

C H A P. XVIII.

CAVERN OF DEMANOVO—NEUSOHLN AND THE MINES OF HERREN
GRUND—BIOGRAPHICAL SKETCH OF BARON BORN—SCHEM-
NITZ, KREMNITZ, AND KONIGSBERG, AND THEIR MINES.

THE day after my return to Pribilini I paid a visit to Mr. Emerich Pomgratz at Andrasfalva. In a neighbouring limestone rock there is a great cavern called Demanovo, which I intended to have seen, but some trifling travelling mortifications prevented it: and as I was only informed of its-being a great cavern, enough of which I had already seen, I was very indifferent about it: but had I then known that this was the cave which Bruchman says is so full of bones, and out of which the skeleton of the *dragon*, which was sent to the Elector of Saxony, was taken, I should certainly soon have levelled all these trifling difficulties, and I should probably have been rewarded with a fine specimen of the skull, not of a dragon, but of the *Ursus maritimus*, or *Ursus spelæus* according to Rosenmuller, for my trouble; for those which are found in the cavern of the Hartze, to which these are likened, are of this kind.

Bruchman in his 77th epistle* says: "Cum iter ulterius in isto

* Epistola itineraria.

subterraneum prosequeremur, magnos acervos sic dictorum ossium draconis, ex quibus & singula antra nomen antrorum Draconum acceperunt, offendamus, quæ vero nihil recedebant ab istis ossibus, in specubus Sylvæ Hercynicæ colligendis, & Unicornu fossile vulgo salutatis. In patriam maxillam, dentes, ungulam & dorfi vertebram, paulo tamen duriolem, nec tam molliter calcinatam, ac ossa antrorum Sylvæ Hercynicæ, sed firmiorem & compactiorem, mecum attuli; hæc ossa in tanta hic prostant copia, ut integra plaustra colligenda. Dominus Georgius Bucholz, olim Scholæ Nagy-Pallugyensis Rect. pronunc verbi divini Evangelic. ad ecclesiam Windicam Minister ac Rector Scholæ Kefmarkiensis, vir sane curiosus, qui multam operam naturæ miracula in regionibus Hungaricis perscrutandi impedit, aliquando integrum Sceleton Draconis, ut vocant, in hoc antro repertum, in Technophylacium Regium Dresdam misit, pro quo gloriosissimus Rex nummum aureum, thaleri magnitudinis, in uno latere Regis augustissimi imaginem, in altero urbem Dresdam exhibentem, laudato Rectori gratiosissime dono dedit."

At a small distance from Demanovo is St. Ivany, where there is an air proceeding from a spring, which is famed for possessing the same properties as that of the *Grotto del Cani*. Opposite to Andrasfalva the Carpathian granit mountains, which gradually diminish in height from the Krivan, begin to get a coating of limestone on this side as they had on the other, and the rocks and hills on the south side of the valley still continue of limestone.

The

The next day I made another stage westward, to Tepla, to pay a visit to Mr. Dvonocovith, to whom this place belongs, whose acquaintance I had made at Pest. Tepla has a very good warm spring, so loaded with calcareous earth, that the very cray-fish found in the rivulets formed by it, are, whilst alive, incrusted; and we had, using common language, boiled *petrified* cray-fish for dinner: they were very good. All the low rocks here have been formed by the overflowings of this, or similar water. Higher up towards the mountains, some petrifications, partly changed into pyrites, are found in clay. Sand-stone strata are likewise found here. At Tepla I left the Carpathian chain, and the valley in which I had been travelling all the way from Kesmark: indeed this seems here to terminate by the calcareous mountains from the great chain and those of the south side of the valley uniting.

But before I travel further, before I leave my pleasant alpine views, let me pause and answer some questions which I fancy I hear some philanthropist in a country far remote from this, propose to me; and such as I have often asked of others returning from amongst some supposed rude uncultivated people, and which even I have often put to myself, when from an elevated situation I have enjoyed a very distant view; questions such as these: How do men live there? In such a climate, in such a frightful country, and under such laws; do men really live, and is it possible that they are happy?—Fortunately for mankind, they do not feel half the evils for which they are pitied,
and

and each nation in its turn looks with pity or contempt on the other. Though this valley is high, and grows little wheat, and wine and tobacco, the riches of other parts of Hungary, fail; yet it is as well cultivated and as well peopled as any part of Hungary. From the high situations I was often in, I had always the pleasing sight of a well-peopled country below me, and frequently could count at one glance near a score of villages. From a gentleman engaged in drawing up the *conscription* lists, and measuring the county, by order of the Emperor Joseph, I received this account. "In the county of Liptau it was found that there were 57,000 acres of 1300 square fathoms each, and likewise 57,000 souls; and in this estimate the land lying in fallow, which is one-third of the whole, is reckoned." And public instruction, how is that?—Not worse than in other countries: most of the villages have their ministers and their school-masters, and this is more than can be said of some other countries which boast much of their advantages. But education, on which every thing in society depends, how it is neglected every where! What are our principles for conduct but an heterogeneous mass of false religion, false philosophy, and erroneous knowledge of the world, supported by absurd dogmas, and silly maxims and proverbs? MAN, it grieves me to see thee thus neglected, whilst premiums are given for an exuberant growth in goose-berries.

