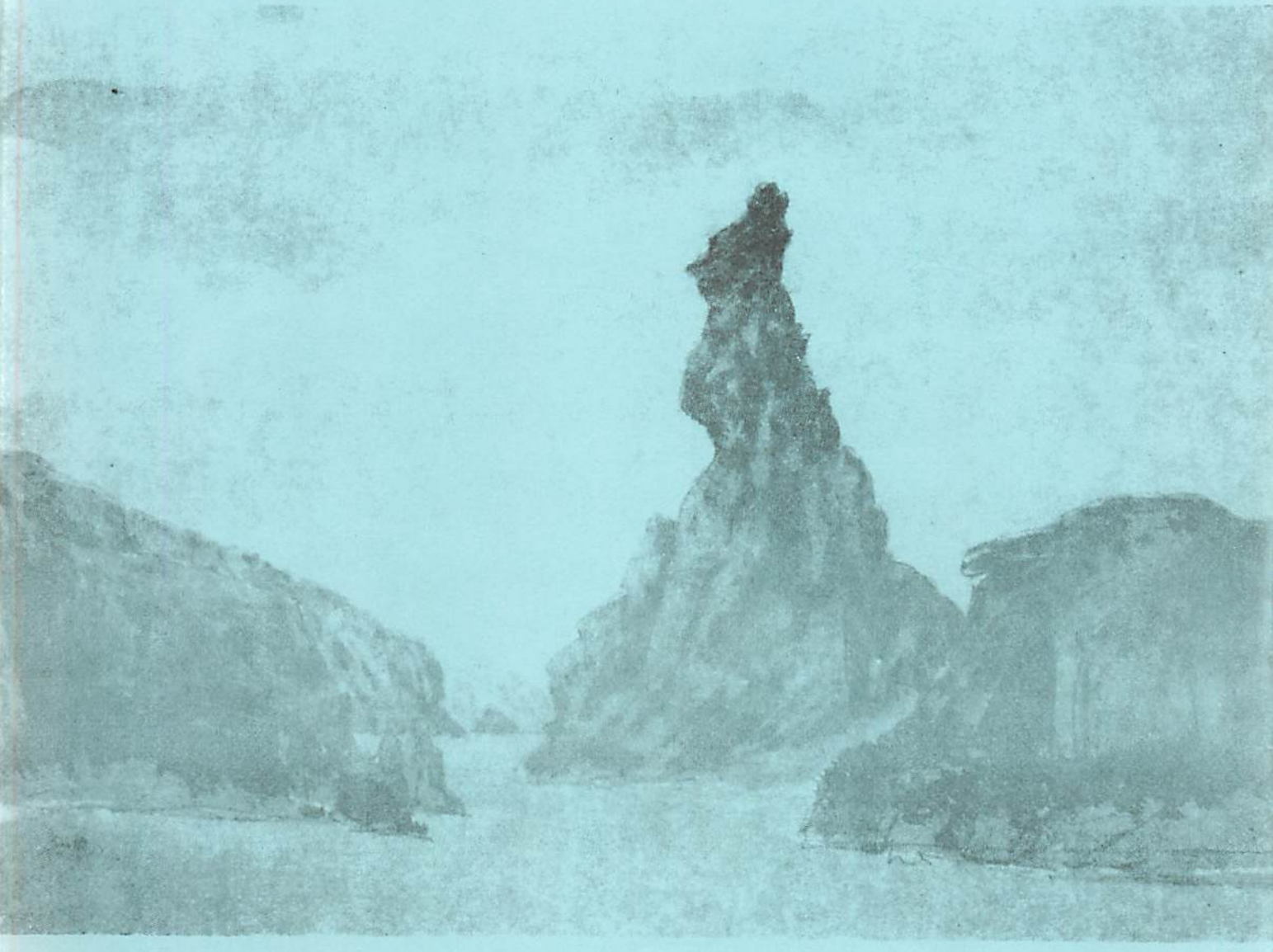
The Edinburgh Geologist



March 1978

Editor's Comments

One year after its first appearance, the third issue of the Edinburgh Geologist has been produced. I have always hoped that the magazine would be varied and so I am very pleased to see several new ideas in this issue - a crossword, two book reviews and a poem. These combined with the main articles cover a range of geological topics and it is hoped that everyone in the Society will find something of interest.

I would like to ask potential contributors to contact me in good time to discuss ideas they may have for the next issue which is planned for October/November this year. I would like to have draft copies of the articles by the end of September to allow for editing and discussion.

My thanks are due to all contributors to this issue, and also to Dr. Mykura and Mr. Butcher who produced the second issue of The Edinburgh Geologist in my absence last year.

Helena Butler
(Editor)

P.S. From the 23rd. March, my home address will be :
9 Fox Springs Crescent,
Edinburgh 10. Tel. No. 445-3705.

THE CORAL FAUNA OF THE MIDDLE LONGCRAIG LIMESTONE AT ABERLADY BAY

Aberlady Bay, situated on the south shore of the Firth of Forth some 11 miles east of Edinburgh, has long been recognised as one of the classic localities in the Midland Valley for the study of Lower Carboniferous/

Rugose corals. It was rather surprising therefore, to find that in the available geological literature, only six species were recorded from the locality. If, as seems likely, the lower Carboniferous rocks of Aberlady Bay were deposited in the same sedimentary basin and over the same period as rocks now exposed at Dunbar and Catcraig to the east, and St. Monance to the north, it seems logical to expect that the large number of coral species occurring at these localities, would also be represented at Aberlady. It was decided therefore, that an examination of the Aberlady limestones would be worthwhile to determine if some palaeo-ecological or geological reason was responsible for the lack of species.

