The atlas of Scotland

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"In passing down Alberni Canal from the settlement, carbonaceous shale can be seen exposed along the shore at the old Alberni sawmill site, lying almost horizontally. Farther along the shore of the canal, about a mile southwards, syenite crops out for a short distance, and is then replaced by a blackish, almost aphanitic diorite, which constitutes the body of Copper mountain. This formation extends along the shore down to a short distance below where the Esquimalt and Nanaimo railway boundary line crosses the canal, where syenite reappears and extends down to Hiwatches or Franklin river.

"A good contact of this blackish, fine-grained diorite with the syenite may be seen on China creek, the syenite dipping under the diorite westward at an angle of about 55 degrees.

"A most remarkable body of limestone crops out in what I have called Limestone mountain, at the head of Hiwatches river. There is an abrupt escarpment, almost perpendicular, of not less than 1000 feet of crystalline limestone, showing well the lines of stratification, and dipping about 15 degrees to the south. I did not succeed in obtaining any fossils, except a few crinoidal stems. A similar mass of the same kind of limestone occurs on the west side of Mount Douglas, showing a good exposure on the east side of Hidden lake, the vertical section being about 500 feet. All these limestones are highly crystalline and more or less dolomitic. They bear a great resemblance to several other large deposits on the island, such as at Horne lake, Kennedy lake, Nootka sound, and on Texada island. . . .

"In one spot on Granite creek I came across some chalcopyrite associated with molybdenite. It is interesting to note the common occurrence of molybdenite throughout British Columbia in association with copper ores; it has been found in numerous places but only in small quantities. . . ."

From the foregoing it will be apparent that Vancouver Island is the western bulwark of the Dominion of Canada; and that, as the Province becomes better settled and its resources more fully developed, it will, along with the island, not only maintain but exceed in value and importance its present high position.

THE ATLAS OF SCOTLAND.¹

FROM the point of view of the Royal Scottish Geographical Society, the publication of this very fine Atlas of Scotland is an event of national importance. There is a sense in which the Atlas may be said to owe its existence to the Society. We do not refer to the fact that the name of the Society appears as sponsor on the title-page. We mean to say that, but for the foundation of the Society, and the deeper and wider interest in Geography which it has awakened by its meetings and its publica-

¹ *The Royal Scottish Geographical Society's Atlas of Scotland, a series of sixty-two plates of Maps and Plans illustrating the Topography, Physiography, Geology, Natural History, and Climate of the Country.* Designed and prepared under the direction of J. G. Bartholomew, F.R.S.E., F.R.G.S., Hon. Sec. R.S.G.S. Edited by—Topography, John Bartholomew, F.R.G.S. (died 1893); Geology, Sir Archibald Geikie, LL.D., F.R.S. etc.; Physiography, Professor James Geikie, LL.D., F.R.S., etc.; Meteorology, Alex. Buchan, LL.D., F.R.S.E. Drawn, engraved, and printed at the Edinburgh Geographical Institute, 1895.

tions, it is very doubtful whether so great an undertaking as the production of a national Atlas would have been projected, or could have been carried through with any warrantable expectation of success. The national importance of the achievement, however, consists first in its being a national boon, and secondly in its being a national credit. It is a boon to Scotsmen to have placed within their reach such a splendid delineation of their country in its varied physical aspects—a delineation so comprehensive in conception, so elaborate in its details, and so accurate in every respect. It is not less a credit to Scotland that both in conception and in execution the Atlas is the work of Scotsmen. Scottish enterprise projected it, and Scottish ingenuity, skill, and taste have carried it through all its stages from first to last. It seems to us that the Society has done nothing but its duty in giving official support and moral encouragement to so important a national undertaking; and it is not less fitting that Her Majesty the Queen has graciously permitted the work to be dedicated to her.

