

dence for information that will enable him to avoid all his useless work in trying to find means of "unmasking" or absorbing the gas; let him take up Faraday and Lyell's report on the Haswell Colliery explosion of 1844, and he will find his own proposal described in every essential detail, as well as a hint thrown out that coal-dust has much to do with explosions; let him peruse the copy of the report addressed to the United Committee of the Coal Trade by the Special Committee appointed to take into consideration Faraday and Lyell's report, and he will find the opinion expressed by the practical men of that day regarding the very plan he now brings forward as original.

But why should he labour through all that mass of reading and more than we have named, when he can find all that is of any value on the subject condensed in that most admirable dissertation, entitled "Rapport de M. Haton de la Goupillière (Ingenieur-en-chef des Mines, Professeur d'Exploitation des Mines à l'École des Mines), au nom de la Commission d'Étude des Moyens propre à prévenir les Explosions du grisou" (Paris: Dunod, Editeur, Quai des Augustins, No. 49, 1880). In that volume he will find an account of all his own plans and those of many others, as well as much valuable information that will prove of inestimable value to him if he should decide to pursue this subject to its legitimate conclusion, as we most earnestly hope he will.

Mr. Plimsoll wrongs the scientific and mining sections of the community when he charges them with so much indifference. In England, in France, and in Belgium there is at present a Government Commission considering the subject of his article, viz. "Explosions in Collieries and their Cure," and collecting evidence which will be of great value in enabling us to approach nearer to the mark we are all aiming at.

As usual the Royal Society travels in the van, and to our certain knowledge has given the sum of no less than 255*l.* within the last seven or eight years towards assisting in experiments which are being made with the view of throwing light upon the subject.

Similarly each of the Mining Institutes is eagerly canvassing every scrap of useful knowledge that may tend to lessen the risks of mining, and especially of explosions.

Lastly, in Germany we have also activity; and we can recommend a perusal of a pamphlet entitled "Die Verhütung von Explosionen schlagender Wetter in Steinkohlenbergwerken," by Dr. Adolf Gurlt, Bergingenieur, Bonn: Verlag von Max Cohen und Sohn (Fr. Cohen), 1880. This pamphlet ends with the following words, in which it appeals to thoughtful miners. We would extend the same appeal to one and all:—

"So mögen denn alle denkenden Bergmänner ihre Kräfte vereinigen um dem verderblichen Feinde des Kohlenbergmannes, dem Grubengase, diesem Moloch, welcher noch fortwährend so viele frische Menschenleben verschlingt, in Zukunft seine Opfer nach Möglichkeit zu entreissen."

If really safe safety-lamps were introduced that could not under any circumstances ignite an explosive mixture of fire-damp and air; and if at the same time the use of an explosive or other agent that produced no flame were substituted for that of gunpowder or dynamite, we might be comparatively free from explosions.

Thus far however neither the one nor the other of these desirable consummations has been attained.

On the other hand, if we could entirely eliminate explosive accumulations of fire-damp and air from our mines we should expect, according to the most generally received opinions, to be able to use naked lights and to fire shots wherever we had a mind to do so. Naked lights we might use under these circumstances; but we should protest in the strongest terms against blasting in the presence of dry coal-dust alone. The rôle of that agent has not yet been officially recognised, at least to

the extent of framing special regulations to assist in dealing with it; and until it is so recognised we venture to assert that explosions will continue, and that the same impossibility of explaining them, save by the assumption of simultaneous eruptions of fire-damp in different parts of the workings, will continue to be experienced.

That this is an illogical method of accounting for them may be gathered from the fact that the Risca explosion of July last required no less than three simultaneous eruptions to explain it. The Penygraig explosion would require one in each district; but we say this without prejudice to the evidence either direct or circumstantial that may yet be forthcoming to prove the existence of explosive accumulations in one or more places in the workings.

In conclusion we would say that the Penygraig explosion cannot be explained by the fire-damp hypothesis alone; explosive accumulations may have been accidentally ignited by a shot, or by a defective safety-lamp, and so have originated the explosion; but something else than fire-damp, something whose presence was entirely ignored, took up the flame, carried it to the innermost and to the most extreme limits of the workings, and was in all probability the cause of 90 per cent. or more of the deaths that ensued. Need we state our absolute conviction that that obscure agent was coal-dust?

