shown through part of the huge works, to see the whole of which several days would be required. These works were founded in 1865 for the manufacture of colouring matters and other derivatives extracted from coal tar. In that year there were only thirty workpeople. In 1870 there were 835; in 1885, 2377; in 1895, 4450. Now there are 8000. They employ, moreover, some 200 trained chemists, 100 engineers, and more than 700 mercantile clerks. The area of the site of the factory is about that of the City of London. On one side of it is the Rhine, so that there is easy transport for the coal (they use 1000 tons a day) to drive their 370 steam engines, and for the pyrites (of which they use 100,000 tons a year), and other raw materials required.

This is not the place for a full account of the progress of discovery in this branch of chemistry, but each discovery in turn has been utilised and turned into gold. Their staff of trained chemists are continually adding to their store of knowledge, and are provided with well-equipped laboratories. To the benches are distributed hot and cold water, compressed air, vacuum and electrical power. The commercial value of their discoveries is safeguarded by a patent department having some seventeen assistants. They hold more than 1200 patents, and take out on an average about two a week.

The Badische Anilin- und Soda-Fabrik has already decided on a site at Birkenhead, but as it is only one out of a dozen German chemical companies which have during the past five years paid dividends of from 10 per cent. to 35 per cent. per annum, there appears to be good reason for bringing to the notice of the directors of these companies places in the United Kingdom which are specially suited to these industries.

There can be no doubt that before the directors of successful foreign companies attempt to establish industries in the United Kingdom, they will make exhaustive investigations as to the general industrial conditions in this country and as to the special considerations relating to their particular industries. The deputation discusses at some length the industrial conditions in Germany, and, in order to compare the industrial conditions there and here, reference is made to the recently published Board of Trade report (Cd. 4032, 1908) on the condition of the working classes in Germany. This question is so directly before the public to-day that there is no necessity to discuss the matter here, but it is of interest to know that Dr. Walther Rathenau, one of the leading industrial authorities in Germany, in his "Reflexionem," remarks that, speaking of the chemical industry,

> the reason the Germans have so far surpassed us is because English science is not strong enough to direct the numerous ramifications of the source of the "black art" into the technical stream, and because English industry has not the army of trained workers which is annually recruited from the German high schools. The same difficulties, he remarks, are encountered by the electrical industries in England.

The other conditions which are considered of importance in deciding the question of the establishment of a chemical industry are stated to be:—

(1) The cost of motive power.
(2) The price of coal, alkali, and acids.
(3) The availability of salt or brine.
(4) The price of land and the amount of taxes.
(5) The supply of water and provision for discharge of effluent.

The deputation appears to have considered fairly fully the various conditions necessary to the successful establishment in Ireland of industries such as the electrical and chemical industries, and it is of opinion that there is no reason why such industries should not be profitably carried out there.

When the deputation made its report, the Comptroller's first decision under Section 27 (in the case of an application for the revocation of Hatschek's patents No. 6455 of 1900 and No. 22,139 of 1900) was under appeal, and it was doubtful what interpretation of the section would finally prevail. Since then, however, Mr. Justice Parker has delivered judgment in the appeal, and there can be no further doubt that a patentee who manufactures exclusively or mainly abroad runs a very grave risk of having his patent revoked. Patentees will therefore be more inclined than they have been to manufacture here, and in order to direct those who may benefit by this inclination, we give the general conclusions arrived at by the deputation, viz.:—

(1) The first is that, if reasonable facilities are offered, there is a strong probability that manufacturers in certain industries will find it to their interests to set up branches of their works within the United Kingdom.

(2) In the next place, in order to attract such manufacturers to any particular part of the United Kingdom, it will be necessary for those interested in the industrial development of any given city or locality to themselves make special and persistent attempts to bring before particular firms the facilities and advantages which the localities in question have to offer. In other words, it will not be enough to send circulars—even those translated into good German—to our Consular representatives abroad. We saw a large pile of these from various municipalities on the table of one of the large Consulates "in case of inquiry." There had been no inquiries. It needs to be recognised that the matter is one into which the keenest competition enters, and in regard to which only persistent efforts on the part of the competing localities themselves will produce results.

