CHAPTER I

INTRODUCTION

During the last century many attempts have been made to obtain an accurate and detailed knowledge of coal. In the beginning the lack of good methods was a severe handicap and it is only in the last decades that real progress has been made. After the discovery of the structural plants in the coalballs the methods of preparing thin sections have been brought to a very high standard. These methods have been used for the study of the coal and in many respects with very important results. It became evident that coal is not a homogeneous material but that it is composed of several elements with different qualities. The practice of coalmining had already given the first indications. The differences between bright and dull coals were evident and rather soon it was possible to bring some striking characters of the coal in connection with this differentiation. At first the researches were restricted to the real coal (especially paleozoic coals). Afterwards the researches were extended over lignites and brown coals and the same principal characters were found in these mostly younger coals.

We have to thank Mrs. Stopes for the greatest progress in a detailed knowledge of coal, who by her researches first gave us an insight into the different constituents and their characters.

After her initial work the number of those who worked on the details of coal increased very rapidly and the literature on the subject grew almost daily.

However there were several difficulties. The method of thin sections was practicable in a somewhat restricted group of coals only, i.e. in those with a content of volatile matter of more than 20%. These are the coals of low rank, as distinct from the coals of high rank, in which the coalification has proceeded much further.

Newer methods, especially that of making polished sections, have given us the opportunity of extending our researches to all coals. But here by the influence of the coalification the real structure very often remains invisible and it was only by the use of etching methods that we got a real idea of the structure, which is a uniform one in all paleozoic coals of the same origin.

The detailed knowledge of the constitution of coals has given us a much better idea of the characters of the constituents themselves. It became evident that these different constituents have different characters in chemical, botanical and technical respects. An immense amount of literature was published on the technical characters and the use of these differences for practical questions and many interesting details and important indications were found.

However it was always a great difficulty that owing to the different aspect of these different constituents in coals of different rank it was almost impossible to be sure that one was working with a homogeneous material and that under the same names the same material was understood. Such questions can be answered by a systematic and comparative research only and consequently the staff of the Geologisch Bureau, Heerlen, made a start with researches of this kind. These researches have already brought several important results and many other indications. However they revealed how great the difficulty is to obtain pure and homogeneous material. It became evident that
one of the first questions to be put was that of the different conditions in one and the same seam, especially where such a seam shows different characters in different places.

Besides this it was evident that the character and qualities of a coal seam could be judged only by the establishment of detailed sections to enable us to get an insight into the detailed composition.

This paper is a first attempt of such researches. We have taken material from one seam from different places, made up the detailed petrographical sections and compared these sections. At the same time several other characters of the seam were taken into consideration and it was attempted to prove correlations between these characters and the petrographical composition.

It is clear that our work is only a beginning and that still much work must be done before light is thrown on the different, often very dark and difficult questions connected with coal. The importance of coal which is of so much use for mankind as a mineral substance of the first order justifies the continuation of these researches. It is our opinion that the only possible way to reach a real knowledge of coal and of the characters and value for technical purposes of the different constituents is to start with a detailed comparative petrographical study. Only then, when we know exactly the material with which we, together with chemists and technologists, are working and operating, we can expect that such results can be obtained which give the right idea of what coal is and how to deal with it.

Our work has been carried out employing the methods worked out in the Geologisch Bureau voor het Nederlandsche Mijngebied at Heerlen and we are very much indebted to the staff of that Bureau and especially to Prof. Dr. W. J. Jongmans and Dr. R. G. Koopmans for their advice and assistance.

This paper is an attempt to describe the properties of one of the seams of the coal-area of South-Limburg (The Netherlands). This seam was chosen, because it occurs over the whole area, it is mined at all collieries and therefore readily accessible at many different points. Moreover it varies widely in the contents of volatile matter.

The properties, which have been determined, are: the percentages of water, ash and volatile matter, and the volume, shape and consistency of the coke-buttons which were obtained in the determination of the volatile matter-contents. Special care was taken with the petrographic examination of the coal samples.

Before describing the methods, which were followed in obtaining, preparing and examining the samples, we shall give a short survey of the formation of coal and of the principles and the methods of coal petrography. This survey is rather short, because these subjects have been repeatedly dealt with by several authors. For this reason, however, we added an extensive list of the newer literature.