society on Monday Mr. A. R. Colquhoun gave an account of his recent adventurous journey, in company with the late Mr. Wahab, from Canton through Yunnan to Bhamo. Mr. Colquhoun's object was mainly to discover trade-routes between Burmah and China, but he collected some interesting information on Further Yunnan, parts of which have not before been visited by European travellers. Mr. Colquhoun describes Yunnan, which is the most westerly of the eighteen provinces of China, as a great uneven plateau, of which the main ranges trend north and south; those in the north reaching an elevation of from twelve to seventeen thousand feet, while in the south they sink to seven or eight thousand feet. In the south, and especially in the south-west, there are many wide fertile plains and valleys, some with large lakes in them. These plains are very rich and thickly populated, the number of towns and villages and the comfortable appearance of the peasantry being very remarkable. Fruits of all kinds—pears, peaches, chestnuts, and even grapes—are found in abundance, while roses, rhododendrons, and camelias of several varieties grow untended on the hill-sides. Minerals are found in great quantities. The travellers constantly passed caravans laden with silver, lead, copper, and tin in ingots; and gold is beaten out into leaf in Tali, and sent in large quantities to Burma. Coal, iron, silver, tin, and copper mines were frequently passed. Mr. Colquhoun also found that the celebrated Puerh tea, the most fancied in China, is not really a Chinese tea at all, but is grown in the Shan district of I-bang, some five days south of Puerh, the nearest prefectural town. In the south the temperature is moderate, and the rains by no means excessive; but the farther north the travellers went, the more sparse became the population, and the more sterile the country, until in the extreme north the hills were enveloped in almost perpetual fogs, rain, and mists, and were practically uninhabitable. The people themselves are mostly the old aboriginal tribes—Lolo, Pai, and Maio—the Chinese being mostly of the official class, and found only in the towns. These aborigines have a much more distinct physiognomy than the bullet-headed Celestial, and are remarkable for their frank and genial hospitality. The women do not crush their feet, and they adopt a picturesque dress not unlike that worn of old by Tyrolese and Swiss maidens. They have a novel way of making marriage engagements. On New Year's Day the unmarried people range themselves, according to sex, on either side of a narrow gully. The ladies in turn toss a coloured ball to the other side, and whoever catches it is the happy man. It is said they are so skilful in throwing the ball that the favoured man is always sure to catch it; which is reassuring. As in Marco Polo's days, the *couvade* still prevails in

some parts. When a child is born, the husband goes to bed for thirty days, and the wife looks after the work. At the conclusion of the paper, Lord Northbrook and Col. Yule paid a well deserved tribute to the late Capt. Gill, Prof. Palmer, and Lieut. Charrington. Capt. Gill, our readers may remember, had himself done some first-rate work on the South-East Chinese frontier, and described it in his "River of Golden Sand;" while Prof. Palmer's loss as an Arabic scholar is almost irretrievable.

SAMOYEDS report to Archangel that they have recently seen, south of Waigatz Island, the wreck of a large vessel crushed in the ice. If the statement be true, and if we remember their never-credited story of the unfortunate *Jeannette*, it is more than probable that the vessel is either the Danish exploring vessel the *Dijmphna*, with Lieut. Hovgaard's expedition, or the Norwegian steamer *Warna* with the Dutch meteorological expedition, bound for Port Dickson, both of which in September last froze in in the Kara Sea, from which place the ice may subsequently have carried the unfortunate vessel to where she now is stated to be. The last intelligence received from Lieut. Hovgaard was dated September 22, and addressed to Herr Aug. Gamil, of Copenhagen, the principal promoter of the expedition, from which it appears that all was then well with both vessels, but that the *Dijmphna* was, when caught in the ice, some considerable distance from shore, in fact in a spot where the whole force of the polar ice, when in drift, would strike her. Herr Aug. Gamil having telegraphed to the Russian Admiralty for any confirmation of the above report, has received a reply that no official information on the subject has been received at St. Petersburg; but that nevertheless instructions would be at once given to the officials on the north coast to scour the same, and gather further particulars. A search party is also being contemplated in Copenhagen, which will, if decided on, be led by M. Larsen, a Dane, who accompanied the American expedition in search of the crew of the *Jeannette*, as the special artist of the *Illustrated London News*.

THE German Government has raised the fund for the scientific exploration of Central Africa and other countries, which in 1882-83 was fixed at 75,000 marks (3750*l.*) to 100,000 marks (5000*l.*) for the financial year 1883-84.

