

(A Local Group within the Geologists' Association)

## NEWSLETTER WINTER 1994

Vol 3 - No 13

### MEMBERS CORNER

The Editor apologises for the NEWSLETTERS being like London buses. Instructions have been given that next year they must be evenly spread out. This may mean that some of them may be single deckers or, heaven forfend minibuses.

It was not made clear in the last NEWSLETTER that in the report on the questionnaire the numbers refer to the duration in years of membership and not to the numbers of people giving identical answers. Would that we do have 21 members all eager to serve on the committee!

We are greatly indebted to Colin Brash for a very readable account of a trip to the Burgess Shale in Canada. It must have been galling not to be able to take just a tiny specimen away. You will remember Colin's slide lecture on this trip on 8 July.

John William's report, Field Trip to Poland, is an extremely interesting document now that the Iron Curtain has been sent to the cleaners. His talk and slide show of this was featured in the February 1994 meeting.

Finally Cath Clemesha describes her trip to the Czech Republic with the Geological Section of the Devonshire Association. This trip took place in May 1994 and was joined by seven FGS members. Thank you Cath.

+++++

### STOP PRESS

Those of us who were on the Malham field trip this year might have been interested to see a programme on BBC1 last month. It was "How Do They Do That?" on 16 November and it concerned a microlight flight from UK to Jordan being a fund raising expedition for cancer. Jordan's King Hussein suffers from cancer. The flight was made over several hostile Muslim countries and the cameraman was none other than Sid Perou, one of our Malham leaders.

All the geological specimens have now been removed from the AEC building in Farnham. They will be housed in the AEC building on Bridge Road, Godalming.

## A FIELD TRIP

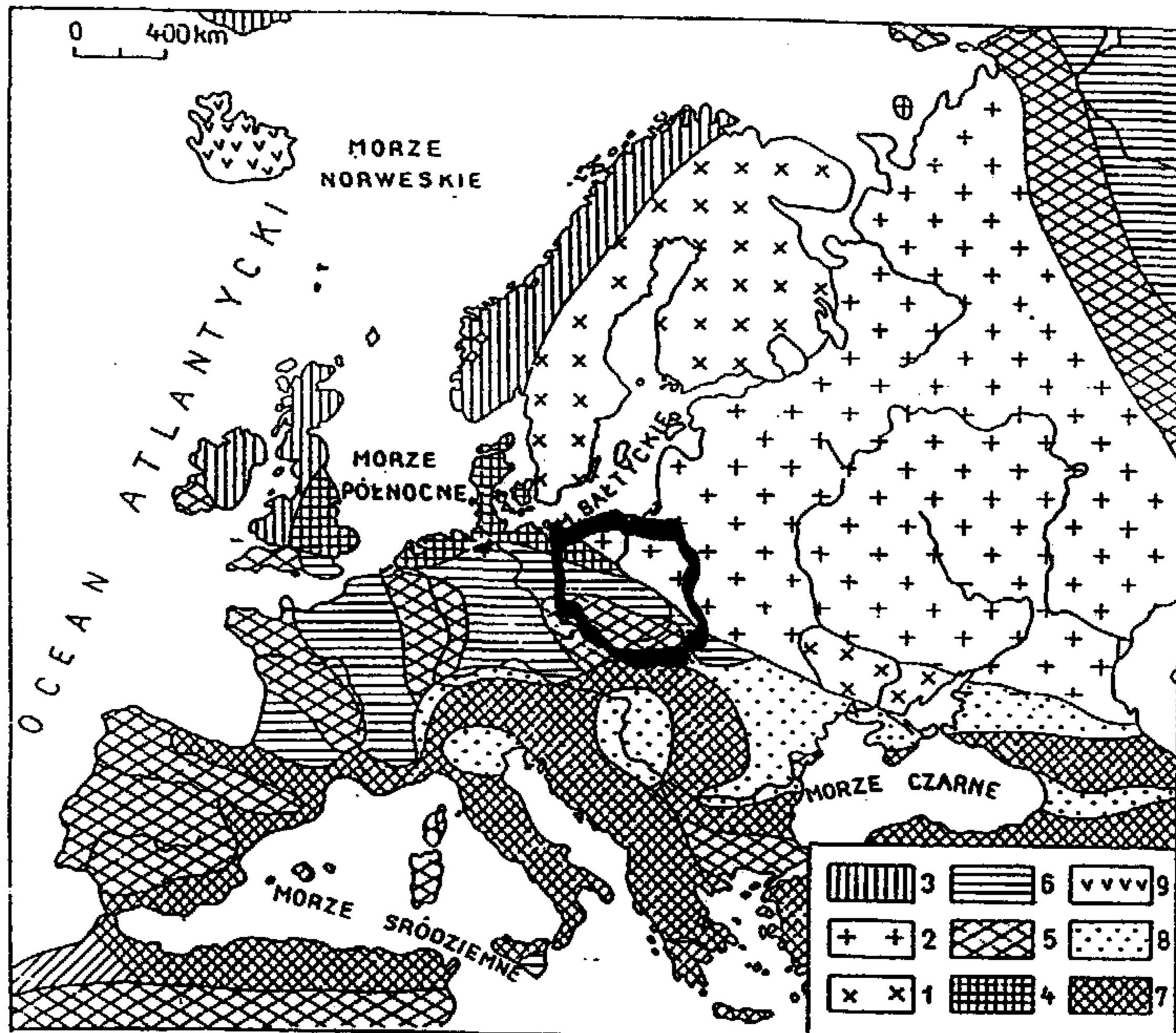
"Where did you go on holiday this year?" "To Poland" ..... (After a long pause) "That's different."

Yes it was!

### Introduction

The Field Trip was arranged by the Natural History Museum as one of their Overseas Field Trips. The idea had come from one of the geological survey members who had arranged it with contacts at three universities in Poland, Poznan, Wrocław And Krakow. It was a combined Geological, Ecological and Botanical field trip.

On 30th July eighteen intrepid adventurers and one Museum employee met at 0800 at Heathrow for the start of the Great Adventure.



after E. STUPNICKA '89

Poland on the tectonic map of Europe (from E. Stupnicka 1989).

East European Platform: 1 - crystalline rocks exposed, 2 - covered; Caledonian structures: 3 - exposed, 4 - covered; Variscan structures: 5 - exposed, 6 - covered; Alpine structures: 7 - orogenic belts, 8 - molasse basins and foredeeps, 9 - Cenozoic volcanic rocks.

## POZNAN

The flight by Polish Airlines (LOT) took us to Warsaw where we met our Polish host Barbara Walna and our coach driver for the fortnight Fred. We had been warned that the coach would not have air conditioning but it did have opening windows. It was reminiscent of those coaches of about ten to twenty years ago when windows slid open and panoramic windows had not yet arrived.

The first excursion was to downtown Warsaw to a Bank for some money. The Poles prevent their currency from being exported and so we had to change currency on arrival. We had been advised that US\$ were the appropriate currency to bring so we changed our dollars into Zloty and were amazed to find that at 18,180 zl/\$ or 27,100 zl/£ we could easily become millionaires.

We left Warsaw for the drive Westwards across the North Polish plain to Poznan. An area affected by the Baltic Glaciation and displaying various manifestations of Glacial events: terminal moraines; outwash fans; eskers; glacial lakes; sands, gravel, and glacial till abound but also the erratics. Evidence is widespread that Scandinavian rocks have been deposited upon the area.

The journey was interrupted by a loud explosion from under the coach as a tyre burst and the floor lifted. Unfortunately it broke the ankle of one of our participants at the same time and after the wheel had been changed we were seeing the casualty ward of a Polish Hospital. The service was very impressive and we were on our way in a half hour but having to leave our member behind to be plastered the next morning.

A midnight arrival at our hotel found the staff ready to serve us with a meal so we ate the sumptuous feast at 1230am.

The next day found us exploring the meadows along the Warta, a river whose course had been affected by the ice and ran Westwards along the face of the ice before being able to continue its way Northwards to the Baltic.