After leaving this valley I travelled southward towards the mines of Lower Hungary. Limestone hills and rocks still accompanied me,

and

and often formed beautiful scenery ; but the road, though a post road, was most abominable ; great stones and fragments of rock which had fallen down from the neighbouring heights, had never been removed ; and though I travelled with four horses I was obliged to go *à pas* almost the whole way. This country grows a good deal of hemp, and the stately Beech, which I had not seen since I left Schmölnitz, made here again its appearance. Impeded by the badness of the roads, and delayed by the difficulty of procuring horses, I was compelled to travel by night to make up for the lost time, and I set out from Rivulfam after it was dark : after going through a *pass*, I ascended a very steep and high limestone hill, the descending of which was really dangerous. I stopped and passed the remainder of the night at Altgebirge, where the furnaces of the *Herren-Grund* mines are ; and early in the morning I continued my journey to Neufohn, which is only an hour or two distant. In this morning's ride I saw more limestone, and in some places the primitive sandstone.

Neufohn is well built, and prettily situated by the side of a river, and amongst high hills covered with wood. It was Sunday when I arrived here, and in the evening the market people began to collect together for the next day's market. A finer show of fruit, I think, I never saw. Having paid my respects to the principal men in the mining department, I went the next morning to the mines at *Herren-Grund*, which are two or three hours distant. They lie in an elevated

elevated situation amongst hills: all the way there I found limestone, but nearer the mine the sand-stone is often seen, and still nearer a kind of *micaceous schistus* (*Glimmer schiefer*), and it is in this, or a variety of it, that the mines are. On enquiring at Neusohn, of those who ought best to have been able to have told me, of what nature the rock here was, I was informed it was granit, and the vein quartz. Granit it certainly is not. Ferber, I think, somewhere calls it *Glimmer schiefer*, but it is very different from a true *Glimmer schiefer*, micaceous schistus; and Born's *Gneissum virescens Ind. Fossilium* is from hence; yet this is not a true Gneiss. It is distinct from any well characterised fossil, yet in some places it approaches pretty near to both of these, and likewise to Schistus*. It is probably allied to the *Arenarius griseus*, *Graue Wache*; but I can by no means agree with Mr. Haidinger, of whom I have the highest opinion, that it is a *Saxum metalliferum* †.

The mines, which are copper, are now worked with loss. Copper

* Gneissum?

Ex granis parvis & minoribus Quartzi pinguis angulis integris, paucillo Feldspati carnei & Micæ argentæ, ope Steatitæ dilute virescentis conglutinatis.

Gneissum?

Ex granis parvis & minoribus Quartzi pinguis & Steatitæ dilute virescentis, ope Steatitæ rubro-hepaticæ conglutinatis, textura subschistosa.

Ardesia.

Hepatica lamelloso-schistosa, unctuofo-nitens, fragilis, scriptura rubescente, lamellis Micæ argentæ inspersis.

† System. Eintheil. der Gebirgsarten, p. 44.

is made here likewise by cementation, and a kind of verdegrise or copper ore (*Cuprum æris*). Though this latter is gained by a very simple means, and which has been long used here, I do not know of any thing of the kind existing elsewhere. Water out of the mines, and from the hills, is made to pass through the rubbish brought out of the mines, which, in the very long succession of time that these have been worked, now forms hills, and is received into wooden cisterns which communicate with each other; and in passing from one to the other, deposits a blueish green kind of sediment, which is taken out once a year: the quantity is about thirty hundred weight.

In these mines beautiful rose-coloured stalactites of cobalt vitriol are found. I collected some a foot long with a moveable drop of water within them; some are part rose and part blue colour. Mr. Born in his *Lithophylacium* says, *an Vitriolum Zinci?* Mr. Gmelin calls it *Vitriolum Magnesi*, but adds a point of interrogation. Mr. Born in his late *Catalogue Raisonné* considers it as a vitriol of cobalt, and says that it has been lately analysed by an *élève* of the Academy of Mines of Schemnitz, who extracted cobalt from it. I sent some of it to Mr. Klaproth, who was so kind as to examine it and give me this analysis. "Sixty grains of it dissolved in water, and precipitated with vegetable alkali, gave four grains of a pale light blue precipitate, which turned black on being heated red hot. A part of it melted with microcosmic salt, and likewise with borax, gave with both fluxes a bead of pure sapphire blue. The remainder dissolved in

diluted muriatic acid, gave a sympathetic ink, the traces of which on paper appeared of a yellowish green. It is therefore a real cobalt vitriol, only containing a little iron."

