

C H A P. XVII.

JOURNEY TO WIELICZKA—THE SALT MINES—CRACOW—AND
RETURN TO PRIBILINI.

IN a tour, as in the journey through life, something new, as we proceed, is constantly occurring, which leads us from our original plans, and engages us in new pursuits. Here at Vafetz I was informed, that at Pribilini, which was only a stage distant, there was a passage through the mountains into Galicia, and that from thence I might easily reach the famous Polish Salt Mines in a couple of days.

Though I was very desirous of being soon at the Hungarian mines of Schemnitz and Cremnitz, yet I could not withstand the temptation of the Polish salt mines; and indeed, having *only* the Carpathian Alps, and a two days journey over hills between us, it would have been unpardonable not to have seen them. Who amongst men that has heard of Solomon's being the wisest man, and Samson the strongest, has not heard of these mines? where, according to some accounts, there are subterranean towns, and subterranean republics, and where the infernal regions and their inhabitants are inimitably represented, and likewise the regions of the blessed.

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I was soon at Pribilini, where I took up my quarters with Mr. Jonas Pomgratz, the only nobleman here. Though he lived in a pitiful cottage, and his income was so small that he condescended to retail brandy, wine, and small beer to his villagers, and that in person, yet I found him well behaved, hospitable and friendly. I was hardly in the house before a flippant young man entered, stared at me, and then asked me for my passport. I told him I had none. Upon this he began a conversation in Latin with my host, enquiring who I was, and asking many absurd questions, and throwing out many silly surmises concerning me. His self-importance was so ridiculous, that at last I burst out in laughter; when, finding that I had understood what he had said about me, he seemed ashamed, and begged my pardon for having entertained any doubt of the respectability of my character. This young man, I learnt afterwards, had lately obtained some small provincial office.

The next day, the 29th of August, I put a small portmanteau on a horse, and set out on foot for the famous salt mines. We passed first through thick pine woods, and then entered the mountains, and kept gradually ascending, always winding amongst the vallies. The passage was noways dangerous, and very easy till we came to the ridge which forms the limits of Hungary and Galicia; here it became more difficult, though not dangerous: the descent on the other side, towards Galicia, is very rapid.—Granit rocks and gloomy pine forests had hitherto surrounded us; but here, on the limits, the scene

greatly changed. The rocks now before us were lime-stone cliffs, and these formed the most beautiful scenery; which, with but little of Imagination's kind assistance, who often heightens the beauty of our other prospects, represented amphitheatres, Gothic sanctuaries, lofty towers and ruined castles; which were intermixed with stupendous precipices and dreadful chasms; and as we descended and passed amongst them, they assumed new resemblances. The sun shone full upon them, and greatly increased the beauty of this noble prospect. From the bottom of several of these rocks the most copious and limpid streams flowed. Nothing but the want of time prevented me from spending a day or two amongst them: they are the finest rocks for alpine plants I ever saw.

I reached Kostelesko early in the afternoon, and would have pushed on further, but my guide pretended his horse was knocked up and could not proceed. This is still amongst the mountains; but Kostelesko is not a village: here are only two or three houses for the miners, as in the neighbourhood some mines are worked, though of small importance. The ore I was shown was grey copper; I could not learn in what kind of rock the vein runs. I had here only miner's fare—a bed of straw, eggs and coarse bread.

Early in the morning I continued my journey: the hills became smaller and rounder, yet the first were still covered with firs: on the pastures a considerable quantity of cattle were feeding, and we

passed several *Kofchars*; and then to the woods and pasture lands succeeded corn land, and here no want of cultivation or population struck me. Withof was the first village I came to: here I changed my mode of travelling; I sent back my horse and man, and procured a pair of horses and a peasant's cart. Whilst I was waiting for my horses, I went and examined some rocks in the neighbourhood: I found them composed of strata of sand stone and clay. The peasants were busy getting in their corn harvest, which consisted of oats, barley and rye. Not only no want of cultivation or population I observed on entering Galicia, but the villages did not appear worse built, nor their inhabitants worse clad, than on the other side of the Alps.—Dunavitz was the next stage. I reached this place early in the afternoon; from the judge not being at home, and through other trifling misfortunes, I was detained here all night for want of horses. I had seen that inestimable gift of Nature, the potatoe, on the other side of the Alps: here I ate some; they are not considered as a delicacy, but form a considerable part of the food of the peasants.

