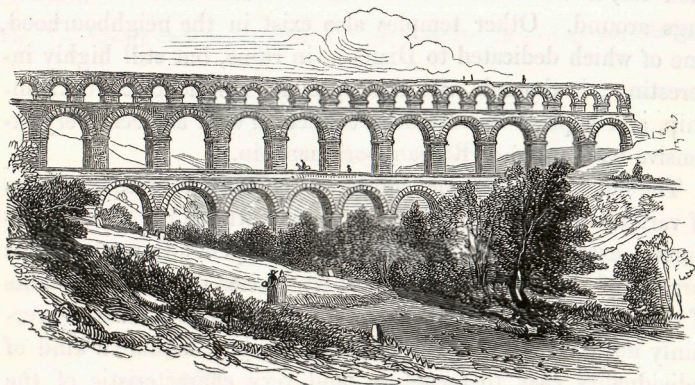


massive strength and stability with lightness and even elegance of detail. It consists of three ranges of arches placed one over another, the lower being nearly seventy feet above the middle of the valley, the second the same height (seventy feet) above the first, and the uppermost much smaller, about thirty feet above the second. The length of the upper tier is 873 feet, and the channel for the water does not give an area of so much as one square yard. Nothing can better mark the accuracy with which this remarkable work was designed, than the nature of the injury done to it some years ago by a foolish attempt to render the middle tier of arches more available, by cutting away a portion to form a bridge. The injury is irreparable, though the portion removed was very small; but with this exception, the effect of eighteen centuries that have elapsed since its construction seems to be scarcely discernible. It is a rare monument of ingenuity and labour, but the purpose is one that would now be obtained far more readily by other less costly means.

Fig. 6.—View of the Pont du Gard.



The country immediately around Nîmes, and between it and Montpellier, is not particularly interesting. To the north, near the Pont du Gard, there are numerous wild valleys of naked limestone rock, but these give place towards the south to a very stony and scanty soil on nearly level or slightly undulating ground, extending to the broad flat marsh of the delta of the Rhone. There is a railroad between the two towns, offering no works of importance beyond a few deep cuttings. The land all

around is richly cultivated, being covered with low vines and olive-trees. Numerous small villages, and one town, Lunel, celebrated for the sweet wine of that name, are dotted over the plain; but there are no inhabitants to be seen, except where a few men and women, and perhaps a mule or two, are beating out the corn with their flails, their mallets, or their feet.

Montpelier as a town is eminently uninteresting, and though correctly described in Murray's Handbook, is by most persons who have not seen it, greatly overrated. Not only the clouds of dust, the never-ceasing wind, and the rows of white houses closed with white jalousies, but the whole aspect and condition of the place seems dull and tiresome. The streets, and especially the market-places of the old part of the town, are in some measure redeeming points, but not enough to justify lengthened description. There are a few objects of interest, amongst which may be mentioned the University and the Botanic Garden, but there is a want of characteristic and striking features. Montpelier is far too much of the modern watering-place to be attractive to any traveller in search of the picturesque, whether he admire nature or art.

Immediately outside the town there is an elevated platform, the Promenade du Peyrou, very celebrated as one of the grandest of public walks. So many towns vaunt their supposed pre-eminence in this respect, and the resulting discussions are so little profitable, that I will not here trouble the reader with anything of the kind. Suffice it to say, that whatever Montpelier and its stony walk may be in winter, they certainly are not the most pleasant places to visit in the month of August.

From Montpelier to Narbonne the country is for the most part level or undulating, crossing the tertiary and alluvial tracts which border on the Mediterranean, and running close along the side of the ancient delta of the Rhone. Between the road and the Mediterranean there occurs a long and singular range of ponds, the remains of the ancient bed of the river before the present delta and channel were formed.

It is not improbable that a careful search in this neighbourhood, towards the south, might be rewarded by the discovery of very distinct proofs of recent elevation. In the time of the Romans the bed of the Rhone certainly took a western course, and the sea probably advanced up the present delta for many

leagues\*. At Agde, about midway between Cette and Narbonne, there are basaltic columns accompanied a little way out at sea by a large shoal. The deltas of the rivers Aude and Rhone are separated at Cette by high cliffs of jurassic limestone, reaching northwards towards Montpellier, and there covered by outlying lower cretaceous deposits; but the coast-line between Cette and the mouth of the Aude has no doubt been much modified in recent times. It is near this point in the Etang du Thau, that the Canal du Midi, one of the most important public works of France, enters the Mediterranean. The canal, sixty-five feet wide at the surface and thirty-three feet at the bottom, was commenced so long ago as 1666 and terminated in 1681, and remains a permanent and noble memorial of practical skill. It is not so much used as might be expected, notwithstanding the fact that it connects the waters of the Bay of Biscay with those of the Gulf of Lyons; but the communications of the present day require both speed and cheapness, and the amount of business done between the eastern and western coasts of the South of France is by no means so great as it ought to be, and must soon become. The railroad from Bordeaux to Cette when completed will certainly develop a great traffic, and in all probability the good effect will not end with the railway, but extend to the canal and even to the roads.