The present work, though the latest and most complete, is by no means the first Atlas of Scotland given to the world. One of the most valuable of the introductory chapters of the book is a chronological summary of the history of Scottish Cartography by Mr. J. G. Bartholomew, to whom as the main projector and general editor of the Atlas the greatest praise is due. It is unnecessary to follow Mr. Bartholomew's table, which contains no fewer than 174 entries, in detail. But it may be useful to note the more important items, and especially those that refer to complete Atlases of Scotland. The earliest of these, of course, is Blaeu's great *Atlas*, published at Amsterdam in 1654, in eleven volumes. The volume relating to Scotland comprised 46 plates, and incorporated the results of the labours of Timothy Pont (1609), and of his successor Robert Gordon of Straloch, whose *Scotia Antiqua* was published, also at Amsterdam, in 1650. Indeed, it is a curious fact that all the early maps of Scotland were published abroad—in Rome, Venice, Bâle, Rouen, and Amsterdam. The next important landmark was reached by J. Adair (1688), whose maps, published in Paris, inaugurated a new era in cartography. Many separate maps were issued during the next hundred years; but nothing of permanent value was effected until Ainslie produced his new and original map of Scotland in 1789. Ainslie's map was in turn superseded by that of Arrowsmith (1807), which was constructed from original materials, and which, incorporating the results of the military survey of 1747-55, was the best map of Scotland at the date of its production. That was followed in 1832 by Thomson's *Atlas of Scotland*, containing a map of each county, and described by Bartholomew as "a monumental work." That was followed by the county maps prepared by Lizars for the *New Statistical Account of Scotland* in 1845, and by the *New Travelling Map* of Keith Johnston in 1857. Since that date, the best maps of Scotland have been those of the Bartholomews, father and son, including the reduced Ordnance Survey maps, first in 16, and ultimately in 29 sheets. In the present Atlas, Scotland is treated in 45 sheets, on the scale of $\frac{1}{2}$ inch to the mile; and while it thus bears an accidental resemblance to the great Atlas of Blaeu, which contained 46 sheets,

there is really no comparison between the two works, which are the products of widely-separated periods, and were therefore produced under wholly different conditions of art and knowledge.

It may thus be said without exaggeration that this Atlas represents in the most complete form the present state of geographical knowledge regarding Scotland; and, further, that it exhibits the art of the map-maker and the engraver in the highest perfection yet reached. Thus every one of the forty-five sectional maps, which, as has been said, form the most important feature of the Atlas, is a work of art pleasing to the eye of the uninitiated; but, to the expert, they are much more than merely beautiful objects. The delicate gradations of colour on land and sea are not intended merely for pictorial effect. They are graphic translations of the message which the contour lines convey with more formal accuracy. That contours and shadings represent a great deal more than appears on the surface, we have the testimony of Professor James Geikie, in the admirable paper on "The Physical Features of Scotland," which he contributes to this Atlas. He says:—

"In the case of the Ordnance Survey Map on the scale of 1 inch to a mile, the varying forms of the surface are so faithfully delineated as frequently to indicate to a trained observer the nature of the rocks and the geological structure of the ground. The artists who sketched the hills must indeed have had good eyes for form. So carefully has their work been done, that it is often not difficult to distinguish upon their maps hills formed of such rocks as sandstone from those that are composed of more durable kinds. The individual characteristics of mountains of schist, of granite, of quartz rock, of slate, are often well depicted; nay, even the varieties of igneous rock which enter into the formation of the numerous hills and knolls of the lowlands can frequently be detected by the features which the artists have so intelligently caught.

"Another set of features which their maps display are those due to glaciation. These are admirably brought out, even down to the smallest detail. A glance at such maps as those of Teviotdale and the Merse, for example, shows at once the direction taken by the old *mer de glace*. The long parallel flutings of the hill-slopes, *roches moutonnées*, projecting knolls and hills with their "tails," the great series of banks and ridges of stony clay which trend down the valley of the Tweed—these, and many more details of interest to specialists, are shown upon the maps. All over Scotland similar phenomena are common, and have been reproduced with marvellous skill on the shaded sheets issued by the Ordnance Survey. And yet the artists were not geologists."

What Professor Geikie says of the large-scale maps holds good with almost equal truth of the reduced maps in this Atlas. The editor is, however, careful to point out that the contour lines both for the height of the land and for the depth of seas and lakes, are given only "as far as surveyed." Thus the bathymetric lines are shown in the cases of Loch Lomond, Loch Awe, and Loch Tay, but not in the cases of Loch Katrine, Loch Ericht, and some others.

Other useful features of these sectional maps deserve to be noted. They show for the first time the corrected boundaries of counties and parishes as determined by the recent Boundary Commission. They

show all completed lines of railway, and they indicate those projected or in progress, and for this purpose the sheets have been revised by the companies concerned. Not only are all railway stations shown, but those having refreshment-rooms are differentiated by a special symbol. The steamer tracks are marked both on the coasts and arms of the sea, and on inland lakes like Loch Lomond and Loch Awe; and these tracks, like the railways, have been revised by the companies. The main driving roads are distinguished from the less important, and these from drove roads and footpaths. Canals also have their special mode of representation. It must be evident from this enumeration that for political and social, as well as for physical, features, these maps are as complete and instructive as they could possibly be made. As a supplement to these maps there are eight sheets of beautifully executed plans of the most important towns—Edinburgh, Glasgow, Greenock, Paisley, Dundee, Aberdeen, Stirling, Perth, Oban, and Inverness.

