

Exploration

REVIEW

FEBRUARY 1964 PRICE 1/6

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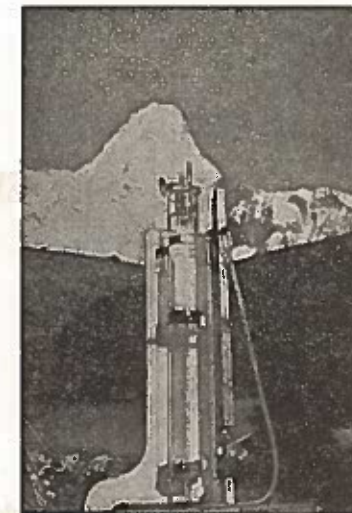
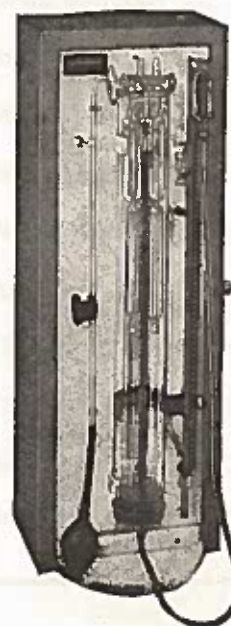
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EXPLORATION REVIEW

**No. 5
FEBRUARY 1964**

**JOURNAL OF THE IMPERIAL COLLEGE
EXPLORATION SOCIETY**

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FOREWORD

THIS year 1964, is the 50th anniversary of the sailing of the "Endurance", the ship which carried Sir Ernest Shackleton and his Imperial Trans-Antarctic Expedition into the Weddel Sea, where she became ice-bound and was finally crushed to pieces. This was the last expedition of the so-called 'Heroic Age of Exploration' and is one that will be remembered for many years to come not only as an amazing example of human endurance — all members survived a winter on the drifting pack-ice and another on the barren Elephant Island — but also for the thrilling story of the final rescue resulting from the memorable 800-mile open boat journey to, and the first crossing of, South Georgia.

Only a few years ago Sir Vivian Fuchs' expedition, including a member of Imperial College, actually accomplished the journey which Shackleton set out to make. Later this year another expedition hopes to retrace in detail Shackleton's route across the glaciers and mountains of South Georgia. Although the Heroic Age ended 50 years ago, opportunities for adventure still abound. Plans are being made at the moment for an expedition to cross the Arctic Ocean, via the North Pole, by dog sledge — a journey never before attempted.

Why do people do these things? Why does the College have such a thriving Exploration Society and such a record of achievement as illustrated by its nineteen bound volumes of expedition reports?

The answer was given by Dr. Fridtjof Nansen — statesman, scientist and explorer — when he replied to the same question by saying

"The history of the human race is a continual struggle from darkness toward light. It is therefore to no purpose to discuss the use of knowledge. Man wants to know, and when he ceases to do so, he is no longer Man."

And Man still wants to know. The more that is discovered, the more there is to explore in detail — and who better to carry out this work than members of Imperial College, whether it be on the mountains, in the air, under the sea, or in the deserts of ice or sand — and good luck to you, no matter where!



Chairman,
Imperial College Exploration Board

EDITORIAL

WE have always been justifiably proud of our record in exploration at Imperial College. 1963 proved another substantial brick in the building of the College's name. Six bricks in fact, for six expeditions successfully probed Africa, Asia, Europe and the Arctic seeking, and finding, scientific adventure. The number was originally seven, but the South Moroccan venture came to a disastrous end in France, with one member unfortunately losing his arm.

The seven covered a wider range of subjects than ever before, and brought a more balanced outlook on the exploration undertaken by the College. No longer could any type be said to dominate. Two expeditions were Arctic (one climbing), two underwater, two tropical, and one desert.

Quantity yes, but not at the expense of quality. If expeditions could be compared, I would not say that those of 1963 were in any way inferior to their predecessors. Far from it. The Imperial College Exploration Board ensures that a good standard is maintained. The setting up of a food committee led to more streamlined organisation, which will be even better when the proposed equipment and medical committees come into being. Moreover, an encouraging trend of co-operation with other colleges was started. This can bring nothing but good in the long run, and lead to still further expansion.