As no 6" geological map of the area was obtained from I.G.S., the area between Aberlady point and the Gosford Bay Sill was mapped by the author at 25" to the mile using Ordnance Survey Sheet NT 4480-4580 as a base, to which all subsequent grid references in this paper refer. Collections of coral fauna were made, sectioned and identified by the author on the basis of the Classification proposed by Hill (1940) and Part "F" Treatise on Invertebrate Palaeontology (1956). In the case of doubtful identification, reference was made to the collection of corals housed in the Royal Scottish Museum, Edinburgh.

Notes on the Geology of Aberlady

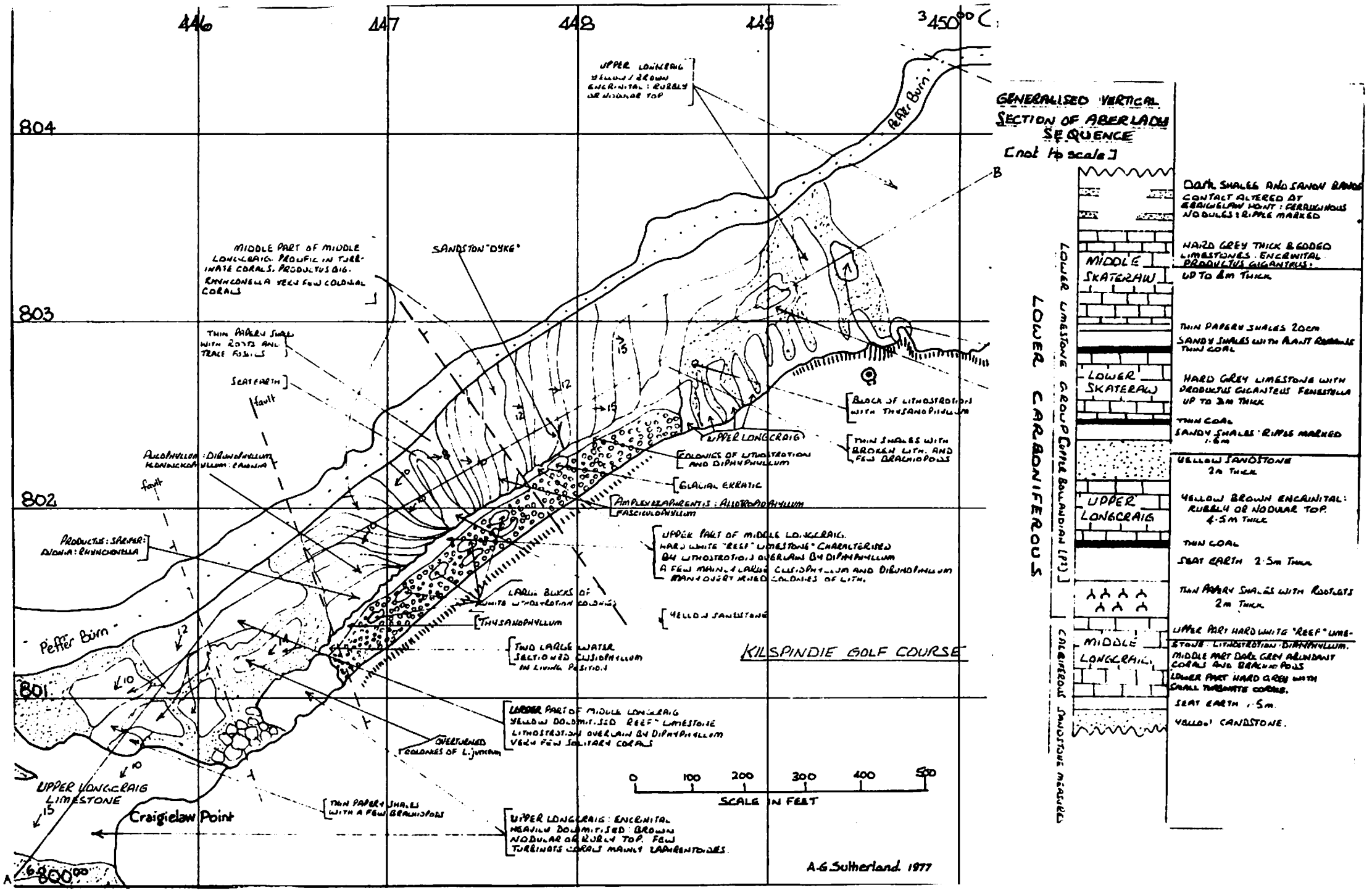
There are four limestones exposed at Aberlady, the Middle and Upper Longcraig and the Lower and Middle Skateraw.
They are interbedded with sandstones, shales seatearths and coals, demonstrating a cyclical change in sedimentary environment from marine conditions with limestones and calcareous mudstones being deposited, to ferruginous conditions with coals accumulating. These repeated sequences can result from sedimentation in a subsiding delta.

The Middle Longcraig Limestone has been placed in the Calciferous Sandstone Measures, while the Upper Longcraig, Lower and Middle Skateraw Limestones, have been placed in the Lower Limestone Group (Upper Bollandian, P2) (Macgregor 1930 and Wilson 1974).

The Middle Longcraig Limestone is by far the most productive for the examination of in-situ coral faunas, the Upper Longcraig Limestone being dolomitized, iron shot, and composed of crinoid fragments almost to the exclusion of other faunas. The lower and Middle Skateraw Limestones are both poorly exposed and while they abound with brachiopods and crinoid fragments, they have poor coral faunas.