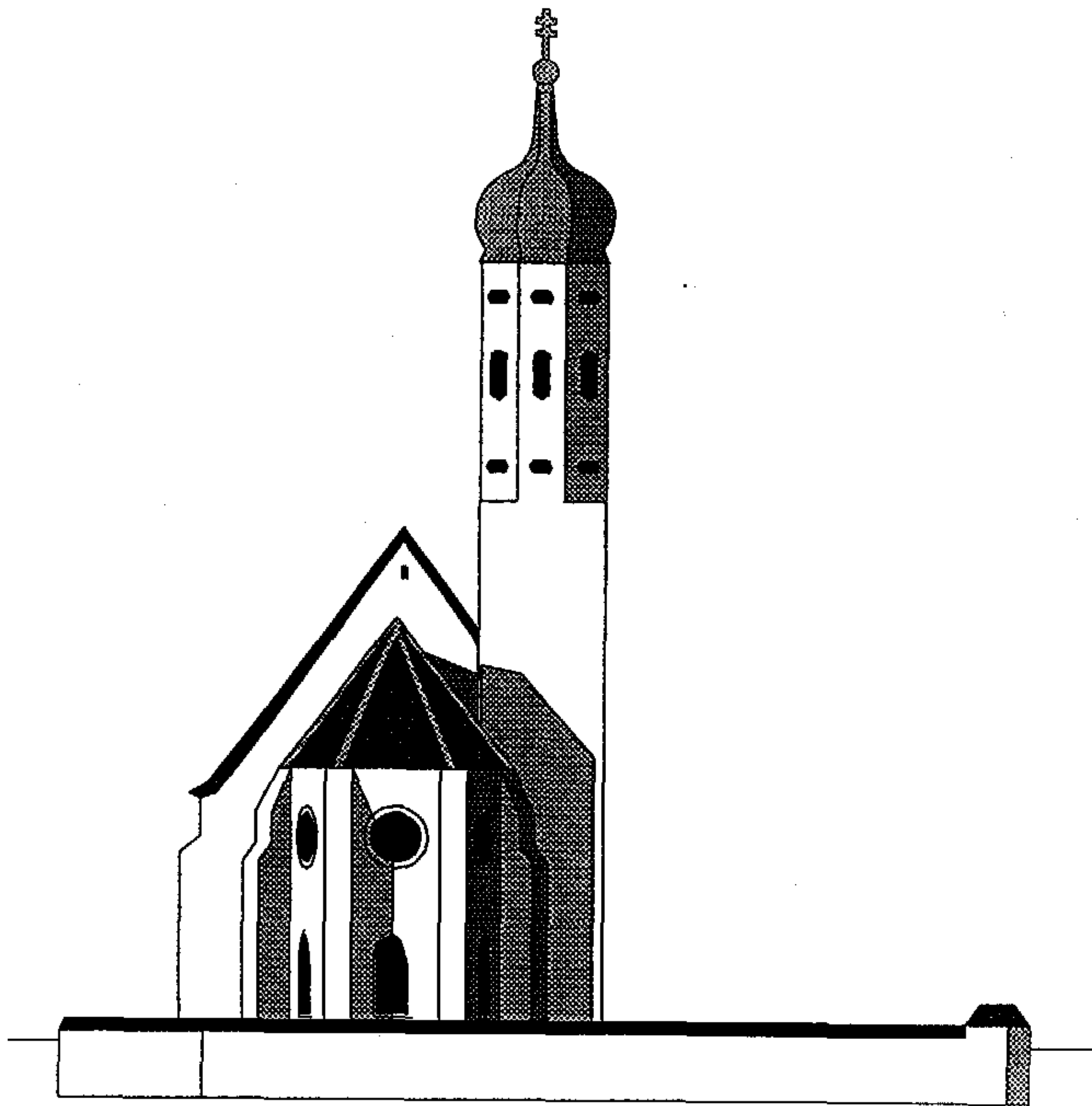
We saw ancient oaks, storks, meanders and castles and during the evening were deafened by a free concert from one of the Groups that were identified with the fight for freedom in the early eighties as we visited the city of Poznan. It has been considerably rebuilt since the war but reproducing the old style apart from the Museum of Modern Art in the ancient market place.

A visit to this part of Poland is not complete without a trip to see two areas of historical importance, Ostrow Lednicki an early major settlement of the 10/11th Century and Biskupin a fortified lake village built around 550 BC and unearthed in 1935. 110 wooden houses on an island 180 by 120 metres. A reproduction of the outer walls and a few streets of the houses has been built. Even at these sites you have not lost the Geology as both are in an area of post glacial lakes and the former includes many erratics.

A couple of nights were then spent in the Wielkopolska National Park. Our Polish host, Barbara, entertained us in the Ecological Station of the University of Jeziory. Set in the middle of the park we were surrounded by oaks and pine with plenty of bird life to identify.

The Field Trip was under the auspices of three Universities and we were given a fine introduction to the Geology, Ecology and Ornithology of the region by members of the Poznan University, followed by a collecting excursion to a local quarry where gypsum crystals could be collected along with a study of glacial till, erratics and clay.

A feature of the trip were the 'Bonfire' evenings or 'Camp fire' sing songs as we would call them. However they were to a much higher standard and we were entertained by a very professional folk song duo as we roasted Polish sausages over the fire by the light of the moon.



### *Wroclaw*

From Poznan we travelled South to Wroclaw taking in a castle and a hunting lodge on the way. At the latter we were entertained to a piano recital combining Chopin with a modern Polish composer (Malavski) in the programme.

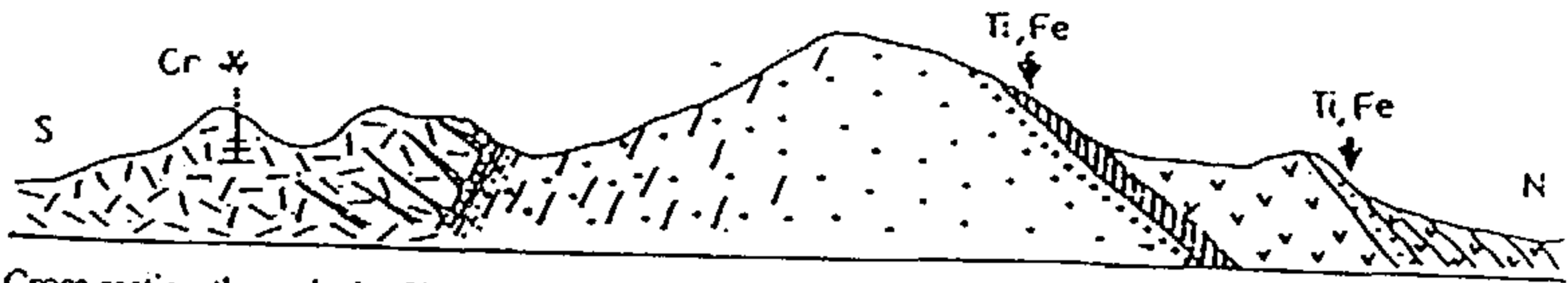
Our destination was a Castle on the outskirts of Wroclaw which had a history as a monastery and was situated on the slopes of Mount Slezka.

A visit to the town of Wroclaw was the following day's highlight, we started in the Mineralogical Museum part of the Geological Department of the University of Wroclaw which had previously been the Communist Party Headquarters, where we admired the prize collection of rocks from the area as well as from around the world. Well displayed it was with difficulty that we dragged ourselves away to visit the town.

By the end of the Second World War, 70% of the City was razed to the ground and the remaining inhabitants expelled to Germany. The City was resettled with people from Poland's pre war Eastern country, now lost to Ukraine

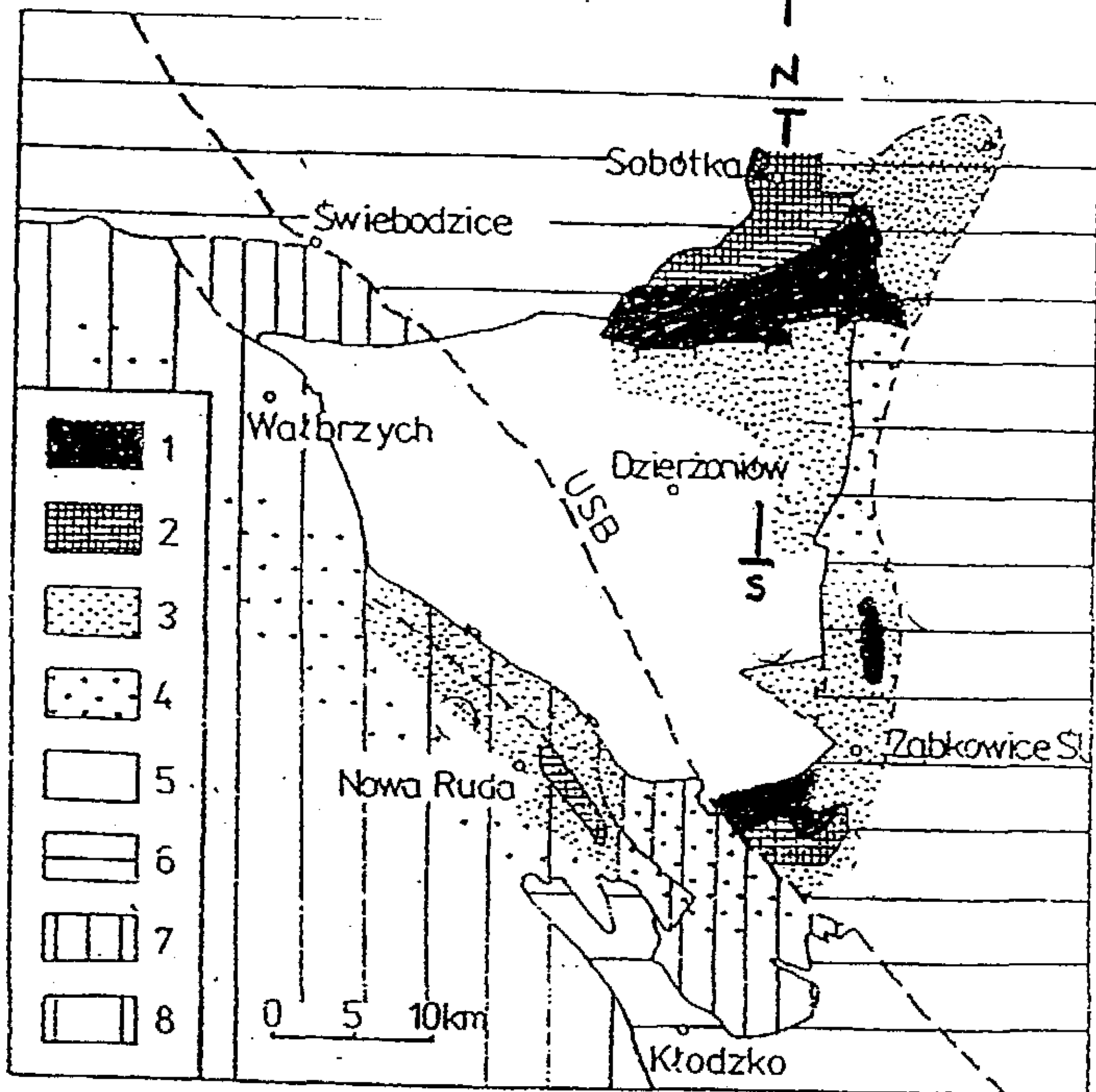
A visit to a local market, where one could buy anything from a Russian General's uniform, complete with medals, to a bunch of grapes, finished our day.