Early in the morning I left Dunavitz; and after traversing a few miles of flat pasture land, I ascended a vast chain of sand-stone hills. The road is frightfully and almost impassably bad: it is generally nothing more than the bed of a stream or torrent. I however arrived safe at Raaba, and I stopped at the town-house for fresh horses. As this was Sunday, the street was full of people: two of the smartest of the crowd came up to me with many bows and compliments; and

as I supposed they were the Squires of the village, who were coming to invite me to their chateaux, I returned them as many; for, as I had entered, passed through, and gone out of Hungary, without a single visit from a custom-house officer, I never once dreamed of being molested by any here: however, they soon after explicitly informed me what they were. They ransacked my baggage, and wanted to take away some trifling things; but on my insisting that they should give me a receipt for them, they returned them. They gave me some very broad hints that a trifling *bono mano* would be very acceptable to them, but I gave them none. My next plague was the judge, who made a thousand objections to my demand for horses, till I pulled out the great *Imperial pass* loaded with seals, which I had obtained since my Leutschau misfortune. As this was in Latin, I made him believe it ordered him to provide me with horses; and as soon as I knew that the custom-house officers did not understand Latin, I gave it them to read; and they agreed that the judge must immediately procure me them: and he now set about it; but I had to wait two or three hours before they came.

Some heavy rain fell, and the town-house, which served as a kind of public house, was filled with company as soon as the divine worship was over. Beside the church, there is something else which serves to bring many of the country people to the principal village or town, on a Sunday. In some parts of our island, remote from the capital, it is not uncommon for the clerk, to give notice publicly
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after the service is over, that on such and such a day so many fat hogs, &c. are to be sold. The Sunday here is the market day, not only for flesh meat and other eatables, but for all the wants of the country people: the wall of the church-yard was hung out with knives, and ribbands, and shoes, and gingerbread, &c. &c.—The business of the day, that is hearing mass and trafficking, being over, recreation succeeded, and this began about noon. It consisted of dancing, and drinking of brandy. The dancing was a good deal after the Hungarian manner, mixed with *Walzes*. As the men were mostly in *Botchers*, or sandals, and not in boots, the music of the spurs was faint; but the ladies wore yellow leather boots. One or two of them invited me to be their partner; but besides the want of space and air, two of the first requisites in dancing, I observed that the ladies, after blowing their noses with their fingers, wiped them on the shoulders and skirts of the coats of their *chapeaux*. Goitres and sickly looks were apparently not uncommon in this district.

My horses at last came; and though it rained, I was very willing to set off, to get out of this stinking hole and on my journey. The road was the same as before, over sand-stone hills, and in the beds of brooks and rivers. I was so desirous to get on, that though the road was really dangerous, and very much so in the dark, I continued travelling till near ten at night, when I descended at a kind of public house. This was nothing more than a very large shed or barn; at one end of which there was a hearth, and a few embers

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on it ; neither eggs, butter, cheefe, nor milk was to be had ; nothing but coarfe bread and brandy. As ufual, I lay upon ftraw.

I was off again in the morning before fun-rife ; the fame vile road ftill continued. Michlinitz, which was the firft place I reached in the morning, although a pretty good town, has not a fingle inn ; but an old German foldier whom I confulted on the important, and here difficult bufinefs of obtaining a good breakfast, conducted me to a houfe which was made ufe of as an inn. I was fhewn into a tolerably good room, with three or four fquare tables in it, like a coffee-room ; and as fuch I believe it occasionally ferved, though it ferved likewise as a laboratory for taylors. I now got good white bread and butter ; and as I had taken the precaution of having a fmall fupply of chocolate with me, I fared pretty well ; and from the number of headlefs ducks and unfeathered fowls that were lying about the kitchen, I believe a good dinner, on giving notice, might be had likewise. If we fhould confider divifion of labour as any fign of the ftate of civilization of a country, we fhould be induced to form a very unfavourable opinion of Michlinitz, and of Galicia in general ; where it feems the bufinefs of an innkeeper is not yet known as a diftinct and feparate calling.

My breakfast over, and my horfes fed, I continued my journey, and over the fame fand-ftone-hills. I have often lamented, that from the want of a proper education, peafants too often juftify the remark contained in thefe old verfes :

Quando

Quando mulcetur, villanus pejor habetur ;

Pungas villanum, polluit ille manum.