There is perhaps one hitch in staging so many expeditions in one season. The number of personnel from the College (about 40) proved a strain on our resources, and a number of freshers went on expeditions. In itself, this is a good idea, but it did mean that they did not then consider that they had the time to organise an expedition for themselves for the next year, so that this year only one expedition is planned.

However, this looks like righting itself in 1965 when already four or five expeditions are being seriously thought about. One hopes, though, that this is not the start of a two-year cycle, as it does strain financial and other external resources in those years when a large number of expeditions go out.

Due to all this activity, the *Review* takes on a rather different appearance this year, with more space devoted to expedition accounts, and less to guest material. In some ways I feel this is a pity, as a lot of the strength of the journal lies in the interest, ideas and information imparted through the guest articles. However, the journal is primarily a means of showing the general public what we do. If somewhere in the College — or elsewhere — this journal should instigate the spark of adventure that will send another expedition into the world of reality then we have succeeded. For man can only progress by inquiring, and what better training than an I.C. expedition?

LANKA EXPEDITION

By Martin Speight

CEYLON — Lanka — is renowned for great natural beauty and excellent tea, not perhaps substantial enough reasons for a University Expedition to the island, though once we had arrived, we were seldom able to forget either. "We" comprised three Medical students from University College, and two Zoologists from I.C., including myself. One of the Medics., Pratha, is Ceylonese, a fact which gave us a terrific advantage. He and Peter Southern, another U.C. man, were to do work on the Veddhas, a fast disappearing aboriginal race greatly requiring more work done on their culture and customs, before these are lost for ever. The third Medic., John Betts, intended working on a primitive mammal, *Manis*, the scaly anteater, which is found in the area where the Veddhas live. Little work has been done on these animals, which are entirely tropical and cannot be kept in captivity. It is thought that work on their anatomy, especially that of the brain, would produce interesting results. Dick Winney and myself, Entomologists, were intent on collecting certain insect and spider groups for the British Museum and for our own purposes, Ceylon not being well known Entomologically.

With these hopes we left Britain in July, to spend nine weeks in Ceylon and return at the end of September. Once across the Channel a night train took us through France to Marseilles, a two-week sea journey now between us and Colombo. Barcelona, Port Said, Aden, Bombay, Colombo — while at Barcelona we thought of going to a bull-fight, but found the bull-ring occupied by "Holiday on Ice". Port Said presented us with disappearing chickens that reappeared from embarrassing places, the Suez Canal with its highest temperatures of the year, Aden with a "mud storm" and some excellent "chukka boots" that still pass for suedes, and Bombay with monsoon rain and coffee made with buffalo milk.

At Colombo we were relieved to find our tea-chests *had* been in the hold all the time and not lost somewhere. We spent the next week touring officialdom to finalise arrangements for the following weeks — not only officials but also relatives. Pratha had many relatives, who were as kind and generous as they were numerous. Ceylonese cuisinerie has to be tasted to be believed.

Through the kindness of one of Pratha's friends we set out from Colombo in an elderly land-rover, complete with driver, for our first long journey. This took us away from the west coast and across the dry South-East, via a detour to the South of the Central Hill Region. There is an excellent system of roads in Ceylon, but they are narrow and winding in the hills making the lower roads faster, though the surfacing frequently leaves much to be desired. We careered along, the still air hung with flashing fire-flies. Behind us our trailer bounced alarmingly, coconuts and tins crashing against each other.

Having deposited Dick and myself at the village of Bibile, the others went on to Maha-Oya, from where they could reach the Veddhas and also collect *Manis*.