The amalgamation, notwithstanding the opposition of the enemies, not of amalgamation, but of Mr. Born, still goes on with vigour; but it is difficult to learn, what are the real advantages of it—for the friends of Mr. Born cry it up as much as his enemies run it down. I have conversed with some of the latter, who, I am sure, though in other respects valuable men, would not cease to decry it though it should convert copper into gold. As the process and the machinery have been so elaborately described, I shall say nothing on it, except that now, tubs something like our barrel churns, but without the internal ribs, &c. and which are moved in the same manner, are substituted to the cylinders, for mixing the prepared ore with the mercury. But I cannot avoid saying a few words *en passant* upon the founder of these works: yet it is not Born's improvements in amalgamation, nor his other discoveries, nor yet his writings, which make him a great public character; it is rather his successful endeavours to introduce a love of science and useful knowledge where he had an opportunity.

The Baron was born at Carlsburg in Transylvania, of a noble family, and came early in life to Vienna, and studied under the Jesuits; who, no doubt, perceiving in him more than common abilities,

ties, and that he would one day be an honour to their order, prevailed on him to enter into it; but of this society he was a member only for about a year and a half. He then left Vienna and went to Prague, where, as it is the custom in Germany, he studied the law. As soon as he had completed his studies, he made a tour through a part of Germany, Holland, the Netherlands, and France; and returning to Prague, he engaged in the studies of natural history, mining, and their connected branches; and in 1770 he was received into the department of the mines and mint at Prague. As we learn from his letters, this year he made a tour, and visited the principal mines of Hungary and Transylvania, and during it kept up a correspondence with the celebrated Ferber, who in 1774 published his letters.—It was in this tour that he so nearly lost his life, and where he was struck with that disease which embittered the rest of his days, and which was only rendered supportable by a strong philosophic mind and active disposition.

It was at Felfo-Banya where he met with this misfortune, as appears from his eighteenth letter to Mr. Ferber. He descended here into a mine, where fire was used to detach the ore, to observe the efficacy of this means, too soon after the fire had been extinguished, and whilst the mine was full of arsenical vapours raised by the heat. "My long silence," says he to his friend Ferber, "is the consequence of an unlucky accident, which had almost cost me my life. I descended the Great Mine to see the manner of applying the fire, and its

effects on the mine, when the fire was hardly extinct, and the mine was still full of smoke." How greatly he suffered in his health by this accident appears from his letter which we mentioned when we spoke of Tokay; where it will be remembered he complained that he could hardly bear the motion of his carriage: upon this misfortune he hastened to Vienna. After this he was appointed at Prague counsellor of the mines. In 1771 he published a small work of the Jesuit Poda, on the machinery used about mines; and the next year his *Litbophylacium Borneanum*. This is the catalogue of his collection of fossils which he afterwards disposed of to the Hon. Mr. Greville. This work drew on him the attention of Mineralogists, and brought him into correspondence with the first men in this line. He was now made a member of the Royal Societies of Stockholm, Sienna and Padua; and in 1774, the same honour was conferred on him by the Royal Society of London.

During his residence in Bohemia, he did not apply himself to the business of his charge alone; but his active disposition induced him to seek for opportunities of extending knowledge, and of being useful to the world.—He took a part in the work entitled *Portraits of the Learned Men and Artists of Bohemia and Moravia* *. He was likewise concerned in the *Acta Literaria Bohemica & Moraviae*; and the editor of the latter publicly acknowledges in the preface to it,

* Abbildungen Böhmischer und Mährischer Gelehrten und Künstler.

how much Bohemian literature is indebted to him. Prague and Vienna were both without a public cabinet for the use of the students : it was at his instigation that government was induced to form one, and he himself assisted by his contributions and his labours. In 1775 he laid the foundation of a literary society, which published several volumes under the title of *Memoirs of a private Society in Bohemia* *.

His fame reaching the Empress Mary Theresia, in 1776 she called him to Vienna to arrange and describe the Imperial collection : and about two years after, he published the splendid work containing the Conchology : in the execution of this, I believe, he had some assistance. The Empress defrayed the expences for a certain number of copies. On the death of this patron the work was discontinued, her successor, the Emperor Joseph, not favouring the undertaking. He had likewise the honour of instructing the Arch-duchess Maria Anna in natural history, who was partial to this entertaining study ; and he formed and arranged for her a neat museum. In 1779 he was raised to the office of *Actual Counsellor* of the Court-Chamber (*Hof-Kammer*) in the department of the mines and mint. This office detained him constantly in Vienna, and engaged the chief part of his time.

The consequences of his misfortune at Felfo-Banya began now to

* Abhandlungen einer Privatgesellschaft in Böhmen.

be felt in the severest manner; he was attacked with the most excruciating colics, which rose to such a degree as to threaten a speedy termination of his life and miseries. In this depth of torment he had recourse to the usual calmer of bodily pain, opium; and a large portion of this being placed by the side of him, which he was ordered only to take in small doses; once brought to desperation through the intensity of his pain, he swallowed it at one draught. This brought on a lethargy, which lasted four-and-twenty hours; but when he awoke he was free of his pains. The disorder now attacked his legs and feet, particularly his right leg, and in this he was lame for the rest of his life; sometimes the lameness was accompanied by pain, sometimes not. But his feet by degrees withered, and he was obliged to sit, or lie, or lean upon a sofa; though sometimes he was so well as to be able to sit upon a stool, but not to move from one room to the other without assistance.