The next day saw us up and about eager to experience some more Geology. We were in an area which contained an ophiolite sequence, surrounded by a ring of Serpentine. We collected specimens of the Serpentinite then proceeded to view the Gabbro of the Ophiolites.



Cross section through the Sleza ophiolite (after L. Jamrozik 1989).  
Main lithologies from S to N: serpentinite, gabbro, and diabase.

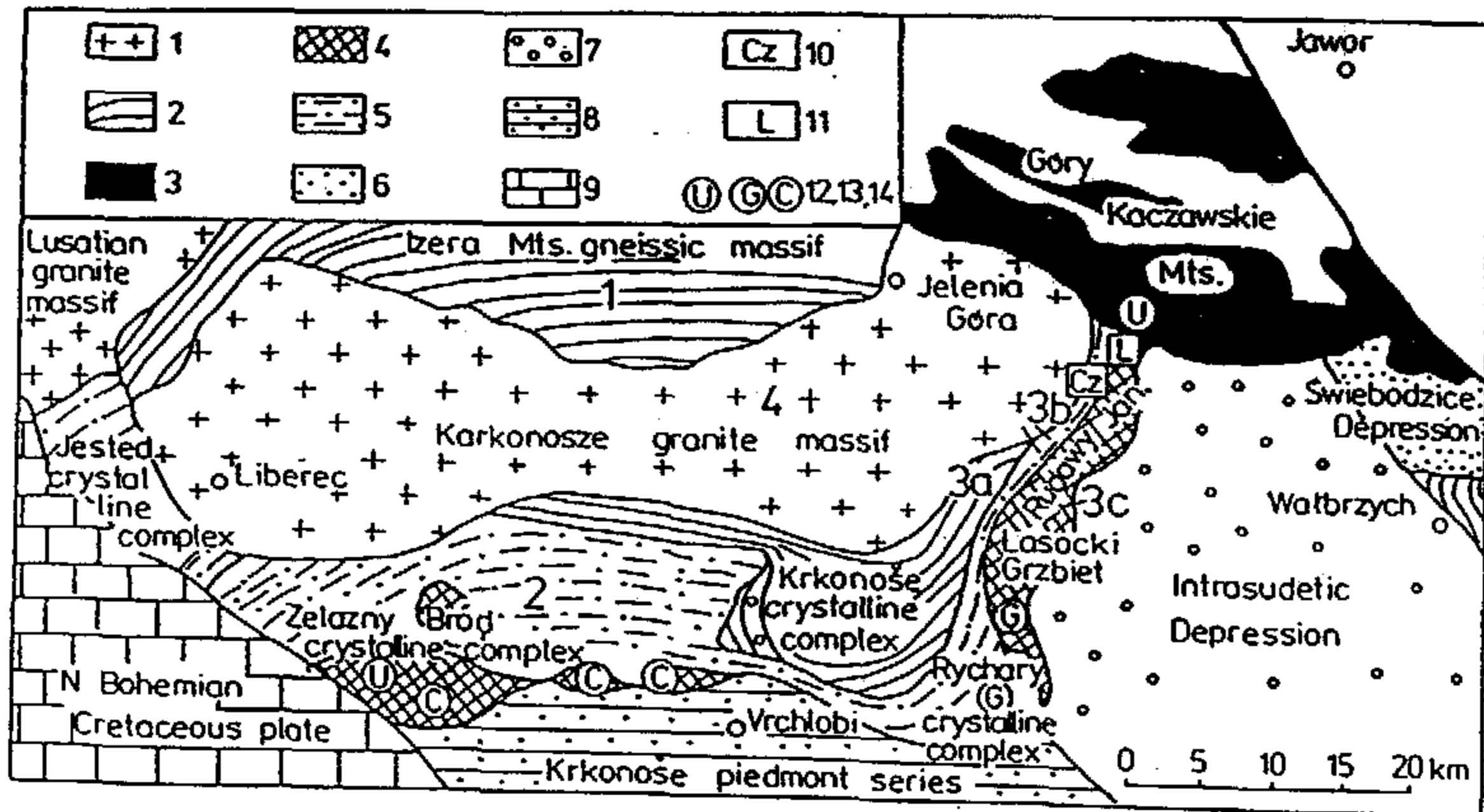
L. JAMROZIK 1989



L. JAMROZIK 1989

Mafic and ultramafic rocks around the Gory Sowie block (after L. Jamrozik 1989).  
1 - serpentinite, 2 - gabbro and diabase, 3 - mafic and ultramafic rocks inferred from gravimetry, 4 - possible extension of serpentinite and gabbro, 5 - Gory Sowie gneisses, 6 - low- and medium grade metamorphic rocks and Variscan granitoids, 7 - sedimentary sequences of Swiebodzice Depression and Bardo Mts, 8 - sedimentary and volcanic rocks of the Intra-Sudetic Basin.

A further excursion took us to an exposure of banded and folded Gneiss and migmatites. On our return journey we collected some Garnets and viewed some granulites. The origin of these was not yet determined with theories between tectonic slices thrust up to the surface or possibly retrograded surfaces. The whole area had been affected by low grade metamorphism.



Geologic map of the Iżera-Karkonosze block and its surroundings (after NARĘBSKI 1981, modified).

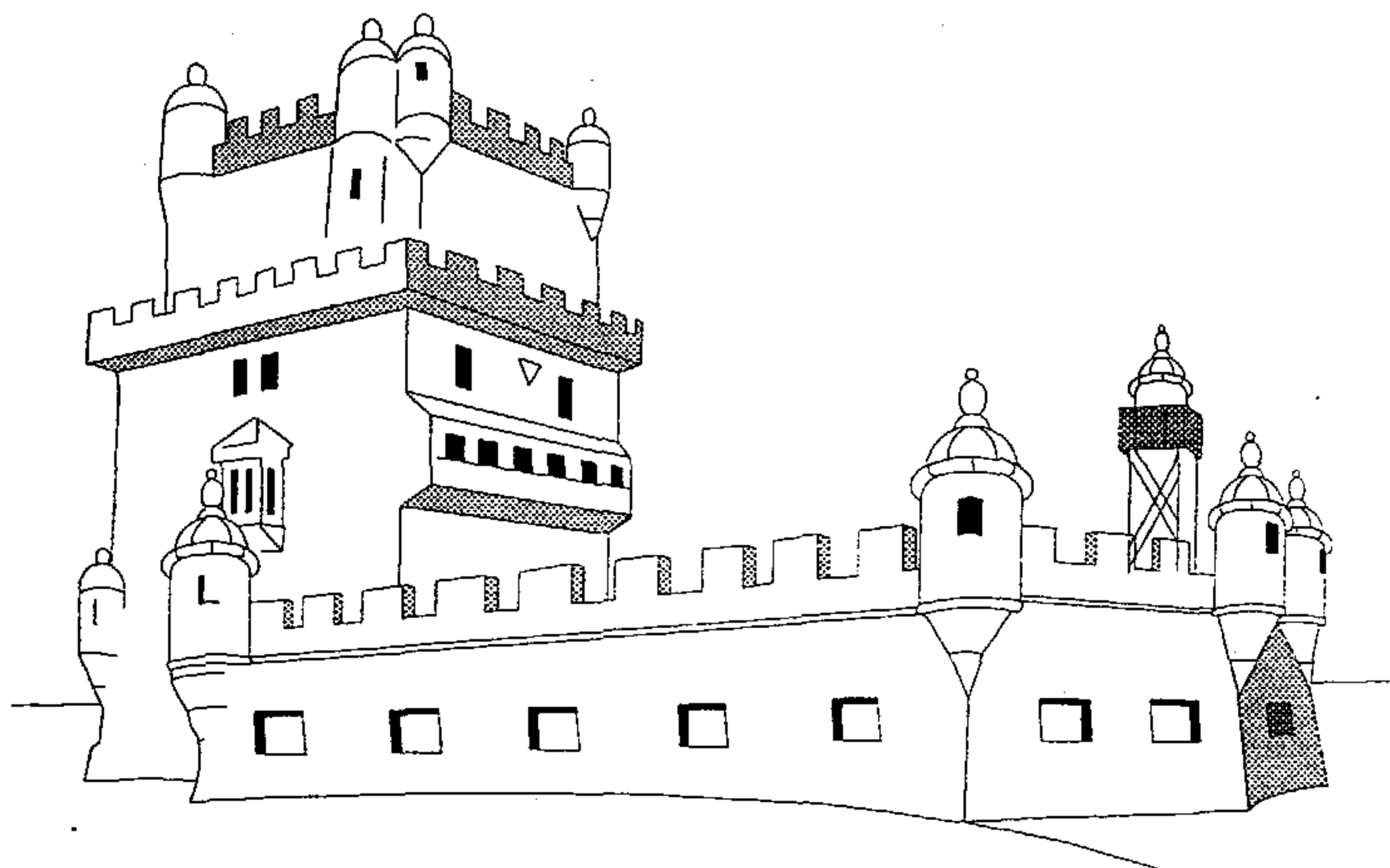
1 – granitoids; 2 – metamorphic rocks; 3 – spilite-keratophyre series of the Góry Kaczawskie; 4 – spilite-keratophyre series of the Rudawy Janowickie – Lasocki Grzbiet – Rychory – Zelezny Brod zone; 5 – mica schists and phyllites, 6 – Devonian – Lower Carboniferous deposits; 7 – Carboniferous – Cretaceous deposits; 8 – Permian deposits; 9 – Upper Cretaceous series; 10 – Czarnów formation; 11 – Leszczynic formation; 12, 13, 14 – ultrabasic, glaucophane and crossite occurrences.