Ungentem pungit, pungentem rusticus ungit.

My driver was a striking example of this: when we set out from Raaba, he respected me so highly, that he was afraid of getting upon his own cart, in which I travelled, and ran by the side. Out of good-nature I made him get up. His respect for me from this moment gradually diminished, till before the evening was over he became almost insolent. This increased so far to-day, that I was obliged often to threaten to knock him down; and, had the journey lasted half a day longer, I do not doubt but I should have been compelled to put my menaces in execution. But I soon reached the long-looked for Wieliczka, though not before my cart was overturned, and so completely, that myself and baggage were turned out into the road; yet no damage was done, my barometer was not even broken.

Wieliczka, a place so much frequented by travellers, to be without an inn, it will hardly be credited; yet it is true, it has no inn. I sent my servant in one direction, whilst I went myself in another; but we were both equally unsuccessful: we found one or two houses which had a spare room to let; and one or two places where something to eat might be had; but such a thing as an inn was not to be found. To one of the latter, a kind of eating-house, though upon a very small scale, I was compelled to go; and in a short time I had

three or four excellent dishes with their requisites, good bread, good cheefe, and good wine, set before me. After dinner I consulted with my hostess about a lodging; she candidly acknowledged she had no accommodations for me; but would for a day or two give me a spare room. Though this was so far from having a bed in it, that it was even without a bedstead or a chair, yet I was obliged to accept the offer; for I had no time to lose in looking after better accommodations, and there were but little hopes of succeeding if I had. Baron Verner, the director of the mines, being out of town, I waited immediately after dinner upon the next in authority, the *Ober Bergs-Verwalter* Seling. He received me in a very friendly manner, conducted me about the salt magazines, and shewed me the machinery and every thing which lay aboveground, for it was too late to see the mines; and he invited me to breakfast with him next morning, and promised then to give me a good guide.

The next morning, after breakfasting with this gentleman, I visited the mines. I was let down in the most convenient manner, being seated on a belt, with another behind my back. Some workmen descending at the same time, and the belts being fastened to the cable one above another, there were two or three tiers of us. I could, as it is generally the case, by my own observations learn nothing of the strata through which I passed: but the following account of the strata covering the salt, I received from a most intelligent man:

Vegetable

Vegetable soil	-	-	-	-	2 fathoms.
A sandy kind of clay, called by the Germans <i>Leim</i>					5
A very fine sand like Tripoly, effervescing with acids.				}	3½
It is here called <i>Triebsand</i> ; in Polish, <i>Sis</i>					
Marl with sand, and mixed with loose stones	-				9
Sand-stone	-	-	-		1
Marl mixed with salt in small particles and cubes					20

Such luxuriant accounts have been given of these invaluable mines, that every modest account of them must now be found dull and insipid. I shall therefore confine myself to those things which interested me as a naturalist. The commodiousness of the galleries, and the fine broad flights of steps, must not be passed over in total silence, as being in perfect contrast to what is met with in other mines; and the dryness is not less remarkable. Instead of mud and dirt, I was rather troubled with dust. This probably is caused by the attraction of moisture by the salt; neighbouring bodies are by this means deprived of their humidity, and the salt which has attracted the humidity is taken out; and then fresh surfaces are exposed, and the little communication the mines have with the open air prevents a quick supply of humid air. It is to this dryness that we must attribute the durability of the wood employed in supporting some part of the mines. It remains here for generations without rotting, though in ordinary mines ten or twenty years are often sufficient to bring it to total destruction.

The scientific traveller is often much incommoded by common travellers through their numbers setting the taste, and deciding what are the things most worthy of notice; he is by this means hurried about by his guides, from one trifling thing to another, and is perhaps never shown objects of real curiosity. Great excavations famed for their echoes, and a chapel cut out in the salt, were the first things I was carried to see. Some of the former are so vast, that a house of many stories high might be built within them. The chapel, in which formerly mass was celebrated two or three times a week, is entirely of salt, even to its altar, and its ornaments of columns, pillars, arches, statues, &c. &c.