His free and active genius led him to interest himself in all the occurrences of the times, and to take an active part in all the institutions and plans for enlightening and reforming mankind. With these benevolent intentions he formed connections with the Freemasons, whose views in this part of the world were something more than eating and drinking, as may be conjectured by the laws and regulations made against masonry by the Emperor Joseph. Under Theresa, this order was obliged to keep itself very secret in Austria; but Joseph, on his coming to the throne, tolerated it, and the Baron
founded

founded in the Austrian metropolis a lodge called the *True Concord*. This was no card club, or association for eating and drinking, where the leading members were chosen by their capacity for taking in solids and liquids, and where a good song was considered as a first rate qualification; but a society of learned men, whose lodge was a place of *rendezvous* for the literati of the capital.

No doubt the obstacles these gentlemen would find, to the progress of science and useful knowledge, in the church hierarchy, and in the cabals of courtiers, would draw their attention to political subjects; and subjects were really discussed here which the church had forbid to be spoken of, and which the government must have wished not to be thought of. At their meetings, dissertations on some subject of History, Ethics, or Moral Philosophy, were read by the members; and commonly something on the history of ancient and modern mysteries, and secret societies. These were afterwards published in the *Diary for Free-masons**, for the use of the initiated, and not for public sale.—In the winter they met occasionally, and held more public discourses, to which the members of the other lodges were allowed access. As most of the learned of Vienna belonged to this lodge, it was very natural to suppose, that many of the dissertations read here were not quite within the limits of the original plan of the society. It was these dissertations, I believe,

* *Journal für Freymaurer.*

which

which gave rise to another periodical work, entitled, *Physicalische Arbeiten der einträchtigen Freunde in Wien*, which was continued for some time by the Baron and his brother Mafons. He was likewise active in extirpating superstitions of various kinds which had crept into the other lodges, and equally zealous in giving to these societies such an organization as might render them useful to the public.

The Baron, and many others of his lodge, belonged to the society of the *Illuminated*. This was no dishonour to him: the views of this order, at least at first, seem to have been commendable; they were the improvement of mankind, not the destruction of society. Such institutions are only useful or dangerous, and to be approved of or condemned, according to the state of society; and this was before the French revolution, and in a country less enlightened than almost any other part of Germany. So zealous a friend was he to them, that when the Elector of Bavaria ordered all those in his service to quit this order, he was so displeased that he returned the academy of Munich the diploma they had sent him on their receiving him amongst them, publicly avowed his attachment to the order, and thought it proper to break off all further connection with Bavaria as a member of its literary society. The Free Mafons did not long retain the patronage of their sovereign: the Emperor Joseph soon became jealous of their influence, and put them under such restrictions, and clogged them with such incumbrances, as to amount
almost

almost to a prohibition; and as such they acted, for the society found it necessary to dissolve.

What raised the Baron so high in the public opinion, was his knowledge of mineralogy, and his successful experiments in metallurgy, and principally in the process of amalgamation. The use of quicksilver in extracting the noble metals from their ores, was not a discovery of the Baron's, nor of the century in which he lived; yet he extended so far its application in metallurgy as to form a brilliant epoch in this most important art. After he had at great expence made many private experiments, and was convinced of the utility of his method, he laid before the Emperor an account of his discovery, who gave orders that a decisive experiment on a large quantity of ore should be made at Schemnitz in Hungary. To see this he invited many of the most celebrated chymists and metallurgists of Europe; and Ferber, Elhujer, Charpentier, Trebra, Poda, and many more were present, and approved of his invention. On this general approbation he published, by order of the Emperor, his Treatise on the Process of Amalgamation, with a great many engravings of the requisite instruments and machinery. To suppose that his success, whilst it brought him fame and emolument, did not draw upon him the envy and ill will of many of his brother metallurgists and associates in office, would show a great ignorance of what is daily passing in common life. Envy has its share even in maintaining order in society: it is this which tends to keep the great from rising higher, whilst a contrary passion lifts up the little, or prevents them from falling lower.

Though great cabals were raised against him, and against the introduction of his method, yet the advantages of it in many cases were so very evident, that the Emperor ordered it to be used in his Hungarian mines; and, as a recompense for his discovery, gave him for ten years the third part of the savings arising from its application, and four per cent. of this third part for the next twenty years. Even this did not defend him from being still harassed by his enemies; obstacles were still thrown in the way to prevent the introduction and success of his discovery, and to defraud him of his well-earned recompense.

Though he suffered very much in the latter part of his life, yet this did not prevent him from continuing his literary pursuits. In 1790 he published his *Catalogue methodique raisonné* of the collection of fossils of Miss Raab, which had been chiefly formed by his donations. This work, elegantly printed in two volumes, was well received by the public; and he was writing the *Fasti Leopoldini*, and a mineralogical work, when death put an end to his useful life and to his sufferings.