1 – 4 – units described in this text.

M. Hinczewski & T. Ober-Driehle 1990

A journey Southwards took us into the Silesia and we were to visit the Sudetes, the Karkonosze Mountains. A range consisting of Variscan granites and affected by the Pleistocene glaciation. A stiff climb to a lake looking very reminiscent of Cwm Idwal was our main destination where we studied grey and pink granite.

Our next day was to see us start with a scramble over a waste tip from a former Uranium mine. We found fluorspar, uraninite, amethyst as well as the basic rock which was a very fine marble. We were dragged away to venture underground to see a fine cave in the marble with spectacular examples of stalactites and stalagmites. We then sampled the waters in a Spa town on the Czech Republic border and proceeded to one of the table mountains, an area where there are hard sandstones which have weathered into a labyrinth through which a trail runs, at times there is hardly room to squeeze between the boulders. These table mountains mark the border with the adjacent country so one could stand with a foot in each land. We returned at the end of the day to a 'Bonfire' Evening and yet another sausage or two.



## KRAKOW

Our journey then took us Eastwards to our last port of call, Krakow but on the way we visited Auschwitz. As the war had such an effect on Poland and this is a memorial to the futility and horror of war it was a visit that should be made and one on which to reflect, however it was hard to equate the horror with the video cameras recording the displays of prisoners effects and the ice creams on sale outside the gates. We reached our Krakow destination, the Science Teaching Centre of the Academy, with relief.

Our first day in Krakow was spent in the Ojcow National Park an area of Jurassic limestone which is twinned with the Peak District National Park. Resplendent with towering pinnacles and caves we spent a pleasant day wandering around the valley, ending up with dinner in a castle defending the entrance to the valley.

Zakopane in the Tatra mountains was our destination the following day, these have been thrown up by the Alpine orogeny and with the Carpathian mountains as their foothills form an area of mesozoic sedimentary sequences folded in the Upper Cretaceous. There are large nappes so 'which way up' is a problem to solve. Rising to a height of over 2,000 metres we were unlucky to have a dull overcast day so were unable to appreciate the beauty and immensity of the range.

We travelled up a local valley that ran into the mountains where we had a trip by horse drawn carriages and could really feel the geology as we passed over it. There were overturned Jurassic rocks and we had mid Cretaceous at the bottom of the valley, lower half way up, covered by Jurassic and topped by Triassic. Certainly a difficult picture to interpret.

A trip without a visit to a Salt mine would not be right, so we went underground to the first three of the nine levels of a working mine in the nearby Carpathian mountains. There had been a severe flood the previous September and we first visited the site where a subsidence of nearly two metres had occurred. It was most impressive to see the bend on the local railway line which distorted the track by several metres. The mine was a show piece and contained a ballroom, chapel, lakes and a very interesting Museum which had the items of previous years of salt extraction in situ. It was a fascinating two to three hour trip.

We ended this day with our third Bonfire Party, we were joined by the Professor of Geology who had fought with the Eighth Army during the war, so we were treated to a rousing chorus of war time favourites.

The former royal capital was one place that was not to be missed, so we toured Krakow for part of our final day in Poland. The Royal Castle, Cathedral, and the oldest university building from the 15th Century were included in our walk around. We ended up in the main Market Square where one could buy local artefacts.

The highlight of the day was a visit to the University to the Department of Mineralogy and Mining where we were greeted by the Dean and enjoyed a talk and tour of their geological displays. We dined in part of the old defences that had been built by the Austrians which afforded a grand panorama over the city.

Our departure from the local airport was early afternoon so we were free to do our own thing in the morning. The more intrepid of us ventured into the nearby quarry and were seen scrambling up the sheer face to determine what the rock was on top of the porphyry that abounded in the base of the quarry. After much scrambling and blood letting it was found to be a sandy limestone, but with no traces of fossils.

Would I go there again? Very definitely yes. It was a very friendly country and the people that we met treated us extremely kindly. The tuition that we had from the Polish Geologists was excellent with the local specialist providing us with the latest theories and also showing us the prime exposures.

The three universities who organised our trip made excellent hosts and the person who masterminded it, Barbara Walna from Poznan gave us a holiday and field trip that I am sure we will never forget.



## *Impressions*

Inevitably with a visit to a new country, people on your return are interested in your impressions and especially when it is a country that is undergoing the amount of change that the former Eastern Block is having to cope with.

## *People*

To me, the people with a few exceptions were small, however they made up for this with extreme friendliness. Casual passers by would speak to you and be willing to share their experiences. Those we came into touch with as part of our trip were very professional and were expert in their subject. Without exception they apologised for their lack of English but they were very fluent and certainly put us to shame. They were also very tolerant when we tried to get our tongues around some of their pronunciation.

I welcomed the frankness with which they spoke and were willing to share with us their experiences of the last few years. (Warts and all). The 'bad' days were not glossed over or the problems that they had inherited as a result of trying to transfer to a Western economy.

Our accident at the beginning of the journey gave them opportunity to cope with an unexpected situation and they rose to the challenge in a remarkable fashion. By the next day we had a substitute translator and guide who deputised for Barbara as she stayed on in the hospital to look after the patient. Barbara even enlisted her husband to drive our crippled member to her home and looked after her overnight until arrangements could be made to repatriate her.

Such was the willingness to share in our experiences that we were joined at the Bonfire Parties by those who had instructed us and we even had a party to see us off at the airport.

## *Accommodation*

We stayed in a variety of places from ancient castle to field study centre, they were all comfortable and ranged from en-suite at the hotels to shared rooms at the field centres. Take your own plug and also a large towel would be my recommendation. The field study centre was no different from what you would expect in the UK. If you expected the International Box with all mod con including mini bar then you would be disappointed, if you want a hotel with a shower and loo and atmosphere then that is what you get. We drank bottled water or beer and vodka and we found that the owners of the hotels in which we stayed were willing to join us. Yet another welcoming aspect.

## *Poland*

A land of contrasts, between very beautiful country and areas spoiled by man with mines, spoil heaps and polluted rivers vying with woods and lakes. Horse drawn hay wagons and scythes contrasted with the mechanisation of yesteryear, some still embellished with the red star. Restored city centres reflecting the architecture of previous centuries surrounded by rectangular concrete blocks of flats.

A country trying hard to build its own character after a very chequered history in which it had been part of Germany, Austria, Prussia or Russia.