The first thing that drew my attention, was the appearance of immense blocks of salt being embodied in the salt-marl. As I walked through the galleries, sometimes I saw the upper, sometimes the lower end of a block; and often, though the galleries were three or four yards high, both were still concealed, and I could only observe its breadth. In some parts these blocks formed the sides of the gallery for fifteen or twenty yards, as the galleries had been cut through them; but now and then, when the fragments were small, all their dimensions (on one side) were exposed.

These blocks must not be considered as rarities; they form the upper bed, from whence the whole of the salt called Green Salt is dug. In one of these, I believe, the chapel is dug, and the
great



great excavations I lately mentioned, which are called Kammers (chambers), of which there are forty or fifty of different sizes, have been made by digging out the salt lying in such huge blocks. Their angular shape is sufficient to show that they were not originally so formed, but that they are fragments of an immense thick bed of salt, which by some catastrophe (many of which our globe, I mean its surface, has certainly undergone) has been broken in pieces.—Blocks likewise of sand-stone are found sometimes imbedded in the same salt-marl. This marl itself is strongly impregnated with salt, which universally pervades it in the shape of irregular crystals. From the abundance of pure salt, this is thrown away; but in many countries of Europe it would be of immense value. After wandering a good while amongst the *Green Salt*, I was conducted lower to see the *Szybicker Salt*. This forms a bed; and, where I saw it, two or three yards thick. This is the purest sort, and is only exported to Poland, or other foreign countries; for the emperor, like a provident master of a family, suffers only the worst to be consumed by his own subjects. This is politic, but hardly just: it is hard that the Galicians should not be allowed to enjoy what Nature has given them in such abundance. This regulation took place under Joseph II.; and the reason was, that by none but the best sort being sent into foreign countries, a greater demand for it might be induced; and then the *Green Salt* could not be thrown away.

The green salt, which is reserved for Galicia, derives its name from a greenish or rather blackish cast it has. The cause of this colour is easily found out if the salt is examined with a lens; it is then seen that it is throughout scattered with remarkably small roundish black grains, like fine gunpowder*. These grains, I think, are of the nature of argillaceous schistus: they are easily scratched with a pin. In other respects the *Green Salt* is like the *Szybicker*, which is sparry †.—All the salt here is used as produced by nature: no art of any kind is made use of, except in taking it out of the mines; and this is very simple. Where I saw the miners at work, they separated large squares of salt from the salt rock on both sides by deep fissures: they then further detached it by cutting away the salt above and below; and when only connected behind, wedges were driven in here, and the whole cube was thrown down at once. But other methods are taken, and gunpowder is even used. These great blocks are afterwards hewn into the *batwans*, which are shaped like barrels, some of which, according to Mr. Guettard, are so large as to weigh four or five *milliers*; that is, about two ton and a half. Those that I saw certainly could not be half this weight. They are

* In Polish it is called Makowka, from Max, signifying Poppy Seed.

† *Muria spatofa*. *Szybick Salt*.

Spatofa diaphana, lamellis minoribus.

Muria spatofa. *Green Salt*.

Spatofa dilute nigricans subdiaphana lamellis parvis, granulis rotundatis nigris mollibus minimis inspersis.

likewise cut into oblong squares of about a hundred weight and a half; the small fragments are put into barrels.

How far the bed of *Szybicker* salt extends is not known; but after mining six hundred fathoms from east to west, and two hundred fathoms from south to north, salt is still found.——For fear of water, the miners are careful not to dig deeper to ascertain the nature of the stratum beneath the *Szybicker* salt. A hundred and twenty fathoms is the greatest depth of these mines.——These two kinds of salt form the riches of the *Wieliczka* mines, from which about six or seven thousand hundred weight is annually dug. The green salt is sold to the Galicians at two guildens and seven and a half creutzers (about four shillings and three-pence) the hundred weight. Five hundred men are employed in them; but these do not live here as some have pretended, but come out when their hours of work are over, as in other mines.

Both salt and fresh water are in these mines. From the first, salt formerly was made by boiling it; but on account, I believe, of the dearth of fuel, this practice was given over in 1724: it is now drawn up in leather sacks to keep the mines dry, and is thrown away. The fresh water is in small quantities, and serves for the horses: there are twenty-four, and they constantly live here.