Narbonne, situated in the plains traversed by a branch of the canal, and close to one of the large ponds (*étangs*), or salt lagoons, which abound on this coast, is a somewhat dull town, with the country around naked and dreary, and though fertile in corn rather unhealthy. The honey for which the place is celebrated, is produced from the bristly plants and tufts of heath growing on the limestone rocks near.

Soon after leaving Narbonne the outline of the Pyrenees begins to show itself, at first looming hazily in the distance, but gradually becoming more distinct. This outline is pleasing, but

\* The advance of the delta of the Rhone in some parts has been much more rapid, amounting, by means of the *teys* (low islands of sand partly covered by vegetation), to as much as a league in a century. In the year 1796 it is recorded by M. Fabre, a French engineer of eminence, that since 1711, when a certain tower was constructed at the extremity, the termination of the delta had advanced into the sea about 6400 yards (5847 metres), a gain of upwards of 75 yards per annum.

not striking, as the heights seem inconsiderable, but something of the peculiar mural character of the range is seen in the extreme abruptness with which even the flanking hills rise from the plains.

Leaving Narbonne after an early breakfast, we reached Perpignan between two and three. The picturesque walls, towers, and fortress of this ancient town are visible from a distance, the whole being built on a small eminence on the banks of the Tet, in the midst of the alluvial and gravel plains of Roussillon; and they are very interesting, not only as picturesque objects, but for the historical recollections they cannot fail to call up. As it is only within about two centuries that this city, the capital of the province of Roussillon, was permanently united to France, it is not extraordinary that we here sensibly perceive an approach to the Peninsula, by a marked change in the style of houses and the costumes of the inhabitants.

The plain of Roussillon is extensive and very level, and is traversed by numerous mountain torrents, chiefly connected either with the Tet or Tech, and coming down from the Pyrenees. I shall have subsequent occasion to notice the gravels which cover much of the Peninsula, and which suggest similar reflections to those appearing here. I only mention here the fact of such gravels existing north of the Pyrenean chain.

The whole of the extensive tracts of low level ground at the northern foot of the Pyrenees, forming the plains of Roussillon, Languedoc, and Gascony, are of nearly the same character, and are chiefly occupied on the Mediterranean side by extensive pastures, and towards the Bay of Biscay by wide sandy plains. At various points along the whole district, the Pyrenees are seen in the far distance rising as a lofty unbroken wall, and forming the one only feature of interest in the landscape.

On the Atlantic side near the coast we have the important frontier town of Bayonne, which is a very lively picturesque place, some parts being old, with narrow streets, projecting houses, and low stone or brick arcades, not unlike those of Chester, while other parts of the town are modern, and consist of broad streets, open *plazas*, and lofty regularly built houses, all brilliant with whitewash. There is an interesting cathedral, recently repaired, with some cloisters attached, of a good style of architecture. Bayonne is situated on a small stream not far from the sea, and

the shipping comes close to the town, although the port is bad. Biarritz is a small bathing-place on the coast, about five miles off, and is celebrated for the numerous caverns existing in the limestone rock, which there forms precipitous cliffs. The sea, when disturbed, and this is almost always the case, rushes into and through these caverns at a fearful rate, constantly tearing away large portions of the walls, and eating out fresh hollows.

From Bayonne, the road across the plains towards Pau, and thence to Toulouse, runs parallel with the great Pyrenean chain. I have only travelled this road once, and on that occasion the weather, though fine overhead, was too misty towards the south to allow of my obtaining fine views of the mountains, except at intervals. The road is rather tiresome, passing over a succession of low but steep hills, forming a kind of rolling prairie, over which the horses rarely go at more than a foot pace. On each side of the straight line of carriage-way are rows of poplars which appear interminable, until at length the neighbourhood of Pau is reached, and comfortable-looking houses take the place of the poplars. The general aspect of the entrance to this town is not unlike that of Bath or Cheltenham, which in many respects it may be said to resemble.