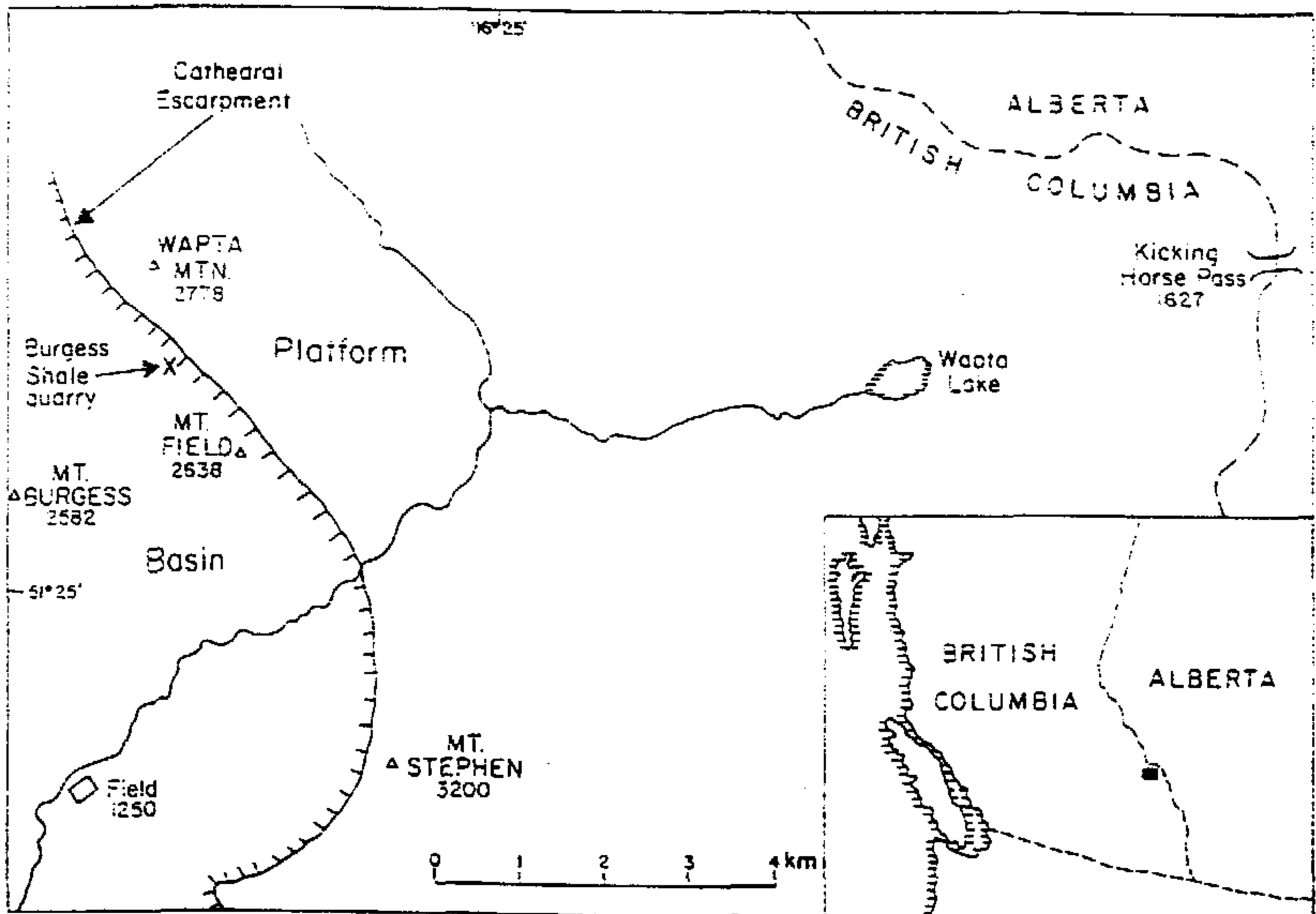
Above all a country with character and people who wanted to demonstrate that they not only had Geology to show us but also wished us to share in their culture and enjoy their showpieces.

I would recommend this field trip to anyone wanting more of a holiday than just sitting on the beach.

In the summer of 1992 it was first mooted "Why don't we visit the Burgess Shales?". I suspect it was Marybeth! The 'we' finally turned out to be Marybeth Hovenden, Janet Catchpole, Maureen Robertson, Mary Andrews, Jill and myself.

Marybeth's brother Donald lives in Vancouver and knew some of the Rockies well, so he would be a useful contact for arranging the journey from the city of Vancouver to the Rockies, if he could be persuaded to come along. He was duly contacted and after a little arm twisting by his sister, he agreed to accompany Marybeth, Jill and myself who would all be travelling together. Janet said she would try and arrange for a guide to take us to the Shales, as all parties must have one, and also book some accommodation near Field (British Columbia) in the Yoho National Park, in which they are situated.

A tentative date of August 30th 1993 was fixed and scheduled into a general tour of British Columbia and the Rockies. The final plans were that a group consisting of Marybeth, Jill and myself would fly to Vancouver on the 24th of August and be met by Donald. After a day or two sightseeing, we would hire a four-wheel drive vehicle and rendezvous with Janet, Maureen and Mary who were driving from Calgary, at Cathedral Chalets, near Field, on Saturday the 28th August. We did just that. It was very nice to see familiar faces some 6000 miles from home. That evening was rounded off with a home cooked meal of corn, potatoes and tomatoes, all bought from farms on the way.



. Location of the Burgess Shale quarry and position of the fossil escarpment of the Cathedral Formation. Heights in metres.

### THE HOODOOS

This article is all about our trip to see the Burgess Shales, but there are several other geological treats in the area. One of these is the feature called the Hoodoos. We all required some practice at walking up steep inclines before the big day, which would be on Monday, and these fitted the bill.

The Hoodoos are a collection of free standing pillars of glacial rubble on the banks of the Hoodoo Creek, some 1400 feet up a 1 mile track, that is in the order of a 1 in 4 gradient!. They are the remains of a thick blanket of debris left at the end of the Wisconsin Glaciation (Devensian) 11,000 years ago. Melting snow and rainwater eroding channels, which deepened into furrows, leaving free standing pillars, cemented by the natural lime and gravels within the rubble, and protected from weathering by capstones. These are claimed to be the best examples anywhere in the world, and as you will be able to see from the slides we are going to show at the Society's members evening in July, well worth a visit.

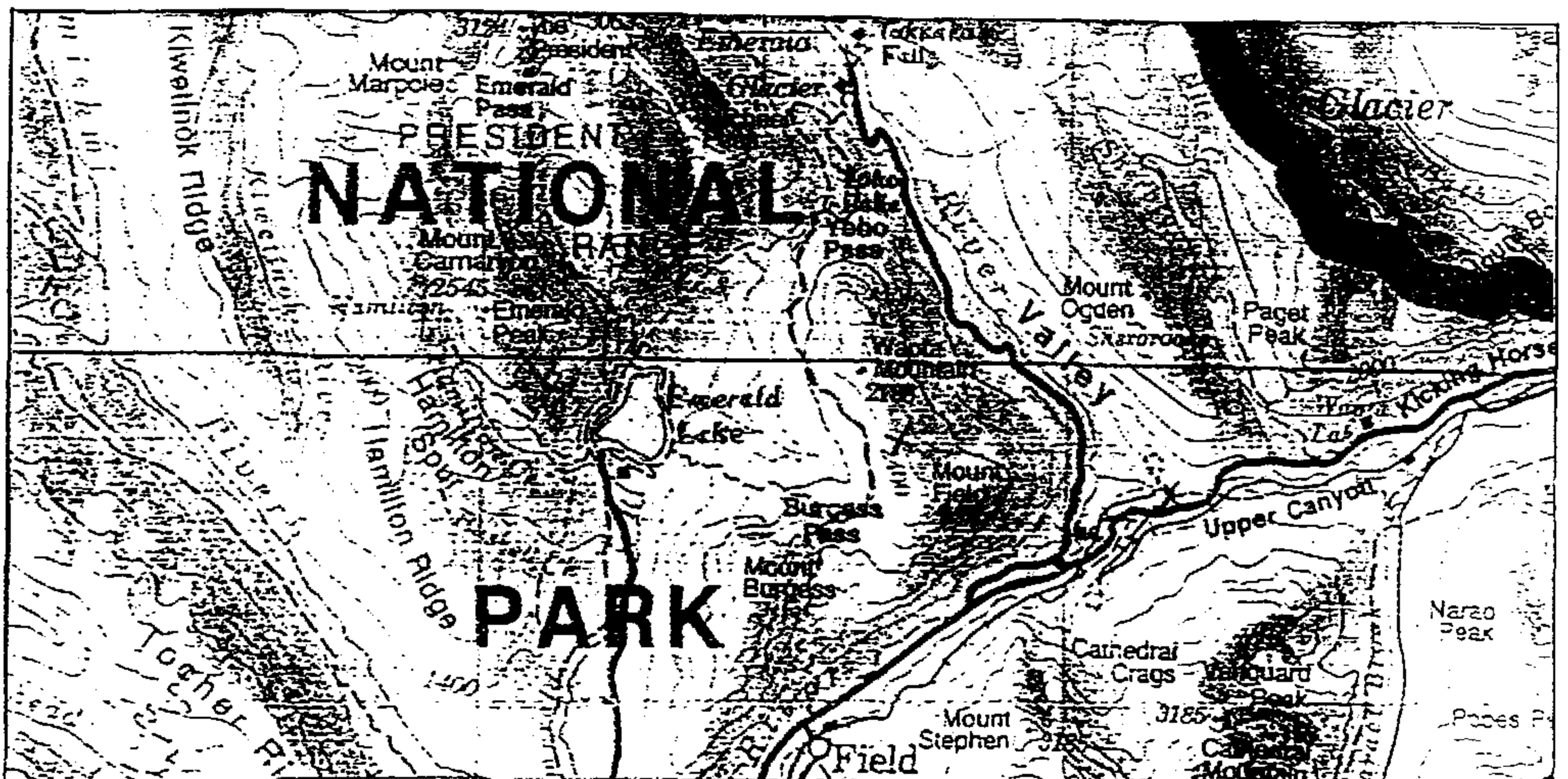
### EARLY TRIP BONUSES

The first added bonus to our trip was that we were all able to celebrate Maureen's birthday by eating some cake, suitably decorated with candles, brought along by Janet from England.