Notwithstanding the varied advice of his physicians his disease continued: in such a state quacks find easy access to the sick; who is not then ready to seize the nostrum of the bold pretender? One of these gave him a decoction which soon calmed his sufferings, and which he was assured would cure him in a few weeks. He continued the use of this for the last five months of his life: it really diminished

diminished his pains; but his friends observed that his cheerfulness, which hitherto had not left him, diminished likewise, and that spasms often attacked his upper limbs. On the 21st of July, 1791, he was seized with spasms and cold; the former soon subsided on friction, but he lost his speech. On the subsequent days he had different attacks till the 28th, when he found himself better, but he was soon attacked again with spasms, and in these he expired.

Born was of a middle size and delicate constitution, dark complexion, black hair, and large black eyebrows. Wit and satire, and a quick comprehension, were marked in his eyes, and his lively and penetrating genius appeared in his countenance. Besides being a good Latin classic, he was master of most European languages of note, and possessed a deal of general information no ways connected with those branches of science required in his profession. He was a great wit and satirist, and a good companion even under the sufferings of bodily pain. His too liberal and unguarded use of satire made him many enemies. In his youthful days he wrote the *Staats Perücke* for the amusement of his friends: this was afterwards published without his knowledge. But nothing shows more his talent for satire than his *Monachologia*, which he published in 1783, just when the Emperor Joseph was making his reforms in the church: indeed, at any other time such a severe satire on the monks would not have been permitted. They are characterised thus:

Monachus.

Descriptio.—Animal avarum, foetidum, immundum, siticulosum, iners, inediam potius tolerans quam laborem;—vivunt e rapina & questu; mundum sui tantum causa creatum esse prædicant; coeunt clandestine, nuptias non celebrant, foetus exponunt; in propriam speciem sæviunt, & hostem ex infidiis aggrediuntur.

Ufus. Terræ pondus inutile. Fruges consumere nati. And upon the order of Dominicans he says—Eximio olfactu pollet, vinum & hæresin * e longinquo odorat. Esurit semper polyphagus. Juniores fame probantur. Veterani, relegata omni cura & occupatione, gulæ indulgent, cibus succulentis nutriuntur, molliter cubant, tepide quiescunt, somnum protrahunt, & ex Suis diæta curant, ut esca omnis in adipem transeat, lardumque adipiscantur: hinc abdomen prolixum passim præferunt; senes ventricosi maxime æstimantur. Virginitatis sacræ ofores in venerem volgivagam proni ruunt. Generi humano & sanæ rationi infestissima species, in cujus creatione non se jactavit auctor naturæ.

The Archbishop of Vienna complained to the Emperor against this work; who replied, that it was only the idle and useless part of the spiritual order which was attacked. This was seconded by his *Defensio Physiophili*; and to this succeeded his *Anatomia Monachi*. He wrote likewise a Satire on Father Hell the astronomer, by publishing

* As being inquisitors.

a long Latin advertisement, full of irony, announcing a book written against the Free-masons, in the name of this learned Jesuit.

It must not be forgotten, that his house was always open to the travelling literati who visited Vienna; and that unprotected genius was always sure to find in him a friend and patron. He carried this perhaps too far, so far as to ruin his estate: probably the expectations of receiving a large income from the amalgamation, made him less attentive to œconomy in his domestic concerns; though I believe his insolvency was chiefly owing to usurers and money-lenders, to whom he was obliged to have recourse to carry on his expensive projects. Through these, though his patrimony was very considerable, he died greatly in debt: this is the more to be lamented, as he left a wife and two daughters.

An hour's walk from Neufohn are the smelting works, where the copper ores, containing silver reduced to the state of *swartz copper*, which is brought from all parts of the kingdom, from the Banat, and even from Transylvania, have the silver extracted by liquation. The lead used for this purpose is chiefly brought from Bleyberg in Carinthia.

I was lodged at Neufohn at the Crayfish inn, where I was much imposed on; but I consoled myself that I had always dined out, and therefore had no great bill; that Prince Bethlin lived in this
house

house when he was called to the crown of Hungary; and that the bill was written in Latin. The word *cornua* plagued me exceedingly to find out what it meant, and I was obliged to have recourse at last to the author the inn-keeper. It meant, what in Vienna-German is called *kipfle*; a small kind of roll shaped somewhat like a horn.— Great licences are taken with the Latin language in Hungary; nothing is more common than to hear words used in speaking Latin which are only known to those who speak the Hungarian, Slavonian, or German languages. *Schmutzidum tempus*, for instance, is the common term used to express bad rainy weather; *Schmutzig* is a German word, and signifies dirty; it is therefore as if an Englishman in speaking Latin should say, *dirtydum tempus*.