But neither Bath—much less Cheltenham—nor any other town that I have seen, unites so much of the true picturesque with the comfortable, or has so many interesting points of view, combined with such grand and magnificent mountain scenery and such rich and well-cultivated landscape in the foreground.

The castle, the birth-place of Henri IV., whose cradle is preserved in one of the rooms, rises out of the middle of the town, surrounded by a natural moat overlooking the river or rather torrent (the Gave de Pau) which rushes past, and separates the town from the cultivated land towards the mountains. Small, and destitute of any claim to architectural beauty, this castle is yet as pretty as it is historically interesting. There are several towers (five) rising from different parts, one of them to a height of 115 feet, and another 80, the latter having the disgraceful reputation of containing oubliettes. There are at any rate several dungeons in the thickness of the wall. There was originally no opening in this tower (which is detached from the outer wall of the castle) to a height of forty feet from the ground. The accompanying view (fig. 7) shows the castle and

some of the towers. The interior has been much restored of late years.

Fig. 7.—View of the town and château of Pau.



The streets of Pau are irregular, being grouped on several almost detached platforms and connected by bridges. There are several public walks, from which may be seen noble views of the Pyrenees, amongst which the Pic du Midi de Pau rises crowning the whole range. Generally these mountains are remarkable for the want of that broken and varied outline which gives to the Alps their most striking beauties, but here there are not wanting marked projections from the usual dark serrated wall presented by the chain, and the Pic du Midi is one of the very finest of all. The lithographed view of this mountain in the annexed plate is taken from a nearer point than the town of Pau, but the form and general appearance are always similar and are easily recognised.

Pau is the central point from which the Pyrenees can best be visited, and although not provided with all the luxuries and comforts of the large cities and frequented towns of Switzerland, nothing essential is wanting in the different hotels of the place, to enable the traveller to enjoy himself and see the country. The number of English here during winter is generally considerable, and the climate is said to be delicious, as snow rarely falls, and never lies long on the ground; the air is usually temperate, and the vegetation clearly shows that frosts are not severe. One

great advantage it certainly possesses over other towns in the south of France and north of Italy, namely the absence of those terrible winds which are so common elsewhere during the spring. As a place for the early winter, Pau must certainly be delightful; and for the spring it is safe, if not so pleasant.

The costumes of the peasants here and further towards the heart of the French Pyrenees are curious, and well worthy of notice. The language of this part of France is also remarkable. In the Val d'Ossau, a few miles due south from Pau, and in a mule-track entering Spain, near Canfranc, whence there is a road by Jaca to Saragossa, the peasants wear a peculiar wide brown cloth cap, short jacket, and knee-breeches, with a bright sash round the waist, whilst the women have on the head a kind of hood, serving both for bonnet and thick mantilla, and also a jacket, both of some bright colour, usually scarlet. In this dress there is much to remind one of some parts of Spain. Both sexes wear shoes or sabots with a kind of wide fall at the ankle. At Barèges, a well-known watering-place, some miles further to the east, the costume is quite different with the exception of the hood, which is indeed found all over the South of France, from Orthés to Foix, and as far north as Toulouse. At Barèges the men's caps are peaked and scarlet, and their legs are covered by gaiters, while the sash is neglected. At Luchon, still further east, the men wear broad hats or Catalonian caps, and the general appearance both of them and the women is altogether peculiar, reminding one a little of the gay holiday costumes of some parts of Castille. About Pau itself there is a mixture, gradually changing as we get towards the central part of the great plains of southern France, as far as Tarbes and its neighbourhood, where a singular variety prevails, evidently including peculiarities of various places and distant periods.

The country from Pau by Tarbes to Toulouse is remarkable for rich cultivation. The first part of the journey affords magnificent views of the central part of the Pyrenees, with numerous snowy patches and sharp peaks. I have already directed attention to the great difference observable between these mountains and the Alps, the other principal European chain, in the broad, flat, wall-like character of the Pyrenean chain, and the absence of large gaps, of which, in fact, there is only one from the commencement of the higher part of the range



Day & Son, Lithrs. to the Queen

VIEW OF THE PIC DE MIDI DE PAU — PYRENEES.