(3) There is a third general conclusion which we believe to be of considerable importance. It seems clear that the effects of the working of the Patents and Designs Act will not be immediate, but gradual and continuous. It is already evident that a number of foreign manufacturers will establish branches of their business in the United Kingdom, and will so maintain their patent rights. But many manufacturers will doubtless prefer to sacrifice their patents rather than take this course. The inventions contained in patents which will be revoked as a consequence become public property, and may be utilised by any enterprising person. Given the necessary enterprise, it will be possible to build up new industries, whilst existing industries may derive benefit from the freedom to utilise inventions in cases where the covering patents are not being worked to such an extent in the United Kingdom as to comply with the Act.

DR. VON NEUMAYER, For.Mem.R.S.

THE news of the death, on May 24, at Neustadt, in the Bavarian Palatinate, of Excellency Georg Balthasar von Neumayer was received with genuine regret by a world-wide circle of scientific men, to a very large number of whom he was personally known for his sterling qualities, the warmth of his friendship, his genial urbanity, and his kindly disposition, more especially towards young men entering upon a scientific career. To these he was the fatherly counsellor who gave them every encouragement to prosecute their studies in the broadest possible manner, for he had long ago realised that science had entered upon a new era of marvellous progress. The foreign visitor to German scientific gatherings has always been struck by the universal reverence for the name of Neumayer, for there have been very few of the savants of the fatherland during the past half-century who have not been influenced, more or less, by the great personality who is now no more.

Dr. von Neumayer was born at Kirchheimbolanden, in the Palatinate, on June 21, 1826, so that at the time of his death he was within a few weeks of completing his eighty-third year. From his early youth he

developed a decided predilection for scientific investigation, and during his career at the Munich University he became intensely interested in the Polar expeditions which were being conducted by Sir James Ross and Sir John Franklin. The German navy and the German overseas trade are subjects which are widely discussed to-day, but few recognise that the vast changes which have taken place originated in the brain of the youthful Neumayer. At a time when divided Germany had neither navy nor mercantile marine worthy of mention, Neumayer was the first to entertain the idea as to the direction in which a united Germany should advance, which was long afterwards crystallised by the present Emperor, when he declared that "Unsere Zukunft liegt auf dem Wasser." So early as 1849 the university student had visions on the subject, and in 1850 we find him departing from Munich to take a subordinate post before the mast on a sailing ship bound for South American ports. This afforded him the opportunity for studying the theory as well as the practice of navigation and nautical astronomy.

On returning from the southern seas in the following year Neumayer went for a time to Trieste as a teacher of navigation, proceeding thence to Hamburg, where in after life he was destined to become a distinguished citizen. But he could not rest long ashore, the sea had its attractions for him, and in 1852 he again took ship for the southern oceans, where he spent a couple of years. In 1856 he went out to Tasmania, and there devoted his time to magnetic work at the observatory which Sir John Ross started at Hobart Town. The following year found him at Melbourne, and here, with the assistance of Maximilian, King of Bavaria, and Alexander von Humboldt, he founded the Flagstaff Magnetical and Meteorological Observatory, which was subsequently taken over by the Victorian Government authorities. A great deal of his time in Victoria was given to a magnetic survey of the country, which was carried on right up to the foot of Mount Kosciusko, in New South Wales. Having accumulated a mass of magnetical and meteorological information, he left Melbourne in 1864 by the then celebrated clipper ship *Sovereign of the Seas,* and returned to Europe. His reception in London on this occasion made a lasting impression upon him, and to the end he never failed to acknowledge the encouragement which he obtained from prominent members of the Royal Society —Sir Roger Murchison, Sir Edward Sabine, and many others, with whom a life-long friendship was entered upon. Settling down quietly in his native land, the Palatinate, he devoted about six years to the careful discussion of the voluminous records which he had gathered in Australia.