The Middle Longcraig Limestone

The Middle Longcraig Limestone consists of a number of layers



GENERALISED VERTICAL SECTION OF ABERLADY SEQUENCE

[not to scale]

LOWER CARBONIFEROUS

LOWER LIMESTONE GROUP (LOWER BALLANDIAN (P1))

COAL MEASURES

CARBONIFEROUS SANDSTONE MEASURES

DARK SHALES AND SANDY BANDS CONTACT ALTERED AT CRAIGIELAW POINT : CERULEAN NODULES : RIPPLE MARKED

HARD GREY THICK BEDDED LIMESTONES : ENCRINITAL PRODUCTUS GIGANTEUS : UP TO 4m THICK

MIDDLE SKATERAW

THIN PAPERY SHALES 20cm

SANDY SHALES WITH RARE RHIZODES THIN COAL

LOWER SKATERAW

HARD GREY LIMESTONE WITH PRODUCTUS GIGANTEUS FENESTELLA UP TO 3m THICK

THIN COAL

SANDY SHALES : RIPPLE MARKED 1.6m

YELLOW SANDSTONE 2m THICK

UPPER LONGCRAIG

YELLOW BROWN ENCRINITAL : RUBBLY OR NODULAR TOP. 4.5m THICK

THIN COAL

SEAT EARTH 2.5m THICK

THIN PAPERY SHALES WITH ROOTLETS 2m THICK

MIDDLE LONGCRAIG

UPPER PART HARD WHITE "REEF" LIMESTONE : LITHOSTROTION : DIPHYPHYLLUM.

MIDDLE PART DARK GREY ABUNDANT CORALS AND BRACHIOPODS

LOWER PART HARD GREY WITH SMALL TURBINATE CORALS.

SEAT EARTH 1.5m

YELLOW SANDSTONE.

separated by thin, grey friable shales and occasional poor seatearths. It lies with apparent conformity on shale, seatearth and a sandstone of indeterminate thickness. It is lithologically variable, changing from a hard, grey crystalline limestone at its base in the Aberlady anticline at NT 4473-8022, through a pure hard white crystalline "reef limestone" at NT 4475-8010 to a yellow dolomitized top at NT 4460-8010. Faunal variations are also noted throughout its average thickness of 2.5 m.

The base of the limestone is best seen in the Aberlady anticline where it is a grey, well bedded limestone, containing brachiopods and bryozoa. The corals are all solitary rugose forms :

Allotropiophyllum (Thomson, 1881)
Amplexizaphrentis Curvilinea (Thomson, 1881)
A.enniskilleni (Milne-Edwards and Haime, 1951)
Claviphyllum eruca (Hudson, 1942)
Rotiphyllum granulare (Thomson, 1881)

which lie parallel to the bedding, and are generally aligned in the direction NE/SW. This horizon (which on average is 0.5 m. thick) is overlain by a light grey, fine papery shale which appears to be unfossiliferous.

Above this shale is seen a horizon of lighter coloured limestone containing :

Amplexizaphrentis curvilinea
Aulophyllum fungites (Fleming, 1828)
Caninia juddi (Thomson, 1893)
Clisiophyllum keyserlingi McCoy, 1849
Koninckophyllum magnificum Thomson and Nicholson, 1876.
Zaphrentites sp.

This horizon also abounds with well preserved brachiopods including Avonia sp. Productus sp. Spirifer sp. and Rhynchonella sp. The bryozoan Fenestalla is also represented. The horizon grades into a carbonate mud with broken Lithostrotion junceum (Fleming, 1828). This mud which is light grey, is probably the result of leaching of the upper part of the limestone shortly after deposition.

A hard, white crystalline limestone overlies this mud and is best seen along the length of the high water mark between NT 4485-8024. It is characterised by massive colonies of Lithostrotion junceum (Fleming) overlain by the larger Diphyphyllum furcatum, Thomson, 1887.

Nudds (1975), has suggested that D. furcatum is polyphyletically derived and should be referred back to Lithostrotion, however, to maintain continuity, it is here referred to D. furcatum. Of 10 specimens collected from this horizon, the larger coral had an average number of

ROUGH SKETCHES OF SOME OF THE CORALS FROM THE MIDDLE LONGCRAIG LIMESTONE ABERLADY BAY.

natural size.

Amplexizaphrentis curvilinea

x1·5 natural size.

Claviphyllum erucа.

natural size.

Allotropiophyllum cuspidum

x 2·5

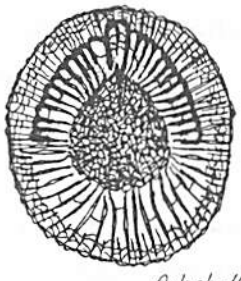
Diphyphyllum furcatum

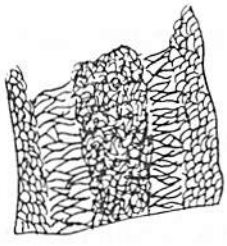
x 2·5

Lithostration junceum

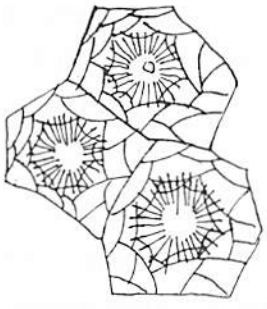
natural size.

Dibunophyllum bipartitum bipartitum



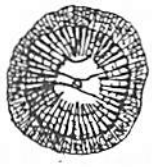


Aulophyllum fungites natural size



x 1·5

Thysanophyllum orientale



natural size

Koninckophyllum interruptum

septa, of both orders, of 27 in a corallite 8 mm. in diameter, with an axial tabularium 5.5 mm. wide and two series of dissepiments, diagnostic of D.furcatum. They are identical to the specimens from Aberlady in the Royal Scottish Museum collection and referred to D.furcatum by Sime (1974)

At NT 4460-8010 some overturned colonies of L.junceum can be seen, perhaps indicative of a period of some turbulence during the deposition of this element of the limestone.

Thomson, (1883) reported finding Thysanophyllum orientale (Nicholson and Thomson) in the top-most shale overlying the Middle Longcraig, but a search of this shale produced only L.junceum and D.furcatum. However, T.orientale was recovered from two localities, in both cases in association with L.junceum and overlying it at NT 4487-8028 (left in-situ) and at NT 4468-8013. The specimens are small and not well preserved, but sufficient detail was evident to make identification positive.