From the Crayfish, where I staid about two days, I went to Schemnitz, which is only two stages distant: about half way I met again with the Breccia rocks like those about Gran, and nearer to Schemnitz with the Saxum metalliferum.— Schemnitz is the principal mining town of Lower Hungary; it is ill built, and stands upon very uneven ground: its inhabitants amount to about eight thousand, half of which are engaged in the mines. The Mining Academy is very respectable, and many foreigners come here for instruction in this department. The students enjoy great advantages: they go into the mines whenever they please, and there are proper persons to attend them; and in the chymical laboratory they are allowed to make what experiments they wish; and the crucibles, retorts, and the chymical

agents are given them on asking for; and all this is at the royal expence. There are, besides, proper teachers for all the different branches of a mining education; as geometry, trigonometry, mechanics, hydraulics and hydrostatics, mineralogy, metallurgy, mining, subterranean geometry, mine-law, mine-œconomy, and forestry.

The mines which have been worked for near four hundred years are in the *Saxum metalliferum*. This varies greatly, from a grey indurated clay with whitish spots, to a porphyritic basaltes, though in general the base is more of the nature of *Wacke*; and the rock on which a chapel and a mount Calvary have been made, which is but a small distance from Schemnitz, is of true Basaltes with small particles of Olivine. The *Saxum metalliferum* does not always contain mica; and this is the case with the balls, and the rock which contains them, mentioned by Mr. Born in his 20th letter. But I have other specimens, in which the hexangular leaves of mica are placed one upon another till they form hexangular columns one-fourth of an inch long. The balls I have just mentioned are certainly very curious; they are only found in one place, I believe, or rather in one gallery: when I was there, the miners had just come to a rock which contained them; and here they were very abundant, so that half a dozen would sometimes be contained in a specimen of the size of one's fist: they are in general about an inch in diameter. Though the balls and the rock are perfectly the same; yet they are often so little connected with it as to fall out; yet sometimes so connected
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with it, as to form only hæmispherical protuberances, the other half being quite united and lost in the rock. They are similar to those in the Imperial Museum at Vienna, only the one is of *Porphyre schiefer*, the other of *Saxum metalliferum*.

In the *Amelia* gallery I observed a very fine white clay. I took some of it out with me: when it appeared pretty dry on the surface, and could be handled without soiling the fingers, it contained so much water that I could almost squeeze it out in drops, and when rubbed between the fingers became quite wet. After I had kept it near a month, though much exposed to the open air, internally it still retained a deal of humidity: when it was perfectly dry it had not half its bulk, cracked of itself into angular fragments, and looked very much like starch, and was so light as almost to swim in water. As it was not known at Schemnitz, I tried it in a wind furnace there, and found it perfectly infusible in the greatest heat we could produce.—As I passed through Vienna I gave some of it to Mr. Fichtel, and in his last work * he has given an account of it; where he says, that with the blow-pipe it gives a very bright light, unites itself with borax glass, which no clays do, and dissolves without effervescence in aqua-fortis; and says it is a very pure and true earth of alum. The Blow-pipe is of very great use in mineralogy; and when Mr. Kirwan's *Tables of the Fusibility of the Simple Earths mixed in*

* Mineral. Aufs. page 170.

various Proportions shall be perfected, it will be of still much greater use, but it will never equal an accurate analysis in the wet way. I sent this clay to the celebrated Mr. Klaproth, and he did me the honour to inform me that it contains 14 per cent. of siliceous earth, but which is so intimately united with the aluminous, that when this latter is dissolved in vitriolic acid, it mixes with it, and only becomes visible when the solution is evaporated for crystallization, by its giving it then the appearance of a clear jelly.

Every thing in the mining departments is conducted upon a great scale; and the reservoirs of water, and the galleries for carrying off the water from the mines, are to be reckoned amongst them.——Mrs. Sharpe has a very fine collection of fossils. Mr. Martin has some good specimens. The Countess Mitrovsky, a beautiful young woman, the lady of the governor, a respectable old gentleman, only admits choice specimens into her cabinet.——One Smith, a hair-dresser, sells fossils, but he asks a ducat for any good specimen. I found here amongst the students not only good mineralogists, but likewise a good botanist and an entomologist.——Near Schemnitz is Eisenbach, where there is a warm bath, with lime-stone rocks in its neighbourhood.

From Schemnitz I went to Kremnitz; but stopped and spent a day at Glashütte, where there is another very good warm bath.

Whilst I was in it, three or four females walked in ; but they were not like the fair one of Gros Wardein, but far gone in the wane ; they had the humanity to keep on their clothes, and so did I.— There are several baths, some for the common people, and one for cupping and scarifying. As the surgeon who has rented them, either from the town of Schemnitz, or else from the King, is obliged to perform this business for the *Plebs* at about three-pence the dozen, he pays a mere trifle for them. To these baths thirteen good lodging-rooms belong. Here again are lime-stone rocks ; so that all the warm baths I have yet seen in Hungary are found in the neighbourhood of lime-stone. The water of these baths, where it comes out of the rock, which is formed of the sediment deposited by the water, is 128 degrees of Fahrenheit.

As I proceeded towards Kremnitz, I met with some remarkable fossils ; first by the road-side, with a black *Pitch-stone* with particles of Adularia and black hexangular mica*. I ascended the rocks from whence it certainly must have come down, but I found no more of it. These rocks were a kind of porphyry with a yellowish white

* Porphyrius

Ex piceo nigro nitenti cultro vix rasili scintillante, granis albidis adulariæ ? cum mica nigra hexangulari inspersis.