While our collections grew slowly, the alcohol for spirited specimens evaporated rapidly — we could not get a satisfactory seal to the bottle. I was collecting flies

(Diptera) and Dick was collecting ants. The latter were numerous, one tree-inhabiting species especially so, dropping off branches to bite and sting furiously under the slightest provocation. The people in the villages are very friendly, and since some English is taught in the schools we had little language difficulty. Sinhalese and Tamil are the languages native to Ceylon, Sinhalese — peculiar to Ceylon — being prevalent in the South-East. We were always being brought things by the children, everything from monitor lizards to leeches. In fact we usually went out with a special bottle for such presents, to be emptied behind a bush when convenient.

We soon joined the others at Maha-Oya, travelling the 30 miles by 'bus. If you imagine a rush-hour tube train with a high population of squalling babies, with every passenger talking and at a temperature of 95° with insufficient ventilation, you get near to visualising that 'bus.

Peter and Pratha got on well with the Veddhas, Pratha conversing with them through the common language of Sinhalese, since they have now nearly lost their own language. They know no English, and have seen few Europeans. Their most accessible settlement is at Pollebedde, ten miles in the jungle from Maha-Oya down a track just motorable by land-rover during the dry weather. Pratha soon gathered a quantity of information on the Veddhas, on their history, religion, etc., though only the oldest Veddhas could tell him much. Although until ten years ago these people were nomadic hunters using caves as temporary shelters, they have been settled by the government, after being moved because of the creation of a reservoir that flooded their ancient haunts.

Peter, working on the adaptation of the Veddha to his environment, spent his time whirling wet and dry hygrometers and consulting thermometers, all the while plotting the Veddhas' actions on an Activity Index system. The Veddhas were much amused by our party and, although shy at first, soon came to sit and listen to Pratha talking to their chief and to watch, mystified, Peter glumly whirling his hygrometers.

Dick and I sometimes travelled with the others to Pollebedde to collect there, or went part of the way, collecting back along the track. We had to confine our activities to the vicinity of the village and tracks, however, because of the bear and buffalo. One day whilst walking along the track to Pollebedde, Peter was charged by a wild buffalo, and "tree-ed" for half an hour.

John had trouble in finding his anteater and was dogged throughout his time in Ceylon by misfortune, ending with acute appendicitis and a spell in hospital in Colombo. As the scaly anteater feeds at night on termites — white ants — whilst at Maha-Oya John frequently went out to make nocturnal tours of the local ant mounds. When he did this he was always accompanied by two Police, or at least by one policeman and the police cook. The police cook was in fact a poacher. He had been caught by the police, but was such a good cook that they persuaded him to stay and cook for them by dropping the charges against him. He needed little persuading since he could now join in all the police raids — he had always wanted to be a policeman, but was too short! When anteater hunting, one policeman always carried a torch, supposedly to see anteaters with, but it had such a faint beam that we could only believe this was politeness on their part, the real reason for the torch being to prevent John from tripping up in the bushes or making too much noise stumbling around. The other policeman always carried a borrowed gun. Unfortunately there was only one cartridge for the gun and that contained something like pigeon-shot. Presumably the animals — elephant, buffalo, bear — that this gun was

supposed to safeguard one from, were all to be terrified by one bang, if come across. On the one occasion when a largish animal was made out in the gloom — on the main road — there was no bang or anything. All seven persons did an about-turn and fled. They *said* it was a leopard.

John also offered a small reward to the villagers should they bring him an anteater. However they know little of the beast and we gathered they would anyway prefer to eat it rather than to sell it to us. The Veddhas, who knew all about such things, were not interested, having no wish to go out specially to look for something they said they could catch any time they wanted to. Further, they had almost no use for money and were not attracted by anything we could give them.

For most of our time in Ceylon we stayed at Rest Houses. At Maha-Oya the Rest House was largely taken over by the police, being used as a residential police station for the area. In the jungle around Maha-Oya there is much marijuana-growing carried on and the police are primarily occupied during August and September in catching the people concerned, this being the time of the marijuana harvest. While we were there we saw enough marijuana brought in to make us all millionaires, had we smuggled it to Britain. One day a fifteen pound weight packet of it was picked up by one of the police while travelling in a 'bus, from the passenger next to him, who had it all wrapped up in an old newspaper!

