LEPLAY AND SOCIAL SCIENCE.

By DOROTHY HERBERTSON.

CHAPTER IV—(Continued).

In 1832 Leplay contributed an important paper to the *Annales* under the title of "*Observations on the commercial movement of the chief mineral products between France and foreign countries for the last twelve years, and more especially for the years 1829, 1830 and 1831.*" The tables appended were compiled from the official returns of the customs. This valuable piece of statistical work attracted great attention, and was largely responsible for the passing of a measure in April 1833, which provided, among other things, for the publication at the beginning of every session of a complete account of all metallurgical, mineralogical and geological undertakings in which any mining engineer had taken a part. This was almost immediately followed by the appointment of a Permanent Statistical Commission for the Mineral Industries.

When this Commission was appointed Leplay was in Spain, whither he had been sent on an important mission. The re-opening of the lead mines of the Sierra de Gador and the Sierra de Lugar had attracted the attention of all mining experts to Spain. It was said that rich deposits existed between Estramadura and Andalusia, but so little was known of the geology of Spain that it was impossible to say whether this was the case. Leplay was despatched to visit these districts and furnish a geological and statistical account of the mineral wealth of the peninsula.

The results of his journey were published in three papers in the *Annales*. The first ("*Itineraire d'un voyage en Espagne, precede d'un apercu sur l'etat actuel et sur l'avenir de l'industrie minerale dans ce pays*") traces the history of the mining industries in Spain from the Roman occupation through the decadence which followed the expulsion of the Moors, to the great revival which began about 1820. An itinerary of his journey follows, with a geological account of the region traversed. In the three months between April 20 and July 15, 1833, Leplay travelled extensively in Estramadura under circumstances of great novelty and hazard. To secure his personal safety in a country where the law afforded but little protection to the traveller he was obliged to organize a small armed caravan. "The gun," he writes, "is as necessary as a geological hammer to any geologist who wishes to examine a country where not even a reaper goes to his field unless fully armed and where the only shelter for the night is often in the midst of a solitary wilderness of palms and aloes which might well make one forget that one was still in Europe." After forming an opinion of the mineral resources of Estramadura, Leplay continued his journey by Cordova, Seville, Cadiz, Malaga and Granada, visiting all the important mining centres on his way. He went on to the rich mines of Alpujarras, in the Sierra de Gador. His journey was brought to a somewhat abrupt end by an attack of fever which compelled him to abandon his intention of proceeding along the coasts of Murcia, Valencia and Catalonia, and to return to France by sea. The second and more important part of this paper is entitled, "*Observations sur l'Estramadura et le nord de l'Andalusie, et essai d'une carte geologique de cette contrée.*" It is illustrated by beautifully drawn geological sections of the district, and by charming little sketches of the chief places of interest. The interior of Spain was at that time little known to the geologist or the general

traveller, and Leplay's papers were therefore of more than usual interest both for the scientific and the general reader.

The appointment of the Permanent Statistical Commission has already been mentioned. Six months after his return from Spain in January 1834, Leplay was named a member. In 1848 he became Inspector of Studies at the School of Mines, and resigned his seat on the Statistical Commission. He had been professor of Metallurgy at the School of Mines since 1840.

Leplay prepared fifteen reports for the Statistical Commission, and the task occupied the greater part of each winter. His summers were spent in travel, in the course of which he collected much valuable information as to the production of coal and iron in the districts he visited. In 1835 and 1836 he visited Belgium and the United Kingdom, and in 1837 he extended his researches to the eastern confines of Russia. M. Anatole Demidoff, a wealthy Russian landowner, had offered to bear the expense of a scientific survey of the Donetz coalfield, one of the richest in Russia, situated on the banks of the Don, between the Caspian Sea and the Sea of Azov. Leplay, though so young a man, was officially asked to organize this survey. He set out overland for the Donetz, accompanied by an engineer, a geologist, a naturalist and a draughtsman, while the necessary machinery and tools and a body of skilled workmen capable of training the unskilled Russian labourers, were despatched by sea. In June, 1837, the party found themselves on the great steppes of the Black Sea, "where the grass," wrote Leplay, "often grew to a height sufficient to engulf the horses." Each of the scientific experts took charge of his own department, organizing and directing the work of his subordinates. Leplay was generally responsible for the whole. Each specialist furnished a report on the work of his own section accompanied by maps and sketches, and the various reports were published in a volume entitled, *Explorations des terrains carboniferes du Donetz*.

The survey of this rich coalfield was a piece of work of great scientific and practical importance, and that it should have been entrusted to a young man of little more than thirty shows how high was his standing among men of his own profession. It led almost immediately to another of still greater importance, which required not merely technical knowledge but administrative capacity. M. Demidoff possessed important gold, silver, platinum, iron and copper mines in the Ural mountains. They had not been properly worked and had proved a loss. Struck by Leplay's combination of technical and practical qualifications, M. Demidoff asked him to inspect his mines and criticize the methods in use. Leplay visited the Ural for the first time in 1844, and found that the methods in use were both costly and unproductive. After a careful investigation he saw how they could be improved, and laid proposals before M. Demidoff. The task of reorganizing this vast industrial enterprise thus fell to Leplay, who promptly set to work to introduce the best and most scientific methods into the extraction and treatment of the ore. He was responsible for 45,000 men, and he directed the operations of his industrial army from his office in Paris with the most remarkable success and ability. The experiment was not merely a financial success but a striking illustration of the power of capital and labour when united for the development of industry and social peace. M. Demidoff contributed the capital and land, Leplay the scientific knowledge and administrative capacity, and 45,000 workmen co-operated in carrying out his ideals. The measure of his success was the profit yielded by the mines and the stability of the industrial society created.

Leplay now stood at the head of his profession, and was known throughout Europe for his excellent and original work. His professional experience had been extraordinarily varied. In the course of twenty years of travel he had made himself

acquainted with the mineral industries of every country of Europe and had contributed numerous articles to technical journals, several of which had been collected and published in a permanent form. He had controlled and organized a vast industrial enterprise. His position as Inspector of Studies and Professor of Metallurgy in the School of Mines made him a power in the educational world and enabled him to exercise great influence over his pupils, who speak of his teaching with enthusiasm. His many occupations left him but little leisure, but what he had he intended to devote to the preparation of a voluminous treatise on *The Metallic Art of the Nineteenth Century*. Not only had he accumulated a vast mass of material but his work on the Statistical Commission had made him familiar with the best methods of recording it. This material may still be examined at the School of Mines, with Leplay's annotations. The reputation of the author attracted universal attention to his proposed work which was expected to be a masterpiece of erudition and encyclopaedic knowledge.

The great work, however, was destined never to be written. The first period of Leplay's life, in which metallurgy ranked before social science in his interests, was drawing to a close. Henceforth he was to be occupied chiefly with administrative duties and the study of social problems. In 1851 he was a member of one of the juries at the Great Exhibition of 1851, and furnished to the French Government a report on cutlery and steel tools. His last contribution to the *Annales des Mines* was published in 1851. In it he described a new method employed in the manufacture of iron in the forests of Carniola, and discussed the chances of wood in its struggle with coal in some part of Europe. With the publication of this paper his career as a metallurgist may be said to have closed, for, although his enthusiasm for his profession never flagged, the increasing claims of public life and of social work left him little leisure to pursue it.

(To be continued.)