The second bonus was that Dr. Desmond Collins, of the Royal Ontario Museum, had just finished a summer season working on the Burgess Shales, had, literally, been brought down by helicopter that day, Sunday the 29th August. As luck would have it, he was to give a lecture on the latest theories and information about the fossils, that very evening. He came down two days later than expected, otherwise his lecture would have been on the previous Friday, and we would have missed it. Once we had found our way in the dark (no street lights out here), we were all crammed into a dark room, lit by a temporary generator which also operated the projector. However, all thoughts were to be concentrated on a fascinating talk on many of the fossils only seen before in Stephen J. Gould's book, with the latest ideas of how these very odd creatures existed, changing some of Charles Walcott's theories. This just 12 hours before we set off to see those same shales! I think any lingering doubts as to whether we could get to the fossils were firmly put aside at this point.

### THE CLIMB UP TO THE BURGESS SHALES

We arose early. had a quick breakfast, loaded up with our sandwiches made the previous evening and squeezed into one car. We drove up to Takkakaw Falls (about 5,700 feet) and assembled in front of the Youth Hostel to meet out guide Rosemary Power. The party, of 12 people, set off at 9.15 to climb the first 1000 feet, which took us up a steep zig-zag path.

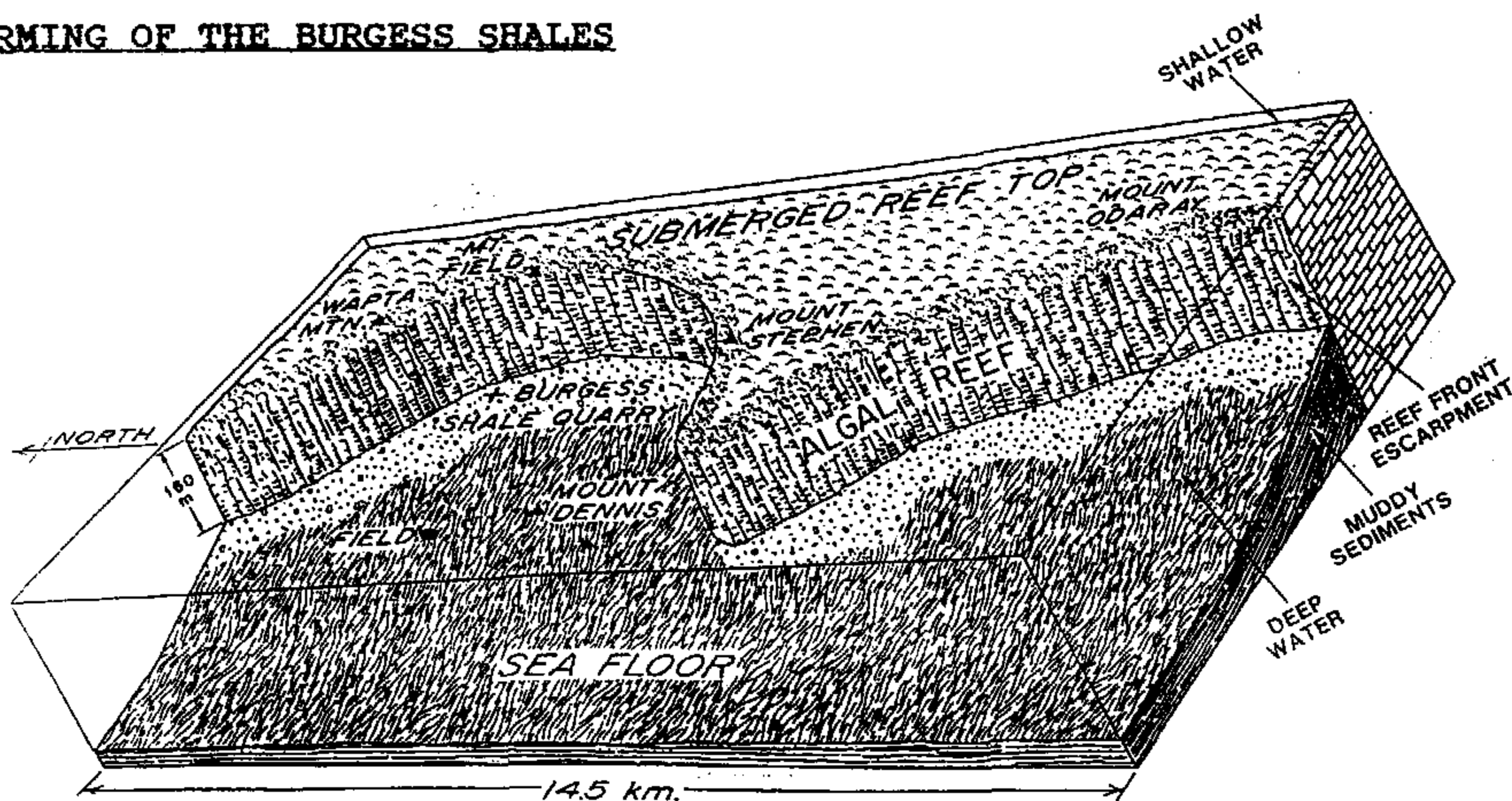


TAKKAKAW FALLS TO THE BURGESS

We proceeded, fairly steadily, with our guide frequently stopping to point out animal tracks as we came upon them. The first point of note was a series of small lakes, called Hidden Lakes, then soon afterwards, Yoho Lake which was very smooth in the windless early morning. The latter was at about 6,500 feet, where we stopped for a short break. Then onward and upward through the Yoho Pass, observing President Mountain on our right, up above us at 10,300 feet, with its receding glacier between us at about our height, 7,000 feet. Tracking around the North East corner of Wapta Mountain we were following the very same track taken by Walcott exactly 89 years ago to the day. We began to climb up toward the Burgess Shales located between Mount Wapta (9,200 feet) and Mount Field (8,700 feet).

We stopped for lunch at 1.30, just below the scree slope at 7,300 feet. The views to the West were superb, over Emerald Lake, 3,000 feet below, and looking toward the Ottertail Range. Now was the really testing moment. We had climbed over 2,000 feet, walked 12 Kilometers, could we scramble the last few hundred feet to the Burgess Shales? Some of the party were not at all sure, but we all wanted to try. So up we went.

### THE FORMING OF THE BURGESS SHALES



530 million years ago the area was covered by a sub-tropical sea, lying at about 30 degrees north of the equator. Running NW - SE of the present town of Field was an huge underwater reef consisting of a 200 metre high algal reef. (not coral which had not yet evolved). East of the reef, where the town of Calgary is today, the water was probably only a few metres deep. To the west, however, there was a sharp drop into very deep water. On this western reef edge fine silty mud was being deposited and banked up high enough to be clear of the stagnant depths. On these muddy sediments the Burgess Shale animals flourished.

The sediments were unstable, periodically slumping and sweeping those animals down to the base of the reef, into the deep stagnant water. The bodies ended up entombed in the fine mud, away from predators and in anaerobic conditions. As more and more sediments slumped, so the previously deposited bodies were flattened, soft body parts were transformed into a thin chemical film of calcium-aluminosilicate, hard body parts converted into a rock like substance. Eventually, the reef stopped growing. Further sedimentation continued the reef became limestone and dolomite, the silty sediments became shale. Throughout the shale, along the old reef front, are pockets of fossils - hence the Burgess Shales!

## FOSSILS IN THE SHALES

The scramble up was quite difficult, but eventually, as our photographs will show you, we all made it. What we think of as a quarry is not what Walcott's Quarry looks like. It is more like a shelf, tilted slightly downward into the mountain side, only some 20 feet or so wide. However, here we were at last, looking at those same fossils that Walcott found all those years ago.

There was a great burgeoning of life during the Cambrian, as seen in the Burgess Shales. Walcott identified many previously unknown species, the majority of these he placed in known phyla, but several he thought were members of new phyla. Recent work has reduced the number of animals that will not fit but there are still four which appear to be evolutionary off shoots, the most famous of which is the strange *Hallucigenia*.

We were lucky the weather was kind to us and we were able to take some very good pictures of *Wiwaxia* (similar to the molluscs, but not in a known phylum); *Ottoia* (one of the most abundant priapulids); *Aysheaia* (a marine worm); etc.

While we were busy looking at the fossils, a small plane buzzed us at about the same height as we were, probably to make sure we had a guide with us. We had also been observed by a family of mountain goat which for some strange reason were interested in certain of our bodily functions. Then a short detour up to Raymonds Quarry, for a bit more searching, this time among the pile of shale accumulated by Dr. Collins' party as containing interesting parts of fossils. Finally, regretfully, at 4.30 it was time to think about our descent.