It often happens that the richest mines are the poorest in mineralogical

logical curiosities; these afforded me none but the *Kroefstein*, or *Pierre de trippes*, and a sparry parallel-radiated salt. Some Mineralogists have considered the former as *Gypsum*, others as *Barytes*. Its specific gravity, which is 2,903, has probably led to this latter supposition; it appears from Mr. Born's *Catalogue Raisonné*, that this was his opinion. Its great weight induced me to send it to the celebrated Mr. Klaproth to be chemically investigated, who informed me that it was nothing but *Gypsum*. Its form is very remarkable. Under the Szybicker salt I detached pieces quite flat, about an inch thick: in other places I saw it forming small veins, sometimes running in straight lines, sometimes very serpentine: Plate the 9th represents it in this shape. At other times the undulations are very deep and close together, as represented by the 8th plate. These two specimens I have in my collection; they were given me by Baron Verner, and came, I believe, from the Bochnia mines, where the finest specimens of this fossil are found. But the specimen from which the 10th plate was drawn, which was given me by Mr. Lebzlnterners? the engineer, a most intelligent and obliging man, and a very good mineralogist, is from Wieliczka. I have small specimens of it likewise in a botryoidal form. When it is taken from the mine, it has a blueish cast, and is somewhat diaphanous; but after it has remained in water a short time, it becomes of a pure white, and perfectly opaque; and something of a confused very fine fibrous texture may then be observed. It is often mixed with another kind of gypsum, which does not lose its transparency by remaining in water, but is somewhat soluble in it.

This



Throstein.

London. Published by G. & S. J. Robinson, Paternoster Row, July 1st 1796.