Our fifth week in Ceylon was spent in the Ruhunu National Park in the South of the island. Here, although some entomological collecting was done, we were able to spend time watching wild elephant, leopard, bear, etc. This area is a sacred Reserve, a situation which has its setbacks. Thus the Park contains 1,500 buffalo, when it is calculated it should ideally contain only 500, but religious principles prevent control of the animals, which are causing a serious overgrazing problem. The sacred nature of the Reserve stems from the fact that a sacred river, the Menik Ganga runs through it. Upon this river stands the Ceylon equivalent of Benares, called Kataragama. To this group of shrines and temples many thousands of pilgrims come every year. Although we arrived fully a week after the annual festival had occurred, on our way to the area we passed a penitent on the road. He was dancing home to his village, with large hooks through his back and carrying a heavy wooden contrivance across his shoulders. He had so far danced nearly a hundred miles.

At this stage John contracted his appendicitis, so our last day in the Park was followed by a 120-mile dash back to Colombo, where we then remained for some days. During this period, Dick Winney and I made a number of visits to Kandy, 70 miles from Colombo, to collect in the hills. The best collecting zones were for me the stream margins, which unfortunately are the best places for land leeches. Only small — about an inch long — these nauseating things infest even the bushes and congregate about you waving from leaf-tips, intent on a blood meal. They are sufficiently numerous to make standing in one place unpleasant for even a few minutes.

With the exception of Peter who returned to Maha-Oya, we now went to stay on a tea estate near Nuwara Eliya, at a height of some 5,000 feet. This allowed John to recuperate and gave us further opportunity to collect from the hill region. The rounded, tea covered hills, the introduced conifers surrounding the bungalow and the cool, clear air, were somehow reminiscent of Scotland, especially at dawn and at dusk.

Time had passed rapidly and we now had few days left, but had not seen the north of the island, or anything of its ancient cities. We returned briefly to Colombo

by night train — getting a habit now — and the following morning set out again by train for the North. On the way Peter joined us and after a further night's journey, we arrived at Anuradhapura. Through Pratha's good offices we were met at the train and were able to spend the day looking over the 2,500 year old, exhumed cities of Mihintale and old Anuradhapura. Anuradhapura possesses the most ancient documented tree in the world, with its origins in a branch from the original Bo-tree of the Buddha. It is a vast tree with numerous descendants surrounding it, all of them contained within a Buddhist temple. From Anuradhapura we travelled, again partly by night, to the northern tip of the island, to Jaffna. On the way we suddenly became aware of a delicious smell of roast beef — unusual where the cow is a sacred animal — and that the train was stopping. The unfenced line had taken its toll of a buffalo which had chosen to sleep there. After the entire human population of the train had poured out, inspected the evidence, and climbed back on board, we continued on our way. This particular train runs from north to south, and every day something succumbs — suicides by this method are common. The next night we travelled all the way back to Colombo. This time we had a comfortable Chinese carriage with soft seats and a soundlessly whirling fan, not an ex-London Transport model with wooden seats.

Three days later the U.C. contingent departed by plane for home, their merciless College demanding them back for the start of term. A business tycoon, obsessed with collecting crocodiles, had asked us to get him a Ceylonese one, so by devious means a baby crocodile also set off by plane, for America, while we two set off by boat for England, to arrive two weeks after the others.

With the exception of the work on the scaly anteater, our projects were quite successful. The Museum is pleased with our insects, Peter has reams of figures — which seem to indicate that Veddhas spend much of their time talking and the rest of it asleep, and Pratha has probably what will be the last-ever notes made on these charming people from first-hand experience.

Aside from our work, we found many things of exceptional interest. At Kandy we witnessed the Festival of the Tooth, when sixty or so caparisoned elephants, dancers, Kandyan chiefs, priests and chanters made up a torchlight procession, bearing what is believed to be a tooth of the Buddha, through the town. The streets are crowded with people and there is much drum-beating all in the light of flickering coconut flares.