W. GALLOWAY

COL. PRSHEVALSKYS' RECENT JOURNEY

THE new number of the *Izvestia* of the Russian Geographical Society contains the long-expected letters from Col. Prshevsky on his adventurous journey on the frontier of Tibet. We have already referred to Col. Prshevsky's work; the following further details will be of interest:—His last news were dated from Hami, whence he proposed to go south-east to Tsaïdam. But it was impossible to find a guide: a Chinese, given for this purpose by the Hami authorities, left the expedition some fifty miles from the town, after having led the travellers into a region full of great ravines. M. Prshevsky, confident in his eleven companions, resolved to find his way himself by sending every day two men on horseback for distances of thirty and fifty miles round to discover the best direction. The advance was very slow, and the travellers spent one month and a half in the mountains south of Sa-djeou, discovering the high mountain-ranges to which they gave the names of Humboldt and Ritter. After a march of 190 miles they arrived at Kourlyk in the Tsaïdam, but here also they were badly received, and could not find guides, owing to the secret influence of the Chinese. Finally M. Prshevsky told the chief of Kourlyk that he would take him as guide to Tibet if another guide could not be found, and on the following day the guide was found.

On September 24 the travellers left Tsaïdam. Again the guide led them into impracticable tracts near to the Blue River, so that M. Prshevsky's expedition was compelled again to seek its own way. After having crossed the Blue River at its sources, they climbed the high plateau of Tan-la, after having crossed the 16,800 feet high pass across the border-range, which was covered with snow in October. On the passage they were attacked by the nomad tribe of Egrays, but the companions of M. Prshevsky gave them a hot reception, and the Egrays fled, leaving four killed and several wounded.

Descending from the Tan-la ridge, the expedition continued its way to Lassa, but at the Nabchou settlement, 160 miles distant from the capital of the Dalai-Lama, they were met by Tibetians, who declared that the expedition could not be allowed to go further without a permission from the Lassa authorities; a thousand soldiers were assembled at Nabchou. M. Prshevsky gave his consent to await an answer from Lassa, and stayed at

Nabchou, buying food from the Tangoutes, who consider themselves as under the rule of the governor of Sining. Twenty days later the answer arrived; a messenger from the Dalai Lama, accompanied by seven officers, entreated M. Prshevsky to return, saying that the whole population of Lassa was very excited against the strangers, as it was declared among the people that the expedition intended to steal the Dalai-Lama himself and extirpate the Buddhist religion. A conflict with the inhabitants of Lassa being most probable, M. Prshevsky was compelled to return. All December and January were spent on the road to Tsaidam, the distance from Nabchou to Tsaidam being 560 miles. Progress on this high plateau (14,000 to 16,000 feet) was very difficult; out of thirty-four camels twenty died, and the collections were conveyed on horseback; the men mostly went on foot. We need scarcely say that the scientific collections and observations are of a great value.

On March 20 M. Prshevsky reached the Chinese town of Sining, close to Lake Koko-nor. After having received permission from the governor of the province to go to the Hoang-ho, however, without crossing it, M. Prshevsky sent his collections to Alashan, and went east to the banks of the Yellow River, which are fifty-six miles distant from the town of Donkyr. He reached them at the Gomi settlement. The river, 450 feet wide, and 8000 feet above the sea-level, is rapid (5 feet in a second). Its valley cuts deeply into a great deposit of clay, gravel, and boulders, the abrupt walls of which, along the banks of the main river, being 1600 feet high, and no less than 1000 feet along the banks of numberless tributaries. The journey across these gigantic ravines with abrupt walls (quite like those of the loess in the lower parts of the Hoang-ho) was most difficult. After a journey of 130 miles up the Hoang-ho, M. Prshevsky reached a lofty mountain-range, which is cut through by the river, and probably is a continuation of the Burkhanbuda range. Further advance along the banks was impossible, and M. Prshevsky not having a guide for crossing the range was compelled to return and soon reached the town Gui-doni, situated on the left bank of the Hoang-ho, forty miles below Gomi. The natural history collections from the Upper Hoang-ho are very rich: 260 species of plants, many fishes, and 500 birds. The astronomical and barometrical observations are numerous. M. Prshevsky did not reach the sources of the Yellow River, and he supposes that they cannot be reached otherwise than along the Tibetan plateau; he doubts however that the Upper Hoang-ho makes so great a bend as it is usually shown on our maps.