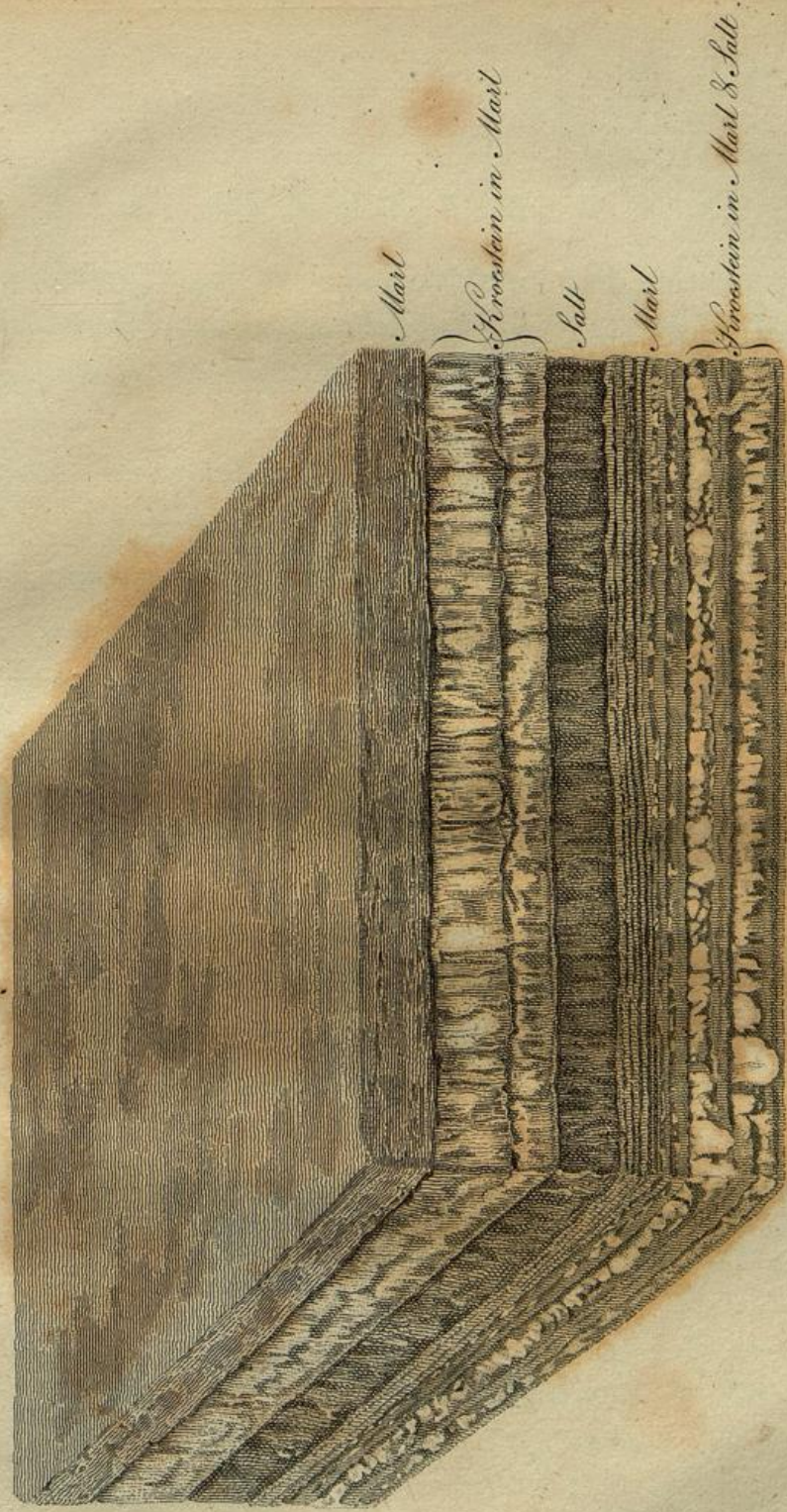




Woolstein.

London, Published by G. & J. Robinson, Paper Street Row, July 1st 1796.





Firestein with thin strata of Marl & Salt.

London, Published by G.G. & J. Robinson, Paternoster Row, July 1st 1796.



This is represented at 4 in the 10th plate, where it in a manner surrounds the other gypsum, and it forms the streaks in the specimen represented plate the 8th: one of these I have marked with an *.

The parallel-radiated salt † is a very beautiful fossil, and is found here in great plenty: it forms in some parts pretty thick veins, and is evidently, compared with the other salt, a thing of modern formation; the fibres or rays run across the vein like the *Inolithus* or *Stirium*.—Where water percolates through the roof, superb botryoidal stalactites of salt as white as snow are formed.

Mr. Fichtel having given it as his opinion that the salt mines of Transylvania belong to the primitive materials of our globe, I was anxious to see if here, as in other salt mines, there were not some medals of the reign of Neptune to be found. In the heart of the *Szybicker* salt I could not learn of any having been seen, but many in the marl enveloping the blocks of green salt. I am indebted to the Engineer for a specimen of marl containing two bivalve shells, found thirty-six fathoms deep; for a crab's claw in the same, found at 40 fathoms; and a piece of charred coal mixed with salt and the lately mentioned gypsum, found at a hundred fathoms.

I wandered about in these vast subterranean excavations for four or

† *Muria radiata*.

Hyalina, radiata radiis parallelis parvis.

five hours, yet I saw only a small part of these mines; but as I was informed I could see only a repetition of the same things, I was satisfied, and came out.—Baron Verner being returned, I waited upon him in the afternoon; he received me in the kindest manner, and invited me to breakfast and dine with him the next day, which I accordingly did, and he gave me leave to pick out from his own small collection, a few choice specimens of the lately mentioned gypsum. What grounds Mr. Carosi had for being so displeased with the directors of these mines I don't know; I had every reason to be contented. He says he was obliged to disguise himself, or they would probably have refused him permission to see the mines, and obliged to conceal the specimens he wished to bring away with him: this must have been a particular case; I was allowed to carry off every thing I could find.

A day's journey from hence is Bocknia, another salt mine, but not so rich.—On both sides of the Carpathian chain, the country is stored with salt; and that from the Marmorufs on the south, and that from these mines on the north, are perfectly alike.—On the south side it begins at Eperies, and extends eastward through the county of Marmorufs and Transylvania, which are immensely rich in salt, as far as Cronstadt; and Mr. Fichtel enumerates a hundred and fifty-nine different places where either rock salt or salt springs are found. Here, on the north side of this chain, it exists in great profusion; first at Wieliczka, then at Bocknia, again at Sambor, and in

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the Buckovine and Moldavia, as far as Okna by Rimnik; and in this run Mr. Fichtel enumerates fifty-eight different places.

It is worth remarking, that the present rude inhabitants of Moldavia and Transylvania, who live in the neighbourhood of salt springs, have the same method of procuring salt which was common amongst the ancient Gauls and Germans; this was to pour gradually the salt water upon a wood fire. Pliny says*, “Galliæ Germaniæque ardentibus lignis aquam salis infundunt. Hispaniæ quadam sui parte e puteis hauriunt, muriam appellant: & illi quidem etiam lignum referre arbitrantur. Quercus optima, utque per se cinere sincero vim salis reddat: alibi Corylus laudatur, et a infuso liquore falso carbo etiam in Salem vertetur. Quicumque ligno confit sal, niger est.”—And Tacitus says †, “Inde indulgentia numinum illo in amne illisque silvis salis provenire, non ut alias apud gentes eluvie maris arescente, sed unda super ardentem arborum struem fusa, ex contrariis inter se elementis, igne atque aquis concretum.”