Placing a high appreciation on the value of the work thus far done by Neumayer, the recently formed Imperial Government of Germany in 1872 offered him the appointment of hydrographer to the Imperial Navy, a post which he occupied until 1876, when he was promoted to the directorship of the Deutsche Seewarte, at Hamburg, an institution the establishment of which in 1868, under Wilhelm von Freeden, as the Norddeutsche Seewarte, he had strenuously advocated. In his new post Neumayer was retained as adviser to the Admiralty at Berlin. The efficiency of the German navy of to-day is largely due to his unbounded admiration for the methods of the English navy. Whether in matters of discipline, surveying, magnetic observations, or any other subject, his aim was to train his countrymen to attain at least the English standard of excellence. During his directorship of the Seewarte he was indefatigable in his exertions to introduce the best scientific methods into all work performed in the German naval and mercantile services, and to-day, thanks to his guidance, both may be said to be second to none in the correctness and trustworthiness of their contributions to scientific progress.

While Neumayer was recognised as an authority on meteorological problems, the subject which he made specially his own was magnetism, and to this field of research he devoted the greater part of his life, down to within the past few months. With the object of furthering our knowledge of this subject he exercised his influence in promoting investigations in all parts of the world—in the international circumpolar expeditions of 1882–3; in the fitting out of the German Antarctic expedition on the *Gauss*; and in many other ways. Recognising the great international importance of the question, he, in February, 1898, made a special visit to London to join in the appeal which was then being made by the Royal Society for the equipment of an English scientific expedition into the Antarctic Ocean. The special points which he advocated on that occasion were gravity and magnetism. "A gravity survey," he said, "is, in connection with a thorough geographical survey of the Antarctic, one of the most urgent requirements of the science of our earth. There are no measurements of the gravity constant within the Antarctic region; indeed, they are very scarce in the southern hemisphere south of the thirtieth parallel, and they are so closely connected with the theory of the figure of our earth that it is hardly possible to arrive at any conclusive results in this all-important matter without observations within the Antarctic region."

Magnetic investigations always entered into his advocacy of Arctic and Antarctic expeditions in addressing meetings of the German Association, the Geographentag, and other scientific bodies. In Germany the rules regulating the retirement of public servants into private life are not so rigidly enforced as they are in England, and this was particularly noticeable in the case of Dr. Neumayer. With advancing years, and when he felt entitled to withdraw from the service, he several times sought permission to give up active work as director of the Seewarte, but such were the high opinions of him entertained by the ruling authorities at Berlin, as well as by his fellow-countrymen generally, that deaf ears were turned to his appeals. It was not until 1903, when he was approaching the close of his seventy-seventh year, that the Emperor paid a personal visit to the Seewarte, and at last the aged director was permitted to retire into private life with a pension and the honour of the ennobling title "von."

During the last six years Neumayer resided at Neustadt, a short distance from his birthplace, his rooms decorated with numerous mementos of his long career in both hemispheres, and to the last maintaining his interest in his favourite subject. He was a Privy Councillor of the Empire, and both at home and abroad he was awarded many distinctions. When the German Meteorological Society was founded at Hamburg, in November, 1883, he was unanimously chosen as its first president; in 1899 he was president of the German Association; while his services to the great port of Hamburg were recognised in many ways, the city perpetuating his memory by naming one of the new streets near the Seewarte and the Bismarck monument after him. In London he was elected an honorary member of the Royal Meteorological Society so long ago as 1874, and he became a Foreign Member of the Royal Society in 1899. "The world is certainly the poorer for his loss" is the expression of one of his English admirers. He was the author of numerous books and scientific papers, some in English, the results of the Victorian investigations being published in two English volumes. His papers and addresses are to be found in the publications of many scientific societies, and he was also the author of various magnetic and other charts and atlases. HY. HARRIES.