We were able to witness fire-walking at the small fishing village of Uddappuwa. Again at night, two hundred people of all ages (almost the entire village) walk and run barefoot over glowing charcoal embers, contained in a twelve foot long bed. This is done variously, "for the love of God", and to gain remission of sins. The ground at each end of the bed is wet and the people run through very quickly — but they keep it up for about half an hour, going round and round in a jostling circle. Even small children take part. They can hardly all have been in a trance. All I can say is that on other occasions I have seen burning coals kicked out of the way by bare-foot people and have also seen a ghuru pick up red-hot embers in his bare hands to put them in a pot. These people also habitually walk barefoot.

I believe we were the first Expedition with Imperial College backing to go so far as Ceylon. Apart from anything else, I will for a long time remember the hospitality of the Ceylonese people. Without them, particularly those who gave us a home in Colombo, our Expedition would not have been.

SOUTH MOROCCO

By J. B. Hall

THE expedition was conceived to locate and survey a 15th century Spanish fort and trading post. As the region was one of semi-desert with a mixed Euro-African fauna, several other projects were possible.

The zoological projects included bird ringing and 'random' insect sampling en route to study both immigration patterns and distributions in the different climatic zones passed through during the drive from London to Morocco. A quantitative ecological investigation of the performance of a small number of species of plants was to be made, and the vegetation of a Wadi was to be correlated with zoological studies of the same area.

Tests were to be carried out on battery seals for Messrs. Lucas Ltd., and on water-purification equipment for Messrs. Paterson Ltd.

For these projects, and to maintain the Expedition's two Land Rovers, a party of six was necessary. The members and their special responsibilities were:— J. T. Saunders, (*Leader and Surveying*), M. G. Stevens (*Surveying*), J. B. Hall (*Botany*), R. W. Ashford (*Zoology*), P. H. Nicholson (*Transport and Photography*) and F. J. Leverett (*Water Purification*).

The Expedition left London early on the 27th June and reached Bordeaux on the 28th June. The insect trap designed in the Imperial College Aeronautics Department was working perfectly, but this was the only project which had been started.

Our speed was limited across France by bouncing on the undulating road surface, and half an hour after setting out on the 29th June the second Land Rover bounced on to the excessive camber on the outside of a bend in Labouheyre. This threw it on to two wheels on which it skidded across a gravel verge into a fence. During the crash, Richard Ashford was thrown out and has since lost his right arm. The two passengers suffered minor cuts only. The vehicle was too badly damaged to be worth repairing. Two vehicles were considered essential for transporting the Expedition and its equipment to Morocco and the loss of one vehicle made abandonment of the venture inevitable.

After the accident, we moved the equipment and personal kit to a camp site near Bordeaux, and spent the following week making arrangements for Ashford's hospitalisation and for shipping the crashed vehicle back to the United Kingdom. On the 3rd July, when we left, Ashford seemed to be recovering. There was only room for three persons on the remaining Land Rover, so Hall and Leverett travelled across France by train having first tried unsuccessfully to hitch-hike. It was not until after the party arrived in London on July 5th that news was received that it had been necessary to amputate Ashford's arm.

The accident was due to many factors including the state of the road and a heavy but not full load. It was certainly not a consequence of student recklessness, and we hope that it will not prejudice those who have helped us so generously, from giving similar assistance in the future.

IBIZA 1963

By D. Pincock

THE eight members of the Imperial College Ibiza Expedition left South Kensington on a sunny day last July with the prospect of six weeks' work in the equable climate of the Balearic Islands. Long before our arrival in Dover it became all too obvious that our hired Land Rover had such defective steering as to be little short of lethal, but with all our passages booked, and only two and a half days in which to reach Barcelona, it was decided to continue with the original vehicle, and to make the best progress we could. The three drivers took one-hour shifts of driving in turn, each shift an hour's fierce concentration to keep the swaying Land Rover and its heavy trailer within the bounds of the straight continental highways as we careered southwards. Much responsibility for our safety rested on the judgment of the observer sitting opposite the driver, who, now on the nearside, had to depend on the observer's estimate of when it was safe to overtake. Each overtaking was accomplished with a terse "O.K." from the observer, an impressive swirl of steering wheel by the driver, and an encouraging hymnal chorus from the 'minstrels' in the back of the Land Rover.