Immediately after dining with the Baron, who is married to an Irish lady, I left Wieliczka for Cracow. To be within a ride of two or three hours of so celebrated a city, and not to give oneself the trouble of going to see it, would shew very little curiosity; but I only staid there a day and a half, to see the palaces and the beauti-

* Lib. 31. c. 7.

† De Moribus Germanorum, lib. 13. c. 57.

ful churches, the botanic garden which has been but lately made, and the observatory which is in it, the collection of natural history, and the library of the university. Some idea may be given of this last, by informing my readers, that in the medical faculty there are no books so *modern* as Boerhaave, and that the writings of this great man are not *yet* here!!!

The walls of the palace, and of the houses opposite to it, have still the marks of balls from the musquets of former contending factions; and when I was here fresh troubles were again ready to break out, and now Poland is annihilated. The Russian troops, which for some time had been quartered here, and had mounted guard with the Polish, or rather opposite to them (for there were two guards everywhere, one of Russians and another of Poles), left this town the day before my arrival; and the rumour then was, that they were to be replaced by Prussians, against whose entrance some trifling fortifications were constructing. The Austrian troops, from what I heard, would have been more welcome. I hardly ever saw finer troops than the few Polish I saw here; but a disorganized state with internal feuds, and surrounded by the most powerful sovereigns coalesced to destroy it, what can it do? But not a word more on politics, for

—————“ My ear is pain'd ;

My soul is sick with ev'ry day's report

Of wrong and outrage with which earth is fill'd.”

Cracow swarms with Jews: many of them have little of the Jewish features: the breed probably through *accidents* has been *crossed*. Besides carrying on their usual businesses of usury, receiving stolen goods, selling old clothes, &c. &c. they act as *porters*, *ciceronis*, and *laquais*, and offer their services to travellers, dressed in their long black robes, as they enter the city. In mine I was fortunate. Regular established inns are not even common, I believe, at Cracow. I was conducted by him to a Mrs. Le Bon, where I was remarkably well off in a family way: she dealt in chocolate, &c. and her husband, Mr. Batch, who was one of the town-council, was a very well informed man, and spoke three or four languages: he was really kind, and conducted me about to show me every thing that was worthy of notice.

Friday afternoon, the 6th of September, I set out to return to Prilini, where I had left my baggage: I soon overtook near a score of empty carts; the drivers, though they knew they prevented me from passing them, would not give themselves the trouble to make way for me: my servant got down, and by giving each of them a hard thump on the shoulder, made them turn to one side. An old drunken foldier observing their ill-natured obstinacy, probably in hopes of getting a dram, drew his sabre and ran after them as well as an old drunken man could do. The drivers were now all alarmed, each endeavoured to get first out of the supposed danger, and the greatest confusion was the consequence, and two poor men with earthen ware.

were were thrown down into a deep dry ditch. I got through them unhurt, but mortified, as I have often been, to see that there are men so debased, that ill treatment is the only means to induce them to act with propriety.

I reached Michlinitz at night, and put up at the Taylors, and the next evening I got to Raaba; but the town or village-house was locked up, nobody was to be found; the village seemed quite deserted, even the custom-house officers did not make their appearance. In this difficulty I addressed myself to the lord of the village, and I was received in a truly hospitable manner: but my worthy host knew neither French nor German; Latin was therefore our only means of communication; and with my good landlady, who took as much care of me as though I had been her son, I could not exchange one word, as she only spoke Polish.—I had already seen enough of the inconveniences of compelled labour, and had felt some of them: here I must feel more. Though lodged in the house of the lord of the village, I was obliged in the morning to wait two hours for horses, and neither my promises nor his threats could make his peasants move a bit the faster. This was Sunday; and as I passed through Dunavitz, which is the largest town in this part of the country, it was quite like a fair: articles of every kind were exposed in the street for sale, as they are with us in fair time. I reached Withof in the evening, and took shelter under the judge's roof; and the next morning I put my portmanteau on a horse, and set out to cross the Alps.