T. Bechem, lith.





at the Canigou, near the Mediterranean, to the Asturias. We also see, in traversing the country eastwards, that there is an almost total absence of distinct lateral or flanking chains, only one such chain being seen between Pau and the central ridge, and that one being low and unimportant. It is, however, only in Spain that the real nature of this singular and most important range is seen, and there only by studying the country in a large and comprehensive manner. The granite mountains of Guadajajara near Madrid, appear to be much more a portion of the central Pyrenean chain than a detached mountain-system, while the remarkable limestone ridge of Pancormo, traversed in passing from Burgos northwards to Vittoria, is an instance of partially altered rock pressed up between two undulations of granite, and belonging also to the great chain itself. In fact, the Pyrenees seem to form merely the northern termination of one broad but not very lofty series of mighty undulations, extending over a wide space, and having occupied a long period in their production, which terminated at a comparatively recent date. These undulations must have been carried on while the whole series of rocks were buried far beneath the level of the sea, and the lifting up of the mass has taken place gradually, without any great shock or sudden elevation. I think also there is good evidence in proof of the lifting up being a process that has proceeded slowly but incessantly up to a very late period, even if it is not now going on.

At the present time the means of communication across the great plains of the South of France are very imperfect, and limited to slow diligences for passengers, and the canal for heavy goods. The railway will shortly supersede these entirely, and cannot fail to develop the natural resources of the country to a great extent. It is capable of yielding large quantities of corn, wine and oil, and though at present poor, possesses all the material of great wealth.

Connected on the one side with Bordeaux, and on the other with Marseilles, situated on the great highway between the Atlantic and the Mediterranean, and possessed of a delightful climate and a good soil, there can hardly be a limit to the advance that may be anticipated in agriculture; while there exists in the Pyrenees, at no great distance, an abundant store of minerals capable of yielding gold, silver, lead and copper, and

only needing the introduction of a moderate amount of capital after the establishment of cheap and rapid means of transit.

There is also another prospect for this part of France. Between Montauban and Madrid there would appear to be an available line for the construction of a railway, entering the valley of the Ebro near Saragossa, and passing through that important town on the way to the metropolis.

Should such a line be constructed, there would be made available an entirely new outlet for the productions of one of the most important provinces of the Peninsula, and there would be an additional chance for the regeneration of that fine country by the means which of all others are the most rapid and the most effectual.

## SWITZERLAND.

I. WALK FROM LAUSANNE THROUGH THE JURA VALLEYS.

II. MEETING OF THE FRENCH GEOLOGICAL SOCIETY AT  
PORRENTRUUY IN 1838.



## S W I T Z E R L A N D .

### CHAPTER THE FIRST.

#### WALK FROM LAUSANNE THROUGH THE JURA VALLEYS.

THE meetings of scientific associations in different parts of Europe often exhibit a good deal of national character and amusing incident, as well as of that scientific lore which is of course the main object of the *réunion*. Such meetings seem to have originated in Germany, but they have since been continued on a larger scale in other countries, so that now and for some time past there have been several societies regularly established for the purpose of holding peripatetic meetings in different parts of the continent. Thus there is the German meeting of naturalists and physicians, small, but of some standing and value. Our own British Association has taken a very high rank amongst similar assemblies; the French have three or four such societies for different sciences; the Swiss have one; the Scandinavians meet in a similar way from time to time, and the Italians communicate, or would communicate, with each other from year to year by large meetings of this kind, if the political state of the country admitted of a dozen or twenty people being together in a room without a number of spies being present to prevent science from being made use of as a handle to rebellion.

I have not myself been a very frequent attendant at the meetings of any societies; my summers for many years having been occupied in travelling, chiefly in parts of the world where Englishmen do not thickly congregate, and I have always rather preferred the distant and less accessible places to those which, from whatever circumstances, are fashionable and more frequented. Still, in the course of my wanderings, I have fallen in occasionally with the travelling societies, and have taken up my lot with them. I propose to give the reader accounts of one

or two of these meetings, although of rather ancient dates, where I was not supported by fellow-countrymen, thinking that these may possess greater interest than accounts of more recent and better known assemblies.

In the year 1838, during my first visit to the continent, a meeting of the French Geological Society was held in the town of Porrentruy, in the north-west corner of Switzerland, not very far from the Vosges Mountains and the Mountains of the Black Forest. My notes of that date enable me to give an account of a walking excursion to this place from Lausanne, and a sojourn in the town during the week of the meeting, part of which was occupied in an expedition which afforded much matter for amusement.

Before proceeding with my story, it may, however, be well to say a few words concerning the French Geological Society, and also as to the place of meeting, which is probably very little known, even by those tolerably familiar with Switzerland. If the reader will take a map, either of Switzerland or France, and search in the north-western part of the Canton of Berne for a small piece of that canton which juts into France, and is surrounded by it on three sides, he may find marked, in rather small letters, the name Porrentruy, or Pruntrut, the latter being the German denomination. It may be described as about seventy miles east of Besançon, and rather more than 100 north of Lausanne. It is situated in one of the valleys of the Jura, enclosed by hills of moderate elevation, and is said (I know not with what truth) to exist rather by the smuggling propensities of its inhabitants, than by any legitimate trade or manufacture. At all events, there is very little of either of the latter to be observed. With this short notice, I must proceed to say a word concerning the French Geological Society.

