THE BLACK COUNTRY GEOLOGICAL SOCIETY

NEWSLETTER No. 21 - June 1980.

Editorial.

It is very nice to be back among you after my travels all winter, and I would like to thank those who produced the last two newsletters in my absence. My preview of the current contributions to the newsletter has been more than usually interesting in enabling me to catch up with what you have all been doing.

It has proved quite difficult to settle down to life and work in England after so many new experiences. We spent some months in Patagonia, and followed in the footsteps of Darwin and the wakes of Magellan and Vancouver between Tierra del Fuego and British Columbia. Our only mishap in such involved planning was the loss of the Antarctic voyage due to shipwreck, but we fully intend to try again one day. As it was we covered well over 30,000 miles mostly by land and water travel.

The surprise invitation to Aston University to see the moon rock specimens could not have been better timed for me, especially as it brought back happy memories of help some years ago with my own geological studies. I found it most interesting and exciting, and in a curiously extra-terrestrial way it completed my welcome home to the old world from the new.

PROGRAMME

July 10th. Meeting before field trip.

July 13th. "Black Country geology", part two. Leader Alan Cutler. This trip will be a sequel to that in January on the Coal Measures. It will concentrate on rocks older than the Coal Measures, and will have in mind the needs of members who are fairly new to field geology.

September 11th. "Silurian Fossils". Lecture by Dr. I. Strachan of Birmingham University.

Indoor meetings are at Dudley Central Library, St. James Road, Dudley - at 7.45pm. with coffee and biscuits at 7.15.
Field trip on July 13th. starts from the library at 10am.

NEWSLETTER

It has been decided to produce the newsletter every two months instead of every three. We would like to have a closing date for contributions, to arrive by the last day of the previous month. I will then assemble and type them in the first week, then the letter will be copied and posted in the second week.

Editor.

GEOLOGICAL AND POLITICAL ASPECTS OF OIL EXPLORATION.

On the 7th February 1980 the society was lucky to welcome Dr. Colin Phipps as guest lecturer. The meeting was well attended and thoroughly enjoyed by everyone. Dr. Phipps started by outlining the history of the oil industry. In England oil was first obtained from Scottish shales at the turn of the century. The industry in Scotland lasted for 75 years. During the first world war the liberals under Lloyd George ordered the search for more oil and many test wells were sunk in the East Midlands. Later during the 1930's several small fields were found in the Millstone Grit near Nottingham but the amount of oil produced was small. Exploitation of British oil was hampered by the lack of technology and the discovery of oil in the Middle East. These countries were politically immature and allowed the oil companies to dictate the low price paid for oil. It was therefore uneconomical to search for oil in other parts of the world. With improved technology since world war two and the formation of OPEC in the 1970's the search for oil in Britain has become economical.

Dr. Phipps also described the technological development of drilling equipment and processes for extracting oil. Primary oil extraction usually only removes 15% of the oil in a field. Secondary techniques such as pumping water or gas into a well to replace the oil and maintain the pressure are needed to extract more oil. Tertiary techniques are now being developed, for example the use of surfactant.

Dr. Phipps descibed his frustration as an M.P. when, as the only geologist in "the house", he was unable to impress upon his colleagues the significance of oil in world economic development, and how important it is that Britain should be conserving her energy resources and looking for alternative methods of energy production. He illustrated this point by discussing how oil had already affected world economic and political development.

Only a few of the many topics covered by Dr. Phipps have been mentioned. I have been totally unable to match Dr. Phipps style which made his lecture so entertaining and interesting.

A.S.

May 1st.

MEMBERS' EVENING.

The first half of the evening was devoted to a demonstration of close-up photography of geological specimens. Douglas Bedson came very well equipped for a practical demonstration, and systematically explained from the simple to the complex how such apparatus is used. He showed his results on prints and transparencies, usually uses high speed Ektachrome film and Silurian fossils from Wenlock Edge as subjects.