The Carpathian chain appears from hence beautiful, and very different from what it does on the other side. At Kefmark these mountains appeared to be in a cluster rather than in a chain; for the mighty Krivan and its *satellites* lie back, and are not seen from thence. On this side the chain runs in a straight line, and the high peaks, from lying at the back, are not so pre-eminent. I ordered my servant to go to Kostelesko with my baggage, and wait for me there, whilst I took a ramble amongst the most outward rocks of this great wall, for such these mountains appear from hence. An hour after leaving Withof, in the neighbourhood of which I had observed sand-stone strata, I came to a lime-stone rock full of petrifications. It was the *Lapis frumentarius**; it seemed to form a bed which rose towards the Alps, under an angle of about forty. I observed it in a hill of about a hundred or a hundred and fifty yards high; but whether it entirely formed this hill or not I could not see. To the left of this is some coarse sand-stone, which I rather think belongs to the primitive kind. After this I entered the hills on my left, to ascend to some very bold perpendicular rocks which I had noticed on setting out. The rocks here were primitive lime-stone, but they had in some places a pretty regular perpendicular stratification; but this could not be traced far. After ascending for two or three hours, I found my guide had brought me into a wrong valley; but it was now too late to return, and I continued my course; and when

* *Oryctographia helvetica* Scheutzer. fig. 158.

near the top I met again with the *Krumbolz*. The lime-stone at last disappeared, and I saw then nothing but granit. The lime-stone evidently lent upon the granit; and on one side, and I think it was on the side facing the great granit Alps, I found a little, in some places lying immediately upon it, in small detached patches like snow before it has melted all away, and not in loose blocks. At the top the granit became schistic, and passed into the *Micaceous Schistus* (*Glimmer schiefer*). But to the east of this mountain, which is called in Polish Czervonnivirch, or the Red Mountain, the lime-stone out-tops the granit: I mean it is higher than the granit, but it is not immediately incumbent upon it. This latter kind of lime-stone, though perfectly of the texture of the former, that is compact, is probably of a different formation. It is apparently stratified, and the strata are nearly horizontal, though rather rising towards Galicia, that is in a contrary direction to the great chain. Had I not seen in other places primitive lime-stone perfectly similar to this, now and then for a few yards assume a stratified appearance, which soon after entirely ceased, so that for miles and scores of miles, not the smallest indication of it could be observed, as I have seen in the lime-stone mountains of Stiria, I should not have hesitated to place this amongst the stratified mountains. A thick mist, the greatest enemy to alpine travellers, soon put an end to my enquiries. The mercury rose in descending from the Red Mountain to Kostelesko, three English inches and five lines; that is, very near three inches and a half.

Though from Kostelesko the finest botanical excursions might be made amongst the very high and beautiful lime-stone mountains which here prevail, which, from the variety of their heights and exposures, must certainly be very rich in alpine plants, I was obliged to leave them and press forward. It was now the 10th of September, and I had seen none of the famous mines of Hungary except Schmölnitz; I hastened back therefore to Pribilini. After leaving Kostelesko I walked about three miles, always amongst the lime-stone mountains: this is their thickness in this part of the chain, and they, as before, afforded me the most beautiful scenery. How far they extend in length to the east and west, that is, how far they accompany the chain of granit, I do not exactly know. I could observe as I came from Galicia, that they seemed to extend a great way to my right and left, constituting the external coating of this side of the Carpathian chain. One of the miners at Kostelesko informed me, that they extended about seven or eight German miles, that is about thirty or forty English. Without going out of my way, I collected on these rocks some beautiful specimens of the *Filago Leontopodium*. Sometimes I saw the primitive sand-stone, but I can say nothing of its situation. After leaving the lime-stone all is granit, or granit approaching to micaceous schistus, *Glimmer schiefer*. This latter I only observed about the top of the mountain which forms the limits between Hungary and Galicia.—It will be remembered, that on the south side of this chain I had hitherto found no lime-stone mountains immediately connected with the granit; for the

lime-stone rocks of the *Fleisch-Bank* form rather the beginning of those which run on the north.—I have heard it said, that the country on the north side lies higher than that on the south: I have no grounds for forming such a supposition: it neither appeared to me so, nor did my barometer indicate it.