The top of the limestone which becomes yellow and dolomitized is seen at NT 4455-8008 and is characterised by L.junceum and D.furcatum. The limestone is overlain by a thin, papery shale, seatearth and a poor coal seam on which rests the Upper Longcraig Limestone seen at Craigielaw Point NT 4452-8008.

In all, 14 species of Lower Carboniferous rugose corals were recovered from Aberlady, of which only three were colonial forms. Hill (1940, pp. 5 - 14) suggested that the Carboniferous rugose corals could be divided into three recurrent facies faunas, 1) the Cyathaxonia fauna, 2) the Caninia Clisiophyllid fauna, and 3) the Reef Coral fauna. It is evident at Aberlady that we are dealing with fauna 2, grading into fauna 3.

Conclusion -

While the corals of Aberlady generally compare well with the species at Dunbar, Catcraig and St. Monance, the abundance of Koninckophyllum magnificum, and cerioid forms of Lithostrotion at the latter localities, coupled with their relative scarcity at the former, suggests that further work is required. At Dunbar, Catcraig and St. Monance the K.magnificum and cerioid Lithostrotion forms appear above the L.junceum and D.furcatum horizon while at Aberlady they do not. This would perhaps suggest that by the end of the period of deposition of the Middle Longcraig Limestone at Aberlady, conditions had become unsuitable for the migration of Koninckophyllum and cerioid Lithostrotion forms, while remaining suitable at the former localities.

The writer is grateful to Dr. C. D. Waterston and Mr. W. Baird, Royal Scottish Museum for access to the coral collection housed there, Mr. R. Gillanders for access to the late Mr. Ian Sime's field notebooks,

Mr. S. K. Monro, Mr. P. Brand and Mr. W. Tulloch, Institute of Geological Science.

Alistair Sutherland.

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LAVA - FEEDER RELATIONSHIPS IN THE ARTHUR'S SEAT VOLCANIC COMPLEX

The Arthur's Seat volcanic complex in Edinburgh is one of Scotland's most famous "Ancient Volcanoes". Aspects of its geology have been studied in various degrees of detail, by thousands of geologists in the last 200 years. Yet many features remain enigmatic, an important example being the relationship between the main lava and ash sequences and the various agglomerate and/or basalt-filled vents within the complex.

Certain early workers (e.g. Geikie, 1897) considered the lavas and vents to be of widely different ages, in Geikie's case Lower Carboniferous and Permian respectively. Starting with Peach (1910), most subsequent workers have attempted to relate the extrusive and intrusive rocks to a model of a single, evolving, central - vent volcano. The most authoritative account is by Black (1966), who on the basis of detailed structural and petrographic studies by himself and earlier workers, presents a convincing history of "Edinburgh's volcano", where all the major rock units are considered to be parts of a low-angled cone centered on the Lion's Head and Lion's Haunch vents. The cover illustration of the first issue of "The Edinburgh Geologist" celebrates the incorporation of this volcanic cone into the city's folk-lore.

Not all geologists, however, have been totally convinced by the concept of an Arthur's Seat strato-volcano. Thus, Cox and Upton (1969, p. 8) note that "there is little detectable radial pattern in the dips of the lavas within the area of the Royal Park", implicitly casting doubt that the lavas and ashes were in fact fed from the vents of the complex. In order to help clarify the lava / vent relationship, a geochemical study has been made of two of the supposed lava/feeder pairs described in Black (1966), namely Lava I and Castle Rock ; Lava IV and the Lion's Head Basalt.

Five specimens were collected from each of the Lava I, Castle Rock and Lion's Head Basalts and four from Lava IV. They were taken from widely spaced localities within each mass (details obtainable from authors) and are thought to cover adequately the major chemical spread within each mass. After petrographic examination, the rocks were analyzed for Ba, Ce, Nb, Pb, Rb, Sr, Y, Zn and Zr by X-ray fluorescence spectroscopy, TiO_2 and P_2O_5 colorimetrically and Na_2O and K_2O by flame photometry.

Certain of the results are presented diagrammatically in figs 1 and 2. The scatter of points within each field represents several factors: analytical error ; the deuteric alteration of certain samples; variable phenocryst contents of analyzed rocks ; differentiation within each unit. Clark (1952) first noted the tendency for certain Whinny Hill

lavas to show systematic mineralogical variations along their outcrop and suggested that this reflected compositional gradients established within the relevant magma columns prior to extrusion. Judging from the new analyses, the Castle Rock plug is also chemically differentiated.

The Lava I and Castle Rock Pair

The rocks from each unit occupy several fields on a Ba-Sr graph (fig.1); a similar separation is found using Na_2O and P_2O_5 as axes. The relationship between Ba and Sr indicates that Castle Rock is not simply the more basic portion of a differentiated magma column of which Lava I represents the more salic top. In that case, Lava I would be enriched in both Ba and Sr. The conclusion to be reached is that the two units do not represent the same magma.

The Lava IV and Lion's Head Basalt Pair

There is a clear separation of the two basalts on a K_2O-Ce graph (fig.2) and the fact that the supposed 'root' has higher contents of these residual elements than the upper part of the column, shows that the relationship between the units is not one of simple differentiation. The Lion's Head Basalt does not appear to have fed Lava IV.

The geochemical evidence does not favour a lava/feeder relationship for the flow/vent pairs studied here. There must therefore be a justifiable suspicion that none of the lavas or bedded ashes was erupted from the Lion's Head, Lion's Haunch or Castle Rock vents. The suggestion must again be entertained that the extrusive sequences were part of the Lower Carboniferous plateau – forming volcanism, erupted from unknown centres and that the vents and associated intrusions represent a later period of activity, only geographically related to the lavas and ashes.

Until the necessary radiometric age and geochemical data are available, Edinburgh's volcano is in danger of losing some of its girth but none of its majesty.