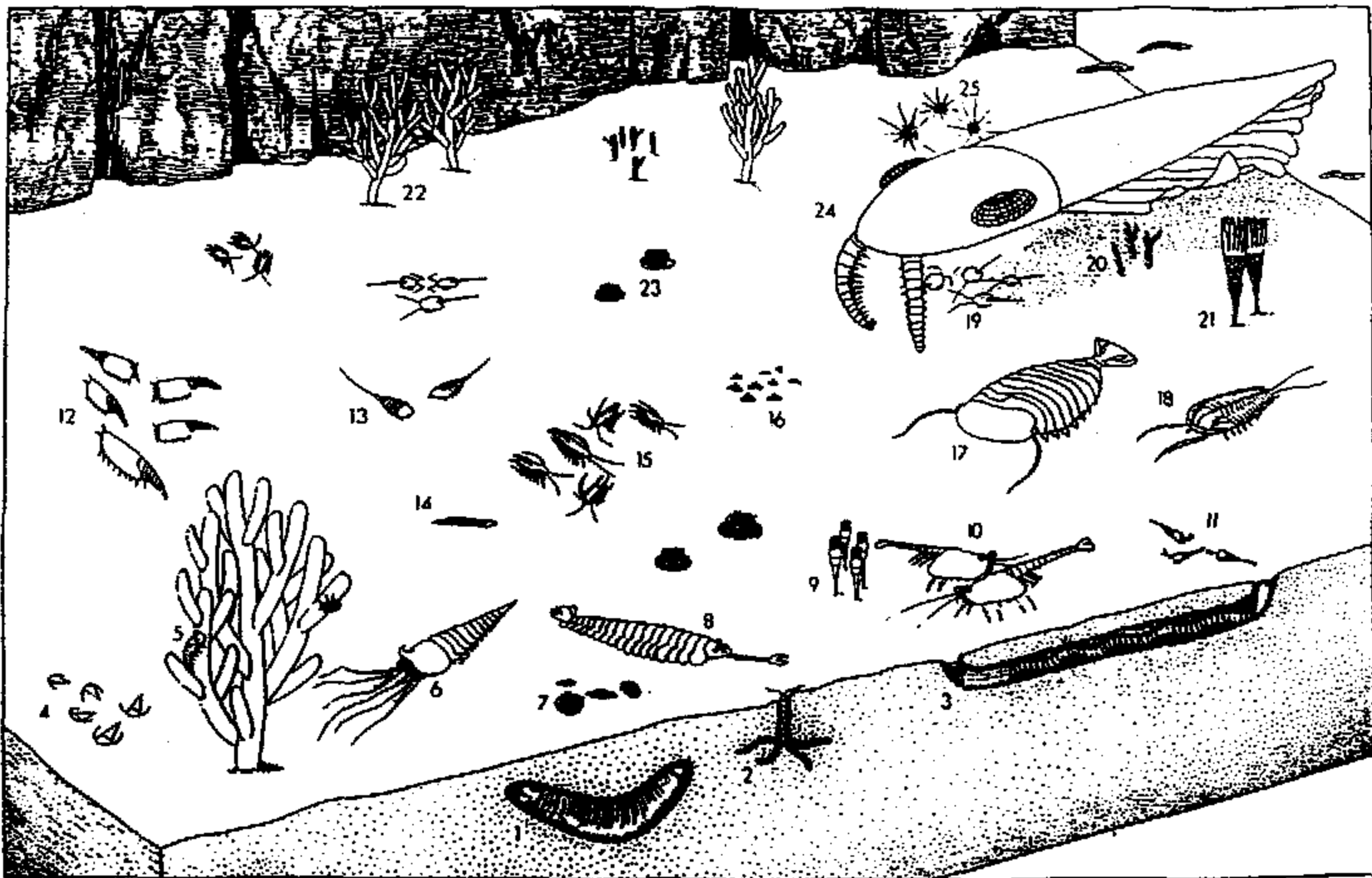
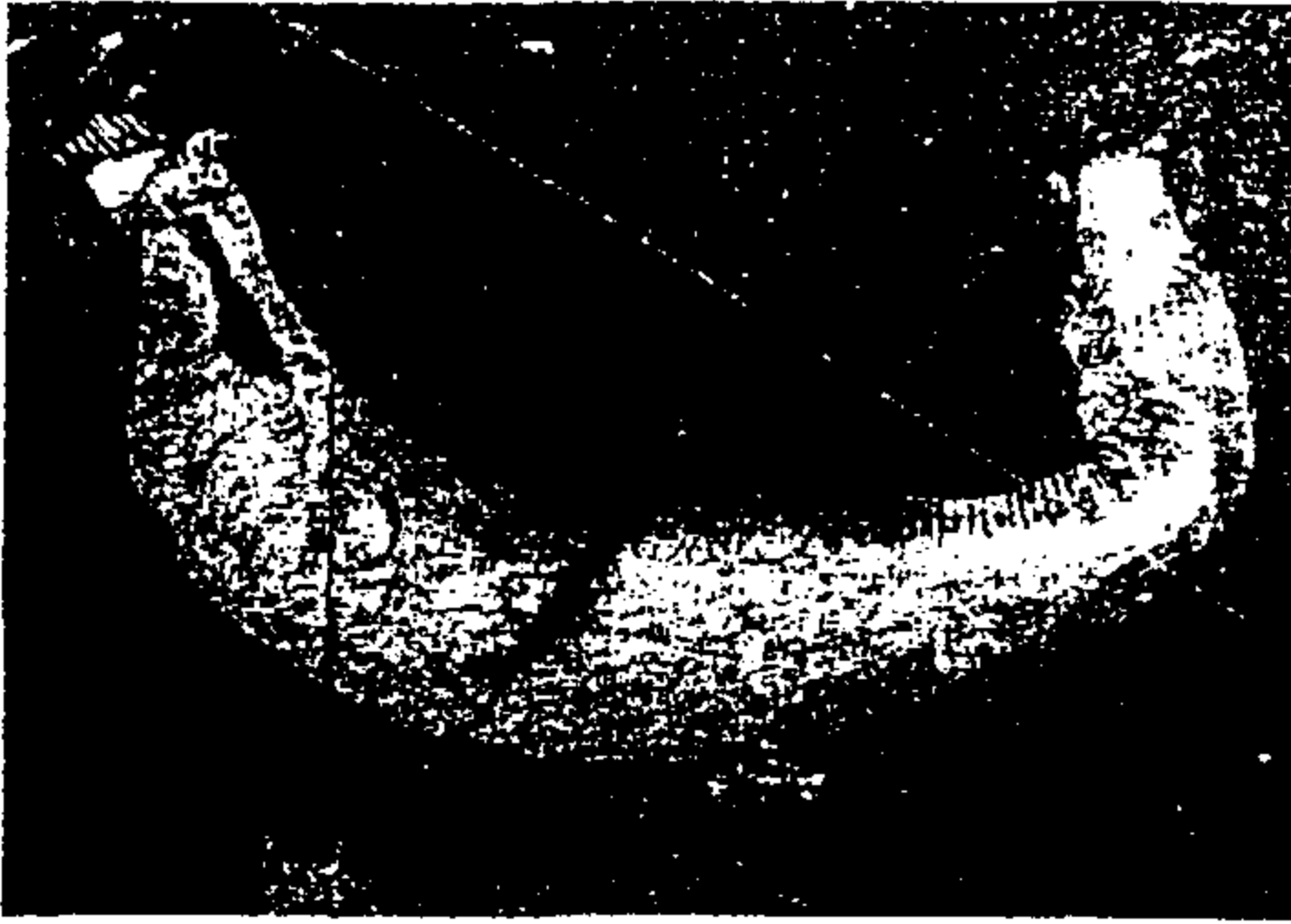
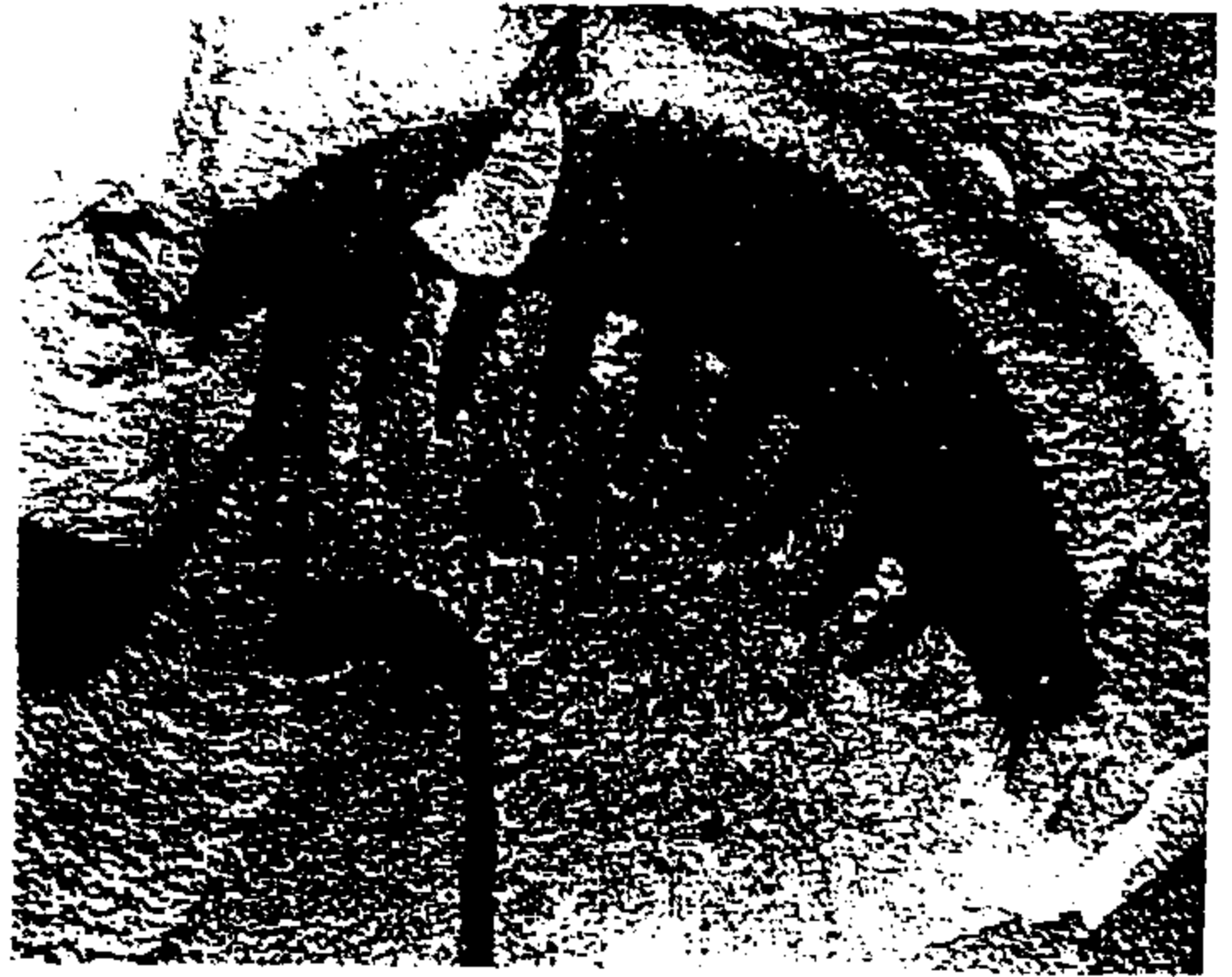