The last letter from M. Prshevsky is dated Gui-ta-din, on the Upper Hoang-ho. As is known, he returned *via* Alashan, and is expected at St. Petersburg by the end of January.

MICHEL CHASLES

THE news of the death of Michel Chasles, perhaps the oldest and best-known mathematician in Europe, will be everywhere learned with deep regret. For the fifty-five years over which his writings extend he has devoted himself with persistent industry to the history of geometry and to the perfection of those geometrical methods with which his name will be always associated. The "Aperçu historique sur l'Origine et le Développement des Méthodes en Géométrie," which in fact forms an elaborate history of the subject from the time of Thales and Pythagoras to the beginning of the present century, is the best known of his works; it was first published in 1837, and a second edition appeared only a few years ago. His restoration of the Porisms of Euclid was published in 1860. The last great work of Chasles related to the investigation of the number of conics satisfying any five conditions: the special method which he invented for

these researches, termed by him geometrical substitution, involved the consideration of the characteristics of systems of conics, *i.e.* of the numbers of conics satisfying four common conditions and (1) passing through an assumed point; (2) touching an assumed line.

In 1865 Chasles received the Copley medal of the Royal Society; this medal has, since its foundation in 1731, been given only five times for discoveries in pure mathematics, *viz.*, in 1784 to Waring, in 1814 to Ivory, in 1841 to Sturm, in 1865 to Chasles, and in the present year to Sylvester.

In 1846 Chasles was appointed to fill the new Chair of Modern Geometry, founded by the Faculty of Sciences at Paris; and as a professor he exerted personal influence over the younger geometers of that time, which has since been apparent in their writings, although the effect of the geometrical methods to which he devoted his life is chiefly visible in the works of the Italian and German mathematicians. He was the inventor of the term "anharmonic ratio," but not of course of the ratio itself, which was known to the ancients. Chasles's memoirs on the attraction of ellipsoids are well known to English mathematicians and physicists; and a translation of his memoirs on Cones of the Second Order, and Spherical Conics, was published in Dublin in 1841 by Dr. Graves, now Bishop of Limerick.

Most of our readers will remember how in 1866 Chasles was deceived by M. Vrain Lucas by what were called the Pascal forgeries, and they will also remember how honourably he extricated himself from the matter, and did all in his power to repair the mischief done. The forger was convicted and sentenced to two years' imprisonment; and not a shadow of suspicion was ever thrown upon the honour or good faith of Chasles.

Scientific visitors to Paris will miss a well-known face at the Academy and a kind and hospitable friend. Till quite recently Chasles seemed as active as ever, both mentally and physically, and it was only last September that he issued a new edition of his "Géométrie supérieure." He was a Foreign Member of the Royal Society and of the Cambridge Philosophical Society.

THOMAS RYMER JONES, F.R.S.

THE late Professor of Comparative Anatomy at King's College, London, whose death is announced, was born about the year 1820. He studied for the medical profession at Guy's Hospital, and took the diploma of the Royal College of Surgeons, London, in 1833. A chronic deafness unfitting him for the active pursuit of his profession, he devoted his attention exclusively to comparative anatomy. Some of his earliest papers were on the dissections of a tiger (*Proc. Zool. Soc.* 1834) and of an agouti (*Proc. Zool. Soc.* 1834). He was the first Professor of Comparative Anatomy at King's College, and was Fulleren Professor of Physiology to the Royal Institution in 1840. He was Assistant-Secretary to the Section of Zoology and Botany during the eighth meeting of the British Association held at Newcastle-upon-Tyne in 1838, the president of the section being Sir W. Jardine, the secretaries J. Edward Gray, Richard Owen, and John Richardson. This meeting was marked by the presence of Christian Gottfried Ehrenberg, who laid before the section a copy of his famous work, "Ueber Infusionsthierchen," making at the same time a short statement as to his views of the alimentary canal of the polygastric infusoria. These views were, in the discussion which followed, criticised by Rymer Jones, who stood almost alone among the British naturalists in opposing them. In 1838 the first part of his "General Outline of the Animal Kingdom" was published by Mr. Van Voorst, happily still among us. It was completed in ten or twelve parts, and was illustrated