On our arrival in Ibiza, we found that the boat from England with our equipment aboard had not arrived, but was expected within a few days, whilst the diving boat we had chartered for the expedition was in Gibraltar with a split hull. By the time both boats had arrived, we were acclimatised to the food as well as the weather, and had determined by trial and error the best size of quadrat to use for our biological work. We had decided to work off the southwest coast of the main island, near to the small islets of Vedra and Vedranell, and when at last the diving boat arrived our first job was to lay a rope marked at 5-metre intervals along the seabed between the two islets. This proved difficult due to the strong currents which would sweep the line up off the bottom in a long arc. It was necessary also to lay the line along a compass bearing of 260°, since it was easy to lose one's sense of direction when working on the featureless bottom in the centre of the strait.

Due to the diving boat's late arrival, it was decided to make up some lost time by living aboard the boat for six days, by which means we would save hours of travelling time between the diving site and our Pension. The diving boat was a steel lifeboat some 28ft. long, and for six days she became a hotel for nine of us. Sleeping places were contested for since there were only two berths, and the table, forecabin shelf, engine-room floor and sloping decks were all used. Less nautical types slept ashore in the surveyors' camp to be described later, and a favourite, though damp, single bed was our leaky rubber dinghy.

The boat's skipper provided us with meals during our stay aboard. Our regular breakfast was a piquant grey porridge, containing as additional nourishment approximately three tiny beetles per ml. The *pièce de résistance* was the nightly stew, produced from the cockroach-infested larder with the same devastating effect as the magician's white rabbit. Thus for one idyllic week we would 'reminesce' each evening over our grey tea and tinned anchovy and onion stew the trials and successes of the day, confident in the thought that this was science in the raw, something worthwhile.

We dived twice each day, and thus had to re-charge our compressed air cylinders around lunchtime in the heat of the day. At about noon a weird procession of Englishmen, each with stiff upper lip, would climb the cliffs of Cala d'Hort to reach the compressor at the top.

Another backbreaking task was that of the snorkel cover — a pair of stalwarts whose job it was to provide a pickup service should it be required by the divers. The cover boys would sit in the leaking rubber dinghy under a baking sun, keeping close to the bubbles rising from the more fortunate pair working in the cool depths a hundred feet below. In any wind or current the dinghy would have to be kept on station by continuous hard work.

Whilst the diving was proceeding, the two surveyors were having the time of their lives splashing yellow paint on the rocks and sleeping out under the stars, but they also had their moments as the following saga will show:—

Vedra Survey (R. A. Davis)

By far the spiciest job on the recent successful I.C. Ibiza expedition was the land surveying. Strangely, the eight grizzled members seemed to shun this task in favour of backbreaking 'lung-lugging' or backburning snorkel covering, even back-bending lizard hunting. Perhaps it was the occupational hazards involved that kept them away.

The survey team, you see, camped without tent, alone near Vedra:— that terrorising mountain island, sacred to the moon goddess (it would appear that she was nocturnally sighted several times; at any rate there were various occasions when some young lad would leap, eyes bulging, from his limestone bed, swearing that a woman had been watching him. Of course, one can assume this a normal symptom of sex-starvation).

But it did seem that evil was at work, for not long had passed before a beautifully fertile spot was discovered on the dusty barren cliffs. This enchanting glade was silent save for the bubbling of a little spring which was tasted and found to be unusually palatable. This source was not used, however, when it was noted that the taster was very soon in the throes of a raging fever.

Several trig. points for theodolite work were established, and a central base line taped and tied in. The longest distances involved, about three miles, were on the mainland but things were not too bad; there was always the chance of a quick, non-saline dip in the reservoir which a friendly farmer and his young wife used to store drinking water.