Figure 21. Restoration of some of the Burgess Shale species living on, above, and in the muddy sediments being deposited at the foot of the submarine cliff (in background). The animals have been numbered from left to right in successive rows across the drawing, beginning with the vertical section in the foreground. The animals shown comprise: branching and globular sponges (*Vauxia*, 22, *Chela*, 25, *Pirania*, 20); the articulate brachiopod *Nisusia* (7); the monoplecophoran mollusc *Scenella* (16); *Hyalites* (4); two priapulid (*Ottoia*, 1, *Louselia*, 3) and one polychaete (*Burgessochaeta*, 2) worms; various arthropods, [the trilobite *Olanoides*, 18; the non-trilobites *Stimeryia*, 17, *Leanchollia*, 6, *Murrella*, 15, *Canadaspis*, 12, *Molaria*, 13, *Burgessia*, 19, *Yohoia*, 11, *Waptia*, 10, and *Aysheala*, 5 (crawling on the sponge *Vauxia*, 22)]; the echinoderm *Echmatocrinus* (21); and the chordate *Pikaia* (14). Miscellaneous animals shown are *Opabinia* (8), *Dinomischus* (9), *Wiwaxia* (23), and the giant *Anomalocaris* (24). The animals are drawn to show their approximate relative size.



*Ottoia* (x1.5), a priapulid worm with a spinose anterior as well as a set of hooks at the posterior end of the trunk.



*Aysheaia* (x3.0), showing the thick body and the legs, both of which are annulated; claws are present at the tips of the legs.

### GOING DOWN

Down that dreaded slope to the path below, following it round behind the great Mount Wapta, back through Yoho Pass, a short stop at Yoho Lake again and here was the last 1,000 feet down the zig-zag path to be negotiated. This was the moment that our knees and feet began to tell us, rather forcefully, that we had nearly covered 24 kilometres, up 3,000 feet and down the same 3,000 feet. We got back to the Takkakaw Falls again at about 8pm. Tired and thankful. Yes our days work had been worth every moment.

### MORE OF THE ROCKIES TO SEE

We spent a few more days in the Cathedral Mountain Chalets, venturing out to see such sights as Lake Louise and its wonderful CPR hotel; Lake Moraine with the lovely reflections and colour; Lake O'Hara which could only be reached by bus or a 12 km walk, but gave us a lovely day to climb up to Lake Oesa past the Wiwaxia Peaks; watching a huge train going into and out of the spiral tunnels which take the trains through the Rockies between Vancouver on the west coast and Calgary on the plains to the west.

Sadly we said goodbye to Janet, Maureen and Mary, as they were going on a different route, or so we thought. Marybeth, Jill, Donald and I were to continue on the Icefield Parkway towards Jasper. On the way we passed such wonderful places as Lake Peyto with its wonderful turquoise colour; Crowfoot Glacier; and then to the Athabaska Glacier where we were taken up onto it in a 50 seater snowmobile with enormous tyres. When we were standing on the 10,000 year old glacier it was hard to believe that there was approx. 1,000 feet of ice below us. Then on to Jasper to try and find a bed and breakfast, on Labour Day weekend. Finally ending way out in the sticks at Pyramid Lake, with nothing much between us and Alaska, and a few bears which we had not seen at all. Although we did see, marmot, elk, deer, chipmunk and the occasional moose. Ah yes, and who did we find sitting in our restaurant but Janet and Co. desperate for a shower.

Then sadly, again saying goodbye to Janet, Maureen and Mary, we set off for Kamloops, and south-west to the coast, Vancouver and home via a few days in Maine, staying with some friends and finishing up in Boston, before flying home.

(I am indebted to Marybeth and Jill for their help with this article) C.B.



TRIP TO THE CZECH REPUBLIC, 12-21 MAY 1994 by Cath Clemesha

Six members plus a friend of the Farnham Geological Society were pleased to be able to join the Devonshire Association (Geological Section) trip to the Czech Republic.

The object of this excursion was to compare the geology of the area with that of South West England. Our leader from Devon was Dr Richard Scrivener of the British Geological Survey in Exeter.

Our Czech guide was Josef Tomas along with local guides at various establishments we visited. Josef is an Environmental Geologist, a great extrovert with a booming voice, currently married for the fourth time. He was very concerned about the many environmental problems, most of which arose during what was euphemistically called "The Former Regime". He was always good humoured, even when our way to a former church which housed an exhibition of Bohemian garnets was barred by a dug up road, bulldozers and angry workmen. Josef allowed himself a terse comment that Katerina, the travel agents courier had assured him she had checked access a few weeks previously. We had to retreat.

We stayed in five different places around the south-west to north-east of the country bordering Germany and Poland. I thought the hotels were mostly good; only one did not have en-suite facilities; in two we had to share facilities between two rooms.; beds were very hard and the duvets dense and very hot.

Food was tasty and reasonably priced. A decent evening meal with wine and coffee averaged under £4.00. The main meal for Czechs is mid-day, so Josef arranged our eating places daily. A typical meal consisted of meat, often pork, in a tasty gravy, sliced dumplings and sauerkraut. Desserts were either tinned fruit with ice cream or apple strudel. Copious amounts of Pilsner lager were offered, particularly at Plzen where we had lunch at the brewery restaurant. However, one could have non-alcoholic drinks such as orange squash.

Language was a problem unless Josef was there to help us. There are lots of "accents" over letters which affect the pronunciation of that letter and/or the previous one. Few people spoke English, except in Prague. German is their second language, but many spoke Czech only. Menus were usually only in Czech, although hotels sometimes had them also in German and English. Waiters we encountered mostly spoke only Czech.

The geology is quite complicated so I am giving an over-all impression. Some memorable places and sites were:

- \* Mineralisation 'round granite plutons (as in Dartmoor).
- \* Metamorphic rocks of Hercynian age, garnets, Permian basalts (as in the Permian Exeter volcanic series).
- \* Open cast brown coal mining (in a basin equivalent to the Bovey Tracey basin).
- \* Spas visited. Marianske Lazne and Karlovy Vary mineral water spas. Jacymov Spa with radioactive treatments.

\* Garnets, garnets! Went down a garnet mine. Visited a garnet treatment plant where garnets are separated from placer deposits and then sorted by hand . The best were reserved for jewelry and the rest ground up for use as abrasives.

\* Environmental problems. We witnessed vast tracts of pine forest totally destroyed by acid rain caused by burning of high sulphur brown coal, which in the past was the only source of power. The open cast brown coal mine itself was an eyesore and for miles around it is a scene of devastation. A great deal of work is going on re-seeding and tree planting after landscaping.

\* Specimens found. I picked up garnet amphibolite, fibrous aragonite, porcellanite, Karlsbad twinned feldspar, large augite crystals, agate amygdales in basalt, opalised peroditite with pyrope garnet and Permian basalt containing various minerals in vesicles.

\* Museums. We saw three museums. One was at the garnet mine and specialised in garnetiferous rocks and minerals from the area. The main one was the National Museum at the end of Wencelas Square in Prague with it's internationally famous magnificent mineral collection.

The last day and a half were spent in Prague sight-seeing, some shopping for garnet jewelry and/or Bohemian crystal. Others attended concerts at the International Music Festival. Most of us visited the National Museum. The last evening of the tour we all met in an exclusive little restaurant for a very enjoyable farewell meal.

If you would like to know more you can ask Mary or Alan Darling, Lyn or John Linse, Marybeth Hovenden, or me, Cath Clemesha.

.....

The Farnham Geological Society Newsletter is edited by David Caddy, 4 Ashstead Lane, Godalming, Surrey GU7 1SZ. Tel: 0483-423207. It is produced and distributed by various members of the Society.