Basis tubi ferruminatorii ope bis auget volumen, & scoriam albam sine phosphorescentia præbet.

base

base of indurated clay, with small spangles of black hexangular mica *. A little further I came to a genuine volcanic *Tufa*, containing a great quantity of small fragments of Pumice and fragments of the glassy *Pitch-stone* charged with grains of *Adularia*: in this were imbedded some fragments of an aggregate, much like grey granit in appearance, but a quite different thing when accurately examined. The principal part is a white somewhat contorted fibrous mass, in which are grains of *adularia*, black hexangular mica, and a few grains of pellucid quartz tinged of a reddish colour. This is Mr. Fichtel's granitic or Pumex-Zeolite; which, he says, constitutes the greatest part of the Shator Hill. It is Mr. Born's *Granite alteré par le feu volcanique*. What it was originally, I do not know, nor do they.——In the specimen I gave Mr. Fichtel from Erlau, he found that the quartz had changed its granulated shape into an amorphous melted mass; the black glimmer had in part become hexangular, and part had assumed a melted amorphous appearance, whilst the feldspar remained untouched!!! Of this he says, it was granit and is burnt to zeolite. If one asks how is all this——whether it is possible that the more fusible should remain untouched, whilst the infusible is melted——whether by chemical analysis the primitive earths are found in those proportions they should be were they only this or

* Porphyrius

Ex Argilla indurata (Germanorum) albo-flavescente cultro rasili vix scintillante, lamellis micæ nigrae hexangularis inspersis.

that fossil burnt or melted by volcanic fire? the answer is, "*Das Vulcanische Feuer gehet nicht immer einen Weg, sondern schreitet bald gerade und unmittelbar, bald durch Umwege und mittelbar zu ihrem Ziele**—*Volcanic fire does not always act in the same manner, but sometimes attains its purpose by direct means, sometimes by indirect.*"

After passing the Heiligen-Creutz I observed, on my left, rocks formed of a congeries of water-worn pebbles, chiefly of the nature of basalt and porphyry, with a few pebbles of milky quartz, united by something of the same nature, but much finer. This latter, when free from the coarse pebbles, where it formed beds of itself, was in some places stratified. Still further I found basalt with grains of *olivine*, and a few indistinct parallelipeds of *feldspar* or *adularia*; it was in some places divided into indeterminate columns. Further on there is a ravine; here I found some petrified wood; the lowest bed I could observe was a kind of volcanic tufa, or something very similar to it; then above this lay some imperfect coal †, and then further up in the ravine a great mass of semi-petrified wood a yard in diameter. And after this I observed nothing but volcanic tufa all the way to Kremnitzka.

Whilst my horses were feeding here, I examined the hills that lie at

* Mineral. Aufsätze, p. 331.

† Turfa foliata. Syf. Nat.

Fragilis terrea inguinans fuliginosa, texture lamellosæ. Inter lamellas hic & illic inhaeret Lithantrax.

the back of the village; they are composed of a very cellular porphyry, of reddish petrosilex or jasper mixed with indurated whitish clay*. On account of the hardness of this stone and its cellular texture, it is much used for mill-stones. In a brook that runs through the village I found abundance of filex of different colours in large loose fragments. Towards Kremnitz on the left hand there is a bank almost covered with blocks of whitish petrosilex full of vegetable petrifications. In some places these blocks are so disposed as to induce one to think that once they had formed a stratum which has been broken in pieces. Hungary is very rich in petrified wood, and particularly in that very beautiful kind which I believe is peculiar to this kingdom, the *Holz-Opal* of the Germans, and *Opalus ligneus* of the Syft. Nat. Of this there are pieces of trunks of trees in the Imperial museum. Mr. Haquet of Lemberg in Galicia says, that about forty or fifty years ago a whole tree, ninety-five feet in length, of this kind I think, was found near Moldokö, which is I believe in the district of Pecklin. He says it is related in the manuscript journal of the Abbé Liesganig, who travelled by the order of the Emperor Francis the First, thus:

Buchholz ante nostrum adventum effodit pedes	-	-	13
Frustrum primum petrificatum a nobis fossum	-	-	6
			<hr/>
			19

* Porphyrius rubro alboque variegatus cellulofus, ex petrosilice dilute carneo & argilla indurata cana undulatum dispositis; argilla etiam investit cellularum parietes: vix adfunt adularia & mica.

Frustrum

	Pedes	-	19
Fruſtum ſecundum	-	-	25
Reliquum arboris	-	-	51
			<hr/>
Longitudo effossæ arboris petrificatæ	-	-	95
			<hr/>

This tree was lying in a bed of *pumice*.