The other contents of the Atlas are of a general character; apply, that is to say, to the country as a whole. First we have a pair of physical maps of Scotland side by side—the one bathy-orographical, the other showing the boundaries of river-basins. Professor Geikie's paper, already referred to, is given in connection with these maps, and they are made more interesting by his exposition. The second pair of maps is also instructive. The one shows, by variety of colouring, the land surface features—ploughed land, woodland, and moorland. The other indicates the density of population by means of depth of shading. To a certain extent they illustrate each other; for the population is thinnest on the moorland districts, and is denser on the cultivated land; but it is, of course, densest in the mining and manufacturing districts, which are not otherwise indicated. In the population map, the sizes of the towns are represented by circles of different diameter. The actual populations of some hundreds of towns are given in a separate table. There are also tables showing the population of the counties at each decennial census for one hundred years, and the present density of the population in each county; the areas and the acreage of each county under different forms of cultivation in 1893; and the occupations of the people in six classes in 1891.

Next come two double sheets illustrating meteorological features—the one, rainfall; the other, temperature. Each double sheet contains twelve small maps of Scotland, one for each month, indicating by gradations of colour the areas of greatest and least rainfall, and those of highest and lowest temperature. Accompanying these comparative maps, there is a series of carefully prepared and exhaustive tables by Dr. Buchan. The first table gives the monthly and the yearly rainfall at ninety-two stations on a comparison of the data of twenty-five years (1866-1890). According to this table, the wettest place in Scotland is Glengyle, Perthshire (92·71 in.), and the driest is Nairn (23·33 in.). The second table shows the mean monthly and annual temperature at eighty-nine stations on the average of twenty-four years (1857-1880). Excluding St. Kilda, it seems that the mildest places in Scotland are Rothesay, Cargen, and Harris (47·8°), and that the coldest is Braemar (43·3°).

These maps are followed by a very fine and very complete geological map of Scotland, occupying two double sheets; and as a companion to this there is a remarkably succinct and lucid paper by Sir Archibald Geikie on the geological formations of the country.

Next comes a series of four maps illustrating the Natural History of Scotland. The first shows the distribution of mammals, the second that of birds, and the third that of fishes, while the fourth shows the deer forests, the boundaries of the salmon-fishing districts, and the limits within which beam-trawling is prohibited. The last map also indicates the position of all the lighthouses on the coasts.

The last pair of comparative maps has been specially prepared by Mr. Friedrich Bosse to illustrate the distribution of languages in Scotland in 1881 and in 1891. They show how, during the decade, there has been a shrinkage of the purely Gaelic-speaking areas, and an extension of the partially Gaelic-speaking and of the English areas. According to these maps, however, the purely English, or "no Gaelic," districts in the east of Scotland, from Aberdeenshire to East Lothian, and also in Galloway, were more extensive in 1881 than in 1891. The small inset maps give the same impression. This seems at first sight incredible, but probably indicates that there was a considerable migration during the decade from the Highlands to the east and south. An explanation should have been given in a note. Connected with the subject of language, there is a valuable table by Dr. Burgess, on "The Etymology of Place Names in Scotland."

If this important Atlas has a defect, it is that it does not contain an industrial map. The coal-measures are, of course, indicated in the geological maps, with a special section across the Carboniferous rocks; but an enlarged map of the midlands of Scotland, showing the mining districts and the seats of the chief manufactures, would have made it complete. This omission may yet be remedied. As it stands, however, the Atlas of Scotland is a work of great merit, reflecting the highest credit on all who, with head or by hand, have assisted in its preparation.

W. SCOTT DALGLEISH.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

ANNUAL BUSINESS MEETING.

This meeting was held in the Society's Hall, Edinburgh, on November 15th. Sir John Cowan, Bart., took the chair.

On the recommendation of the Council, the Marquis of Lothian was re-elected President, and the Vice-Presidents were also re-elected. The Duke of Hamilton was added to their number.

The following twelve Members of Council, who retire by rotation, were re-elected:—Captain Hamilton [Dunlop, R.N., Dr. Rogerson, Mr. John Stephen,