He began with a simple 35mm. camera, additional lenses of varying power for closer focussing and electronic flashes, all of modest cost. The use of a high stop to increase the depth of field, so important at close range, and the bouncing of a flash off a white background were explained. Zoom lenses, extension rings, bellows and telephoto lenses were shown in their varying applications to close-up work down to the two inch range.

It was interesting to see the use of a reversing attachment between the camera and its reversed standard lens for very close work, and the mount to add a microscope lens to the camera. For flash closer than one metre, there is a ring flash which encircles the lens. As each item was demonstrated, we were given that most important piece of information, its price range.

In the second part of the evening,

Alan Cutler and Peter Parkes showed the beginning of a collection of slides of society events and geological exposures, which they hope to increase and use for teaching as more become available from members. Some shown were type specimens, trilobites, crinoids and a Coal Measures fish in its natural uncompressed shape. Others were of field trips and the exposures seen, and exercised our memories and powers of identification.

S.P.

December 13th.

MINERALISATION.

Lecture by Dr. Barnes of Swansea University.
(First half of report)

This interesting and illuminating lecture emphasised the diversity of modes of occurence of mineral deposits around the world. Minerals which are of economic importance may have a variety of origins and may therefore be found in a variety of deposits. The tendency to think of minerals occurring mainly in veins was dispersed as the lecture progressed.

Placer deposits are the main source of tin and gold. 55% of the world's tin is found in gravels or on river terraces, and 70% of the world's gold comes from the Precambrian placer deposits of Witwatersrand which outcrop in Johannesburg, South Africa, but are covered by 3000 feet of overlying rock in most places. The deposit is a fan conglomerate composed of very poorly sorted material, with pebbles up to an inch in diameter. The material was eroded from the Swaziland System and subsequently underwent slight metamorphism which produced the present day quartzite. The conglomerate contains bands of carbon which were considered to be inorganic, but recent research has shown that organic structures resembling those of fungi are present. Gold has recrystallised in the matrix and the highest concentrations are found in the carbon bands where it seems closely related to the fungi structures. One theory suggests that the fungi took in a very weak solution of gold, concentrated it and eventually precipitated it. Gold in Nevada also occurs in association with organic matter and it may have a similar origin.

The extent of the Witwatersrand placer deposits remains unknown. Mining was extended down to 11,000 feet and there are plans to mine to 13,000 feet. However they are experiencing many problems at these depths because of the increase in temperature with depth and the tendency of the rocks to expand and explode when the pressure is removed from them.

Another form of sedimentary mineral deposit is the salt and shale deposit of Kupferschrefer in Germany. These deposits are half a mile thick and contain copper, silver, lead and zinc. Material from the Harzog mountains was taken in solution to the Zechstein Sea and later concentrated because of evaporation. Large deposits of this type also occur in Zambia and are a major source of copper.

The irregular lead and zinc ore bodies in the limestones of the Missouri Belt have a less obvious interpretation. The minerals were deposited from low temperature solutions in what appear to be collapsed caverns. The caverns possibly collapsed after the limestones were buried and they provided a transit zone for water movement and the concentration of metals. The problem is to determine how the metals were precipitated. One suggestion is that sodium chloride solutions with metals in them were moving through the rocks and precipitation of the ores occurred when sulphides were encountered. Hydrogen sulphide helps the precipitation of the metals and this gas is associated

with the presence of bacteria and methane.

Lode deposits are another form of mineral occurrence and they may be of two types, i.e. veins which have length and no great thickness, and mineral impregnations where the mineral is disseminated throughout the rock at a relatively low concentration. Lode deposits provide an important source of copper. At Butte in Montana copper occurs in rich veins in a heavily faulted quartz monzonite, a rock in which orthoclase and plagioclase are equal. At Bingham copper is again associated with the same type of rock but it is disseminated through the monzonite. These copper deposits are often called porphyry copper deposits and they account for 50% of the world's copper, the massive type of deposit providing more than the veins.

M.O.

(The second part of this report will appear in the next issue)

June 4th. Aston University.

MOON ROCKS.

A small party from the society was invited by Professor Hawkes to see an exhibition of moon rock specimens from the Apollo programme, which the University had care of for a few days. Those of us who attended had been warned about security, but it was most unobtrusive.