R. MACDONALD,
A. BODYCH,
University of Lancaster.

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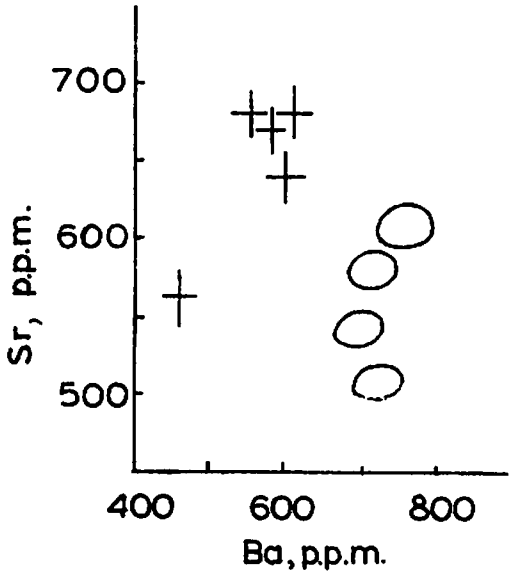


Fig. 1

Castle Rock

Lava I

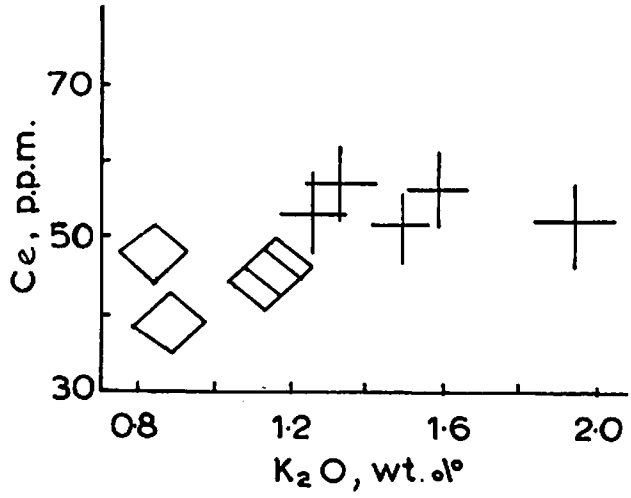


Fig. 2

Lion's Head Basalt

Lava IV

Size of symbols represents analytical uncertainty.

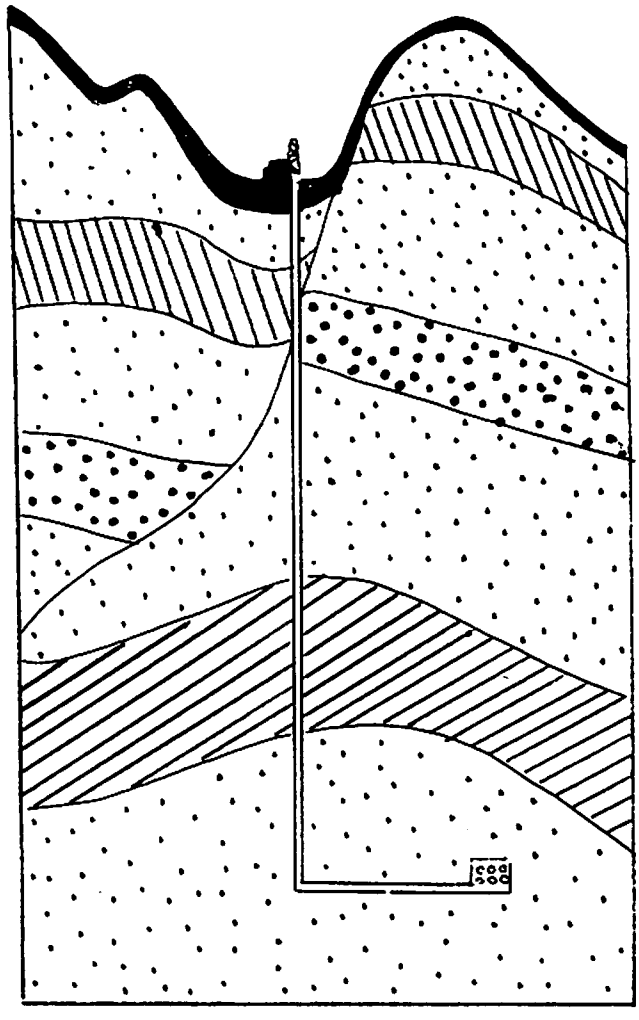
THE NUCLEAR DEBATE

by

Prof. Donald Duff,
Dept. of Applied Geology,
Strathclyde University.

Staff of the University's Department of Applied Geology were most impressed early last year at the unprecedented flood of inquiries they received from a variety of people and sources following the announcement that technical surveys were to begin in order to assess the economic potential of Scotland's uranium deposits - and that test-drilling was also to take place as part of a programme to assess different rock-types as potential underground storage sites for nuclear waste. These inquiries (if anyone is in doubt) were proof positive that the nuclear debate has by no means shaken off the dust of Hiroshima and that many of us (scientists and laymen alike) feel deeply concerned and part of it. The interrogation to which Department staff, as geologists, were subjected demonstrated too that the geologist's role was as crucial as that of any other scientist. The questions thrown at us ranged from the incredibly naive to the penetratingly shrewd, and revealed how most non-geologists failed completely to distinguish between geological exploration and exploitation, either of materials or of sites. In other words, there is apparently still widespread difficulty - even among informed laymen, and despite the publicity given to drilling for North Sea oil - in making people understand that many more holes are drilled in the ground than will ever produce mines or oil wells. Press, Radio and TV reports also indicated that the physicists, engineers and chemists who were attempting to explain exactly what they wanted to do alarmed public meetings in the Orkneys and in Ayrshire and Galloway were either unsure of their geology or were being hopelessly misreported in the media.