Kremnitz, where I arrived in the evening, is a small walled town not half so big as Schemnitz. The governor Baron Mitrovsky, with several of his counsellors, were here on a visitation. By invitation of his Excellency, I supped with them. An Englishman, unacquainted with the oeconomy of mines on the continent, would be surpris'd to know with what form and regularity the mining business is here conducted; every thing is put down on paper with the formality of law proceedings, and then considered in councils, &c. The mines of Kremnitz are not noted for the quantity of ore, but rather for the quality; all the ores contain gold and silver: but notwithstanding this, these mines are worked with loss. The richness of the ore makes them very careful in washing it after it is pounded, and the wash-hearths are the most remarkable things here. Water they have in abundance: this, after passing over the hearths, is conducted to reservoirs where it deposits its mud; this is not taken out and washed again, but a stream of water is made to pass through it, which washes it away, and this is then used to wash other hearths. Some think nothing is gained by this over-scrupulous care.

The rich ores from other mines are brought here to have their gold and silver separated from them. I was present at a coppelation process conducted upon a very large scale: the *button* of silver I think must have weighed six or eight hundred weight. After the lead was reduced to litharge, or evaporated, the fire was continued about half an hour: during this the silver boiled up like water; in this state, and the fire not damped, some pale-fulls of warm water by means of a trough were poured upon it: the fire was now damped, and then three men pressed iron bars, something like knives, upon it: this is done, that afterwards it may be more easily cut in pieces. Other chemical processes are likewise carried on *en grand*, as the fabrication of nitrous acid, and the separation of the gold from the silver. The mint is here likewise. I was informed by a friend who visited Kremnitz a few years ago, that in 1788, 110,000 marks of silver, containing about one fortieth or fiftieth part of gold, were here separated from the ore; and in the first half year of 1789, the produce was proportionally greater, 70,000 marks having been separated in this half-year.—Goitres I observed to be very common here.

From Kremnitz I went to Konigsberg: the road as far as Heiligen Kreutz is the same by which I came. A difficulty of getting horses obliged me to travel in the night. Till it was very late, as I travelled through the villages, I was amused by large groups of women, who were employed in breaking of flax by the light of fires. As it is generally the case, where people, particularly females, work together,

gether, there was plenty of singing and noise, and the poor benighted traveller afforded them some sport, and an object to exercise their wit upon. When in the morning I reached Konigsberg, I was greatly surpris'd to find there was no inn here, only dram-shops. I went to the town-house to see whether I could get a room there: this caused a droll mistake. The magistrates were sitting when I was turned in amongst them: on my asking them to lend me a room, they suppos'd I must be a strolling player begging leave to act in the town-house, and I believe I should have succeeded if I had had such a favour to request: but on hearing I was only a traveller, they told me they could not accommodate me; and some attacked me for a passport, and they were not content with that of the English minister. I promis'd to show them half a dozen, as soon as I could find a shelter for myself and baggage. The Burgomaster took pity upon me, and received me into his house as a friend: now I was no more plagued about passports, and I found in my host a worthy and hospitable man.

The mines here were formerly very productive; after that, till within a few years, they were worked with loss. I should have staid here only a few hours, but I wish'd to ascertain the fact mentioned by Mr. Born, of the *Saxum metalliferum* lying immediately upon granit, which he says runs down from the Carpathian mountains. This celebrated man in his 20th letter says, "The valley in which Konigsberg lies, is on one side, towards Schemnitz, surrounded with
hills

hills of *saxum metalliferum*, and on the other side, towards the north and east, with granit mountains, which extend from the Carpathians alps hither. In the *Royal Zeche*, which is now worked again, the vein has the granit for the bottom and the *saxum metalliferum* for the top." And in his 21st letter he says, "The Althandler vein (kluft) at Konigsberg runs between granit and the *saxum metalliferum*." And a little further he says, "We have at Konigsberg found the *saxum metalliferum* lying immediately upon granit." And Mr. Haidinger, in his Classification of Mountain-Rocks, quotes Mr. Born. What has led to this opinion is a run of rock of a kind of porphyry or *saxum metalliferum* being found here, very different from the other rock, and of a redder colour. What made me doubt of Mr. Born's accuracy, were some mill-stones that were lying in the street, which I at first look took for granit. This is no doubt the same stone; for the Baron says, "This granit is here called mill-stone, because the feldspar by decomposition is changed into a white powder, which falling out of the cells, forms a good mill-stone, which is transported to distant parts of Hungary." And in his *Litbophylacium* he says, "*Granites ruber ad Uibanyam (Konigsberg) Hung. inf. ad lapides molares utuntur.*"—I went into the mine. I found the *saxum metalliferum* forming both the top and the bottom: but I could not get to that part of the mine where this rock is found, the timbers having fallen down; but the miner who accompanied me assured me it was the same as that where the mill-stones are quarried. I then visited the quarry; it lies just above the town; the rock is much the

fame as that at Kremnitzka. It is composed of reddish white indurated clay and red jasper as a base, with grains of pellucid, though more often of reddish quartz crystal, decomposed feldspar, parallelipeds of adularia, and a little black hexangular mica.—Mill-stones are a considerable branch of commerce of this city. Hlinik, which is a town or village in this neighbourhood, is still more famous for mill-stones.