This society, unlike most of those on the continent, is founded on an English model, that is to say, is expensive to its members, and with the greatest liberality opens wide its arms to embrace all, whether natives or foreigners, who have no objection to paying sixty francs entrance-fee, and thirty francs per annum besides. It was still in its youth at the time I speak of, but has since become more distinguished; and now numbers among its foreign members some of the most eminent continental and English geologists, and has published a large number of valuable memoirs.

This society, besides its regular meetings, calls together its members annually at some town in France or the neighbourhood, choosing for the place of assembly a district interesting for local geology. It will now be understood how a French society happened to hold its meeting in Switzerland, and the little town in question, otherwise quite unimportant, was fixed on, because of its convenient distance from some of the most instructive secondary geology of France or any adjacent country.

In order to reach Porrentruy from Lausanne, where I was staying for the summer, two roads were open to me, the one by Berne, Soleure, and Délémont, by the diligence; the other by the valleys of the Jura, only practicable on foot. Being anxious to see the scenery within the ranges of those very interesting mountains, and being, moreover, a tolerable walker, I chose the latter, and had no reason to regret my determination; and as the journey has not often been described, I transcribe here a few passages from my journal of that date.

The road from Lausanne towards the Jura is full of beauty and interest. Almost as soon as the town is fairly left behind, one feels dropped as it were into a district which resembles closely the prettiest and quietest scenery of the middle of England. Were it not that on looking in the direction of the lake of Geneva the Savoy Mountains are still visible, Mont Blanc towering above them in all his snowy magnificence, the illusion would be quite complete, for the few vineyards that there are, look very much like hop-yards, and the rest of the cultivation is quite English, consisting of corn, clover, meadow land and orchard, prettily varied and set-off by quickset and other hedges. The cultivated ground lies on the slope of a gently rising hill, which has not the least pretensions to be called anything but a hill, and lasts for some few miles, a few Swiss houses coming in now and then to improve the picturesque effect and harmonize with the mountains. In this way, the road passes a château and a village or two, but gradually becomes more open and less English,—the mountains, when they are really seen, altogether removing any grounds of comparison.

After walking rather more than two leagues, I stopped at a neat-looking public-house, in a small hamlet, and obtained some excellent ham, cheese, bread and wine for dinner. I was looking at my map while the meal was preparing, and thus



attracted the attention of the landlady, who at once took it from me, and after looking for the large towns she knew of, was rather annoyed at not finding her own village (Mèx) among them. There were two men in the room who were anxious to help in the discovery of this important place, and all concluded that it must be somewhere, although they could not find it. It was amusing to see the deep interest which these people took in the matter. They could evidently read with great ease, and they quite understood the meaning and use of the map, but they did not like the omission of their native place. They were not less than twenty minutes amusing themselves thus; and while this was going on in one room, I could hear in the next, which was the kitchen, the voice of a little boy not more than six or seven years old reading his letters and beginning his education. The cleanliness, good-will, and perfect simplicity and freedom of manner in these Swiss peasants pleased me very much. They have, however, one great fault,—the men are sad drunkards, so much so that one can hardly walk about in any direction after dusk, especially on market nights, without proof of the prevalence of this vice.

Leaving the little hamlet of Mèx, I walked on through a pretty country, and after some time came upon another beautiful prospect, entirely different from that which I had seen in the morning. Not far from the road, and coming into view by a sharp turn, there rises suddenly, from a noisy, babbling brook, a richly clothed hill of simple but picturesque appearance. The height is considerable, and quite on the top is a remarkably pretty church, with a fine square tower, rather lofty and crowned with a spire. This and a house near it were the only buildings visible, and they stood out so boldly in the clear atmosphere against the intensely blue sky, that I thought I had never seen buildings look so well. Just before me was a little stone bridge; to the right, a cross road leading up to a small house in a wood; and the road on which I was travelling, wound about so much, in order to make the way up the hill practicable, that it was only seen for a very short distance, and then was quite lost. This was the appearance in front. On turning round one might observe the broad valley between the Jura and the Savoy Alps, in the foreground beyond these extended the lake of Geneva, and rising from the lake, the mountains stood out in a long line of jagged