## THE AIMS AND METHOD OF GEOLOGICAL INQUIRY<sup>1</sup>

### II.

IT will be observed that the results obtained by geologists could not have been arrived at had they confined themselves solely to the detection of resemblances and correspondences between the phenomena of the present and the past. The natural forces have always been the same in kind, if not in degree, and we can often watch the gradual development by their means of products which more or less closely resemble the rocks of our sections. But experimental evidence of this kind takes us only a short way, and we are sooner or later confronted by appearances, which are not reproduced by nature before our eyes. As another example of this I shall adduce one which, although it has far-reaching issues, has yet the merit of being readily comprehended without much preliminary geological knowledge. It is moreover instructive as showing how the imaginative faculty works in a mind trained to clear and steady observation of nature. The fact that a large proportion of the lakes of the world rest in rocky hollows or basins had been long known before it occurred to any one to ask how such rocky hollows had come into existence. The question was first asked and the answer given by Prof. (now Sir) A. C. Ramsay. He had pondered over the problem for years before its solution dawned upon him. None of the ordinary agents of geological change seemed capable of producing the phenomena. The most common of all denuding agents—water—certainly could not do so, for although it may dig long and deep trenches through rocks, water could not scoop out a basin like that occupied by Loch Lomond, or any of our Highland lakes. The tendency of water is, on the contrary, to silt up and to drain such hollows, by deepening the points of exit at their lower ends. Did the hollows in question occupy areas of depression—had

<sup>1</sup> The Inaugural Lecture at the opening of the Class of Geology and Mineralogy in the University of Edinburgh, October 27, 1882, by James Geikie, LL.D., F.R.S. L. and E., Regius Professor of Geology and Mineralogy in the University. Continued from p. 46.

they, in short, been formed by unequal subsidences of the ground? Some considerable inland seas, as for example the Dead Sea, and doubtless many larger and smaller sheets of water, owe their origin to local movements of this kind. But it is incredible that all the numerous lakes and lakelets of Northern Alpine regions could have originated in this way. In many cases these lakes are so abundant that it is hard to say of some countries, such as Finland, and large parts of Sweden, and even of our own islands, whether it is land or water that predominates. If all these numerous and closely aggregated rock-basins represent so many local subsidences, then the hard rocks in which most of them appear must have been at the time of their formation in a condition hardly less yielding than dough or putty. It was suggested that the lakes of the Alps and other hilly regions might have been caused, not by local sinkings confined to the valleys themselves, but by a general depression of the central high-grounds and water-sheds. The subsidence of the central mountains would of course entail depression in the upper reaches of the mountain-valleys, and in this way the inclination of those valleys would be reversed—each being converted into an elongated rock-basin. But a little consideration showed that before the lakes of such a region as the Alps could have been produced in this manner, those mountains must have been some 15,000 feet higher than at present. Or to put it the other way, in order to obliterate the Alpine lakes and restore the slopes of the valleys to what, if this hypothesis were true, must have been their original inclination, the Alps would need to be pushed up until they attained twice their present elevation. Now, we are hardly prepared to admit that the Swiss mountains were 30,000 feet high before the glacial period. If our Alpine and Northern lake-basins cannot be attributed to movements of depression, still less can they be accounted for by any system of fractures;—they lie neither in gaping cracks nor on the down-throw sides of dislocations. In a word, a study of the structure, inclination, and distribution of the rock-masses in which our lake-basins appear throws no light upon the origin of those hollows. We probably find in many cases that the position and form of a basin have been influenced in some way by the character of the rocks in which it lies—but we detect no evidence in the rock-masses themselves to account for its production. It is not necessary, however, that I should on this occasion mention each and every cause which has been suggested for the origin of rock-bound hollows. Some of these suggestions are unquestionably well founded. For example, there can be no doubt that certain lakes have been produced by the sudden damming-up of a valley in consequence of a fall of rock from adjoining slopes or cliffs; others, again, occupy holes caused by the falling in of the roofs of caves and subterranean tunnels; while yet others have been formed by a current of lava flowing across a valley and thus ponding back its stream, just as many a temporary sheet of water has been brought into existence in a similar way by the abnormal advance of a glacier. In these and other ways lakes have doubtless originated again and again, but the causes just referred to are all more or less exceptional, and manifestly incapable of producing the phenomena so conspicuous in the lake-regions of Britain, Scandinavia, and the Alps.

Ramsay, to whom the varied phenomena of glacier-regions had been long familiar, was struck by the remarkable fact that fresh-water lakes predominate in Northern and Alpine countries, while they are comparatively rare in regions further south and outside of mountainous districts. The great development of lakes in Finland finds no counterpart in the low grounds of southern latitudes. It is in regions where glacial action formerly prevailed that rock-basins are most numerous, and this suggested to Ramsay that in some way or other the lakes of the Alps and the North were connected with glaciation. The final solution of the problem flashed upon him while he was studying the glacial features of Switzerland. His scientific imagination enabled him to reproduce in his own mind the aspect presented by the Alps during the glacial period, when the great mountain-valleys were choked with glacier-ice, which flowed out upon the low grounds of Germany, France, and Northern Italy, so as to cover all the sites of the present lakes. He saw that under such conditions enormous erosion must have been effected by the ice, by means of the rocky rubbish which it dragged on underneath, and that this erosion, other things being equal, would be most intense where the ice was thickest and the ground over which it advanced had the gentlest inclination. Such conditions, he inferred, would be met with somewhere in the lower course of a valley between the steeper descent of its upper reaches and the