But this flow of questions made Departmental staff realise that as geologists we were ourselves perhaps not so up to date as we might be in recent developments in nuclear geology. This, of course, is yet another example of how difficult it is for scientists nowadays to keep abreast of all that is going on in science. This being so, what chance has the concerned layman if he wants to be properly informed. My colleague, Dr. W.G. Aitken, and I decided therefore that a specialist meeting would be of utmost value. This meeting would bring together the geologists working on the Scottish projects and other scientists involved in radiation hazards in mining uranium ores and in the disposal of radio-active wastes. We felt too that we should also try to bring in



representatives of planning authorities, elected members and officials, particularly from those areas which were emerging as possibly the most suitable for exploration. The support was enlisted of our Visiting Professor, Dr. S.H.U. Bowie, then Assistant Director and Chief Geochemist of the Institute of Geological Sciences (and the man in charge of the UK's uranium exploration programme), along with that of our national professional body , the Geological Society of London. There is no need to describe the planning and detail of the meeting, which was executed under Dr. Aitken's direction, but it duly took place in the John Anderson Building on Saturday, November 12, extending into three sessions and by all accounts proved extremely valuable to those present. So far as is known, it was the first of its kind held in Britain and attracted more than 100 participants, including geologists, nuclear engineers and chemists embodying great expertise. Many Scottish local authorities sent elected members and senior officials who are likely to be involved in taking vital planning decisions extending into the nuclear field. The Principal, Sir Samuel Curran, himself a distinguished nuclear physicist, welcomed

participants and opened the proceedings with a stimulating address.

In the event the conference seemed to succeed in its design which, within the framework of the ongoing nuclear debate, was to provide a unique forum for comprehensive scientific analysis of the uranium hazard, right through from exploration to disposal. If the role of the geologist in the debate represented the kernal of the agenda, the papers presented and ensuing discussion provided an encyclopaedic sweep. Many misconceptions were cleared up about radio-active waste and there was highlighting of the real dangers that existed, understanding of which is essential so that planning decisions can be taken by means of informed rather than emotional judgements. The keynote address by the Chairman of the UK Atomic Energy Authority, Sir John Hill, set the scene, Sir John of course being a staunch advocate of the nuclear future. Planning for this he argued, was imperative now in the light of the impending decline of oil supplies and the increased cost of producing coal. These were changes which would begin to be felt most by the end of the 20th. century, on an assumption that present world energy demands would not diminish. It was a familiar case, stated by Sir John with his customary force and conviction. Caithness and the Orkneys were identified by our own Prof. Bowie as containing the UK's most promising strategic reserves during a far-ranging appraisal of global uranium deposits, a theme further developed by Dr. Jane Plant (of the IGS) who dealt with natural radiation levels when outlining details of the extensive survey currently in hand to determine the concentrations of a variety of elements, including the radioactive nuclides, in Scottish rocks and rivers. Speakers from the National Radiological Protection Board and from the UKAEA (Mr. M. O'Riordan and Mr. N. Keen respectively) analysed potential hazards associated with the mining and milling of radioactive ores and the disposal of mine tailings on the one hand - and, on the other, the options open for the disposal of waste from nuclear power stations.

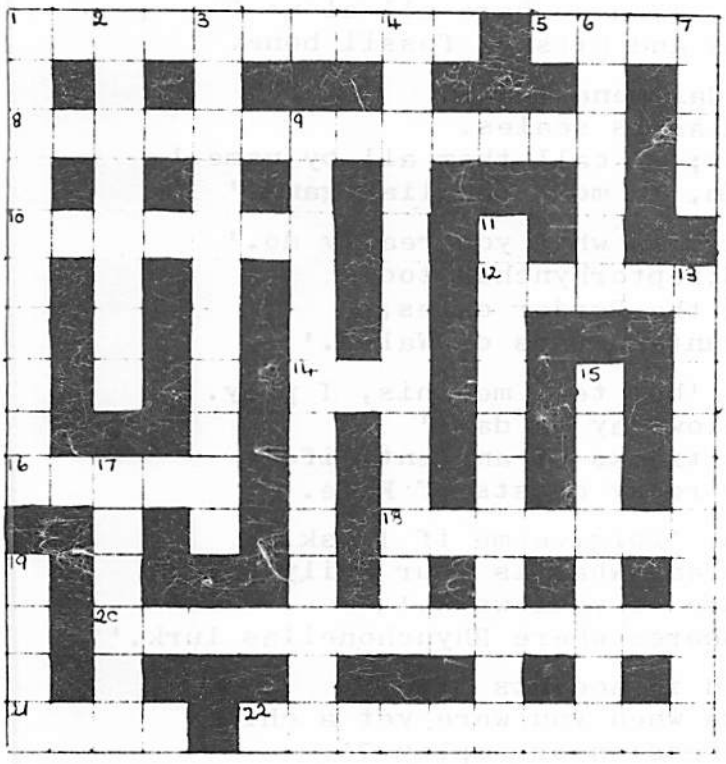
This led to a review by Mr. D.A. Gray and Dr. J.D. Mather (both of the IGS) of what in the public mind has become the crucial area of the nuclear debate, the problems of underground waste disposal (and the geological priorities to be met in selecting underground sites). Both speakers emphasised that the survey and drilling programmes proposed for Scotland in order to test some of the geological priorities, the issue around which much of the public anxiety arises, were only part of an extensive EEC programme of research into the acceptability

of various geological environments. Invaluable insights were also provided into the engineering geology problems involved in creating storage caverns in various types of rocks, in the prediction of future climates in evaluating long term storage requirements and in the understanding of groundwater characteristics. What emerged from Messrs. Gray and Mather's analysis was unambiguous: it was not yet possible, they said, for geologists to give their approval to underground disposal - extensive research was necessary over much of the next decade. But, it was made equally clear, the timetable of such investigations should provide answers in time for the expected expansion in nuclear energy production.

