
The limestones of Scotland: chemical analyses and petrography — Chapter 1

Introduction

The distribution, field relations and reserves of limestone and dolomite in Scotland have been described in the Geological Survey memoir 'The Limestones of Scotland' published in 1949 as volume XXXV of the Special Reports on the Mineral Resources of Great Britain. In that memoir abbreviated reference was made to the chemical composition and petrography of the rocks and the present volume forms a companion memoir giving the full record of the chemical analyses and petrographical descriptions of the specimens examined during the investigation of resources of Scottish limestone and dolomite during the years 1939 to 1944. The analyses were made by officers of the Macaulay Institute for Soil Research, Craigiebuckler, Aberdeen, and apart from the results for trace elements determined spectrographically, have already appeared in the Wartime Pamphlet No. 13, Parts I to VIII, which had a restricted publication during the years 1942 to 1945. A few analyses, some of which have not previously been published, made in the laboratory of the Geological Survey on specimens collected at other times are included.

The arrangement of a long series of chemical analyses of limestones and dolomites presents a problem to which no entirely satisfactory solution has been found. The analyses might be arranged, for example, on a chemical basis in order of the carbonate content of the rocks, or on a locality basis following the county arrangement adopted in the companion memoir dealing with the field occurrence, or in other ways. It has been considered that an arrangement based on the stratigraphical position of the rocks would prove the most satisfactory, at any rate from the geological point of view. In the following tables the analyses are accordingly arranged under the geological formations Lewisian to Recent—to which the rocks belong, the Carboniferous limestones which provide the majority of the specimens examined being further subdivided under the Series of the Scottish Carboniferous. Within these main divisions the arrangement is by counties in alphabetical order. The compilation of the analyses according to this scheme was carried out by Mr. T. H. Whitehead.

The analytical tables are set out in two portions, the upper stating the results of chemical analysis as percentages and the lower stating the results of spectrographic determinations of the trace elements as parts per million.

Each analysis is headed by a number which, prefixed by SL, refers to the specimen or sample collected during the 1939–44 investigation of limestone resources; prefixed otherwise the number refers to specimens collected by Geological Survey officers at other times. Beneath the specimen number is the registered number of the thin section and corresponding rock-chip in the Scottish series of sliced rocks and in the space below is a page reference to the description in this memoir of the thin section. The lowermost number, above the figures of the analysis, is a laboratory number indicating when prefixed by M the serial number of the analysis carried out in the Macaulay Institute, or when prefixed by GS the serial number in the records of the chemical laboratory of the Geological Survey.

The petrographical descriptions are correlated with the chemical analyses by means of the reference numbers of the specimens and they are arranged in the same order as the analyses. The page on which the analysis is given appears beneath the reference number.

Each petrographical description is preceded by the stratigraphical name of the limestone, for example, Gilmerton (or No. 1) Limestone; the locality; one-inch sheet; county and six-inch sheet; and, in brackets, a page reference to the field description of the occurrence in 'The Limestones of Scotland', Special Reports on the Mineral Resources of Great Britain, vol. xxxv, 1949; this reference is cited in shortened form as *Lst. Scot.*, 1949. In some cases no page reference is given because some occurrences, though collected and analyzed, were considered to be of no economic interest and their descriptions were omitted from that memoir. The S number beginning the petrographical description identifies the specimen and corresponding rock-section in the Sliced Rock Collection, Scottish Series, of the Geological Survey and Museum on which the description is based. A 'designation' following each description specifies the essential mineralogical, fossil and structural features of the rock in accordance with the scheme developed in Chapter V, at the end of which there is a glossary of the terms used in the designations. Many of the structures corresponding to these terms are illustrated in the photomicrographs Plates 1-4.

In correlating the chemical analyses and the petrographical descriptions readers will appreciate that in most cases the sample analyzed included many fragments of rock to represent the whole thickness of the bed, whereas for microscopical examination usually one thin section only was made from one specimen selected as representative. Where the sample analyzed included rock from layers of clearly differing composition two or more sections were made. The chemical analyses therefore are not strictly referable to the rock specimens and thin sections which are retained for reference in the Survey collection of cut rocks and sections, though in general the analysis, cut rock and thin section must closely correspond.