The first exhibit to view was part of a series of wall displays, while the specimens were being distributed on the microscopes. This showed stratigraphy as applied to the moon, basically in intervals of 1000 million years. The youngest is the Copernian, up to 2000 m.y. in age, then Eratosthenian, from 2 to 3000m.y. Imbrian extends from 3 to 4000 m.y. and Pre-Imbrian is older than 4000m.y. The older groups are subdivided into igneous rocks which are mainly lavas, and major impact craters and their associated ejected products.

Weathering processes are quite different from those on earth since there is no atmosphere and no water, and therefore no water laid sedimentary rocks and no fossils. Lack of an atmosphere has allowed the impact of vast numbers of meteorites onto the moon, and these have had the most obvious effect upon the surface. Other processes are trivial by comparison, such as the slow mass wasting under the influence of gravity only one sixth that of the earth, and the large daily temperature range of 250°C.

Twelve thin sections were exhibited on polarising microscopes which allowed viewing by transmitted plane polarised and crossed polarised light, and also had an alternative system of reflected light to examine the opaque minerals. There was a card with information beside each specimen. Some specimens were basalts, some breccias, and some were regolith (the nearest thing to lunar soil) in graded grain sizes. Most of the moon basalts are older than 3000m.y. a sobering thought for one's sense of wonder when compared with our own dynamic planet.

Specimens:-

A. Porphyritic basalt containing phenocrysts (large crystals) of olivine, clinopyroxene and ilmenite (a titanium mineral). From a mare (smooth lunar "sea") area.
B. High titanium mare basalt, with large plagioclase feldspar crystals enclosing pyroxenes, and containing more ilmenite. It also contained crystobalite, a silica polymorph which is rare in earth basalts.

High titanium basalts are mostly of Imbrian age. Those with low titanium are often Pre-Imbrian and contain more rare earth elements than do this planet's.

C. Anorthosite, composed of 95% plagioclase feldspar. The cataclastic nature of the specimen was shown by crushing which had offset crystal twinning. Perhaps this is the oldest

rock in the collection, since it is typical of Pre-Imbrian age.

D. Vitric polymict breccia from the Apennine Front. (glassy, containing rock fragments of more than one size and type)

E. A crystalline polymict breccia from ridge areas radial to the Imbrian Basin, and likely to be primary ejecta.

F. Similar to E. but crystallised after melting due to impact.

G. Regolith of fine size. This contained many orange glass spheres. It was a very dramatic specimen and is the "orange soil" of the astronauts' descriptions.

H. Regolith with orange glass and dispersed metallic blebs. Metals in their reduced state are more common in lunar rocks because of the lack of volatiles to form oxides.

I. Regolith with glass grains and agglutinates, and basalt fragments with vesicles. Vesicles occur with a boiling melt, and the redistribution of volatiles on heating is one of the subjects intensively studied in lunar geology.

J. Lunar highlands breccia.

K. Regolith of course size with opaque minerals.

L. Regolith including fragments of anorthosite, norite and much feldspar. Its glassy matrix shows the fine crystals of devitrification.

There were other displays, and many books and pamphlets, but our hour and a half ration had flown by. I found no time even for a quick coffee, tempting as this was on a hot evening, before closing time arrived and with it the need to come down to earth and sincerely thank our kind hosts.

S.P.

Advertising.

Requests have been received to publicise three items. Further details on all are with the Editor.

1. **British Association for the Advancement of Science - geology programme. University of Salford.**
   Sept. 1-5th.
   Sept.2nd.- Items on geology and conservation.
   Sept.3rd.- Items ontectonic and magmatic processes.
   Sept.4th.- Items on Red Beds.
   Sept.5th.- Items on Ice Ages through time.

2. "Shoreline Holidays". Bude, Cornwall. Study centre including geology, with many facilities. Seven day stay £40 per week, including V.A.T.

3. Sale of geological specimens, books and maps, now in Wolverhampton but with a strong Devonshire content. Total value £345.

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