The meeting, we hope, provided assurances that careful and extensive research was well in hand into the disposal problems surrounding radioactive waste. We hope also that it indicated to the many "planners" present that - as the nuclear debate proceeds - there is already available a wealth of information on most aspects of the exploitation of radioactive materials. Society must face the fact that we already have a legacy of radioactive wastes which must be dealt with even if the nuclear energy programme was abandoned now. This is not a Scottish or a British problem, however much it may sometimes seem that way in those communities who fear themselves to be particularly "threatened". It is an international problem which will be resolved only by all those nations with a nuclear industry advancing essential research programmes. In fact all have active programmes in hand and my own expectation is that the problem will be resolved to the satisfaction of scientists within the next decade.

*This article is reproduced (by courtesy of the University of Strathclyde) from the University Gazette, Winter, 1977, ISSN 0309-0434.

A Geological Crossword



ACROSS

1. An orogenic canal ? (10)
5. When father assisted time (4)
8. Remove a point to expose in velvet (9,4)
10. Blown deposits (7)
12. Proponent of Tertiary epochs (5)
14. A striped one's viewer ? (3)
16. Sedimentary lists (5)
18. Bend shock waves (7)
20. Seek mineral in healthy plot (13)
21. Sounds a burden, this vein (4)
22. Primitive naked seed abundant in the Mesozoic (10)

DOWN

1. The age of chalk (10)
2. Throw a graptolite at my pal (8)
3. Steep walled pluton of intermediate composition (7,4)
4. Estimated at 4600 million years (3,2,3,5)
6. Does it rule titanium ? (6)
7. 'Mock on, mock on; 'tis all in vain !
   You throw the .... against the wind ! (Blake) (4)
9. Non-uniformitarians are apt to do this (6,7)
11. Bolted sheep pens ? (6,5)
13. Hot burn (4,6)
15. Tie Allan in pegmatite (8)
17. Cornish reptile is complex ? (6)
19. Fossil fuel (4)

THE AGED PALAEONTOLOGIST

by Dr Murray MacGregor

Quite recently one evening, as it was getting late
I met an aged man, a-sitting by a gate.
'Pray tell me what,' I asked of him, 'You do here all alone ?'
He said, I hunt for scraps of shells and bits of fossil bone.

'I search for Acidaspis spines and Calymene tails,
For bryozoa, crinoid cups and Cephalaspis scales.
I know their habits and their haunts; I call them all by name.'
'It sounds,my friend,' I said to him, 'a most peculiar game.'

'But what I'd like to know,' I said, 'is what you really do.'
He said, I search for Lingula and Streptorhynchus too.
I hunt for Tylonautilus through all the Border dales,
And follow Diplograptus o'er the mountain tops of Wales.'

'That's very brave of you,' I said, 'but tell me this, I pray.
What is the occupation that you follow day by day?'
'Oh well' he said, 'I follow in the tracks of ancient life,
And hunt for giant mollusces on the rocky coasts of Fife.'

'My poor old friend,' I said to him, 'forgive me if I ask,
That you should state in language clear what is your daily task.
I cannot comprehend at all the nature of your work.'
'Oh well,' he said, 'I haunt the shores where Rhynchonellas lurk.'

I gazed on him in sadness and I said in accents mild,
'Pray try to bring to mind the days when you were yet a child.
Did no one teach you any trade, profession or employ ?'
'Oh yes,' he said,'I gathered graps when I was still a boy.'

'But when you came to manhood, Sir did you not wish to be
A dentist or a grocer or a sailor on the sea,
A lawyer or a carpenter? 'Oh no,' he said, 'my wish
Has always been to spend my days in catching Fossil fish.'

'But please,' I said, 'I'd like to know the things that you have done,
'There's hardly time for that,' he said, 'but here at least is one.
I've shown that there's no Llandeilo and, deny it if you can,
The Glenkiln Shales, from base to top, are Caradocian.'

'You speak in language strange,' I said, 'I would not dare to doubt,
But even yet I am not sure what it is all about.
Have you done anything else?' He frowned, 'I'd have you understand
That once I played a leading part in Skipsey's Marine Band.'

'Perhaps,' I asked, 'you played the flute ?' He answered, 'Oh, no, no.
I merely mention it at all because I wish to show
How I've hunted Listracanthus and Pterinopecten too
From Rumbling Bridge to Sanquhar, and from Sanquhar down to Crewe.

'You puzzle me, my friend,' I said, 'but let us try once more
Can you not say in simple words what you have done of yore ?'
'Oh yes', he said, 'with pleasure; I'm very glad to state
That I found an Exogyra in a piece of Stonesfield Slate.'

'Dear me,' I said, 'how very odd, but is that really all ?'
'Oh no,' he said, 'for maybe you'll allow me to recall
By far the proudest moment since the day that I was born
When I found an Arctic Fauna in the Zone of Capricorn.'

It did not seem the slightest use. I gave it up at last.
'It's very nice to have,' I said, 'these glimpses of your past.
But now that you are drawing towards the evening of your days,
Do you not think it's time for you to try and mend your ways ?'

'For now that you have reached,' I said, 'such a distressing age,
Do you not think you ought to rest ?' 'Oh no' replied the Sage,
'What you propose is quite absurd. I've many things to do
And if you'll pardon me I'd like to mention just a few.

I mean to prove the Highland Nappes are not as Bailey states
By finding Mesograptus in the Ballachulish Slates.
I mean to show where Jehu erred and Campbell went astray
In all their work from Aberfoyle to far Craigeven Bay.

I mean to prove the Ledi Grits are early Eocene,
The Lias is fresh-water and the Bunter is marine.
That Richey's Moines are Trias; and when encrinites are found
in Craig's old paragneisses I'll be sure to be around.

There's Weir and Leitch from Glasgow too, I wonder what they'll say
When I rename all their mussels in a scientific way.
I don't like compromising or doing things by half
So I mean to deal with Trueman in a lengthy monograph.

There's Begg from lone Balclatchie, there's Wright from Inverteil.
When I redescribe their fossils, well, I wonder how they'll feel.
And if you will allow me, Sir, before we part tonight,
I'd like to demonstrate to you that Begg is never Wright !

'Oh not tonight, my friend' I said, 'I could not stand the strain,
Perhaps some other evening we will meet and talk again.

. . . . . .

A thought has just occurred to me, He may be here tonight.
So if you come across him, friends, please try to be polite.

At a Dinner held in Crawford's Restaurant, Edinburgh, on the 13th. November, 1937, in honour of Dr. John Pringle, on the occasion of his retirement from a long and distinguished career in H. M. Geological Survey, the poem was read by its author,

Dr. Murray Macgregor.

J.P.B. LOVELL (1977) The British Isles through Geological Time. A Northward Drift. 40 pp. Geo. Allen & Unwin, £1.95.

When the hypothesis of plate tectonics received widespread recognition around 1970, a whole generation of stratigraphy text-books became obsolete. Three text-books have appeared in the U.K. with the intention of filling this gap. That by Read and Watson (1975) Introduction to Geology, volume 2 Earth History with much stress on processes and a world-wide cover has an 'upper end of the market' image.

Owen's (1976) Geological Evolution of the British Isles is tailored to student purse as a text-book for student use.

Lovell's slim, new (1977) book with its wide two-column pages has been written 'to provide an introduction to its subject in an usually concise, attractive and useful format'. An introductory section is devoted to continental drift and plate tectonics (2 pages); symbols used on the most excellent maps ($\frac{1}{2}$ page) and geological time ($1\frac{1}{4}$ pages). The subject of geological time is refreshingly presented with a table showing the position of the British Isles through successive geological periods with respect to the equator. Sections on the geological periods from the Precambrian to the Quaternary (28 pages) follow, the Carboniferous and Cretaceous getting 4 pages each and the others 2. There follow 2 maps to show (i) the broad outcrop pattern of the British Isles and the off-shore areas and (ii) one of the tectonic and major igneous features. The book closes with an index of the technical terms used. Each geological system is handled in the same order: fossils, areas of outcrop of special interest (rocks and interpretation for each area), palaegeography, continental drift and plate tectonics and lastly a section on economics.

The book must receive high praise for its excellent organisation, the quality of the maps in which good use has been made of the two-colour presentation, the two column format on the 22 x 27 cm pages, and for the almost complete absence of printing errors. Commendable is the focus of attention on economic aspects of the geology and the allocation of the same cover to the Quaternary as to the older geological systems, despite its short time span. A truly enormous body of data has been synthesized in presenting the different aspects of geology that are covered.

Perhaps the main criticism of the book lies in the second remark in the introduction. It is 'unusually concise'. It is for its purpose, 'to provide an introduction', too concise. This is apparent more in some sections than others. The two pages on continental drift and plate tectonics have suffered from this and similarly the section on the Precambrian. The palaeontology for each system is also very brief. Such criticisms become often a matter of personal preference, but I would like to have seen the Jurassic get 4 pages too. One may regret the loss of the Shetlands and the Viking Graben, with its oil fields, beyond the northern end of the maps, but for the map maker they are undoubtedly a long way north !

Despite these criticisms, for the geologist, amateur student or professional the book is a remarkable synthesis of the stratigraphical

history of the British Isles, up-to-date, excellently presented and very concise.

A. R. MacGregor.

REVIEW - GEOLOGY AND SCENERY IN SCOTLAND by J. B. Whittow, Pelican Books, 1977, £1.95.

Few people would dispute the contention that Scotland contains some of the most diverse, most fascinating and perhaps best documented geology in the world. If you pick up a text-book on geology or geomorphology you will find that many of the basic concepts of the science are illustrated by Scottish examples - where, for instance, would you find better displayed thrust tectonics, better examples of cauldron subsidence, finer raised beaches or ice-dammed shore lines ? Yet among the great abundance of geological texts dealing either wholly or in part with Scotland there is one major omission - a simple text-book on Scottish geology and geomorphology written specifically for the interested amateur who does not have an extensive background of geological knowledge.

Dr. Whittow's book has been written with this readership in mind, and he has tried to follow the pattern of the classic "Geology and Scenery of England and Wales" by the late Sir Arthur Trueman, which in its lucid and simple way has helped a whole generation of amateur and young professional geologists to a greater appreciation of the scenery of southern Britain. Dr. Whittow's book starts with a short chapter which introduces the main structural units of Scotland, its major rock formations and the milestones of its geological history, and tells us something of the evolution of its scenery and the effects of the Ice Age. The rest of the book consists of a detailed regional description of Scotland, starting with the South-West and working its way through 16 separate regions northward to Shetland. These chapters have a rather flowery style but contain a tremendous amount of information presented in a way which suggests that the author has an intimate

personal knowledge of the ground. While retaining as its central theme the relationship of geology to landscape, the narrative ranges widely over such diverse subjects as archaeology, natural history, Scottish history, the evolution of towns, building stones, industrial archaeology and even the works of Sir Walter Scott ! The sections dealing with landscape evolution and Pleistocene geology are particularly good; they are well researched and contain the views of even the most recent workers in these fields. The presentation of the 'geology' though ample for a book of this kind, is more patchy and some sections are at least twenty years out of date.

The book is well illustrated with many clearly drawn sketch maps, sections and block diagrams, and some fine black and white photographs. There is a good glossary of geological and geomorphological terms, but a poor and inadequate section dealing with geological maps and texts. There is no mention of any excursion guides or of the IGS Regional Handbooks, even though many of the diagrams and tables in the book have been taken directly from the latter.

Despite these shortcomings, there are many good things in the book, and I am sure that members of the Society will find it an instructive companion in their travels through Scotland.

W. Mykura.

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We have obtained a few copies of 'The Geology and Mineral Resources of Yorkshire' edited by D.H. Rayner and J.E. Hemmingway published by Yorkshire Geological Society. This book costs £4.50 and is available from -

Mr. I. Bunyan,
Publications Sales Officer,
c/o The Royal Scottish Museum,
Chambers Street,
Edinburgh EH1 1JF. - Postage extra.

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