On the islands it was much worse. For a start, the mapping of the coast of Vedra and neighbouring Vedranell was tricky, as the cliffs were sheer; varying from ten to a thousand feet. We tried a hilarious method of compass traversing which entailed several people swimming around with tapes, compasses and rubber dinghies for hours on end. Yellow markers were painted on the cliffs from the dinghy. This was somewhat hazardous as a huge swell threatened to dash our heroes onto the rocks whilst the wind did its best to spray them with great 'dollops' of waterproof paint.

Now for the exciting theodolite work on these islands. First our boat steamed round and round looking for a convenient break in the cliffs for a suitable landing place. At last two of us were set adrift in the dinghy with supplies and we beached on the north shore.

The boat trailed a flag of foam over the horizon. We were left on the boulders making signs until nothing more could be seen and only the throb of the engines and occasional splash of an empty bottle were left ringing in our ears. We turned to face the ascent of Vedra, complete with theodolite and tripod.

The first four hundred feet was a very loose scree; above this we hit a cliff which I first tried to break by climbing a narrow forty foot chimney which opened onto a slab offering only pressure holds. I turned back when my trousers fell down. My companion, meanwhile, had found a comparatively easy route which we followed to the Vedra arête. The final five hundred feet were gained by traversing about half the total length of this ridge. We set up the theodolite at 1230ft. to the screaming "kree kree" of circling hawks above us.

When descending, the theodolite tended to lodge above one, then suddenly swing off nearly pulling the bearer with it. By the time we hit the scree it was dark and we might well have spent the night in one of the caves at this level on a soft bed (provided, over the years, by the mountain goats). But we decided to press on, and, much to our surprise, promptly executed sitting glissades down an unseen stone chute, neatly skipping over several ten-foot pitches without noticing them.

At base camp we both drank a litre of 'Gaseosa' and then unceremoniously stripped and leapt from a rock into the sea which, at that point, was unfortunately only six inches deep due to a submerged reef. Our bath was soon followed by a sumptuous meal of dry bread (infested with ants), tomatoes (the squashy variety), melon and a tin of peach jam which had entangled with a packet of Persil (n.b. to a starving climber this did not impair the flavour, but the bubbles did impede breathing somewhat).

I retired to an uneven bed, for my companion had bagged the only level ground around, and soon fell into a heavy sleep. After a while we were awakened to find what must have been every brown rat on the island surrounding the remains of our food supply. Several were trapped on the floor of the dinghy which I was using as a pillow, and I kicked out half in glee half in panic. As they escaped over my face I noticed that they were quite dry and had no offensive smell.

The morning brought a most glorious day and we set off paddling our way across the mirror sea surface to continue surveying. Needless to say when the relief boat arrived, they found us basking on a little grey shingle beach, munching foaming jam.

The surveying? Don't worry it was very successful and the programme was completed.

MALTA 1963

By J. D. Woods

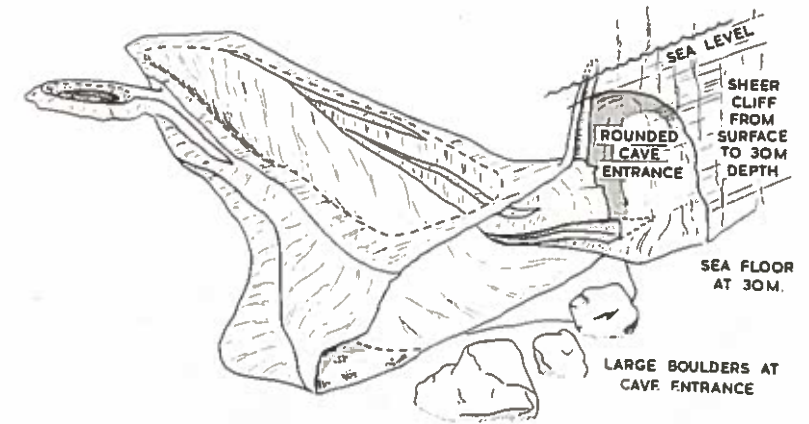
MALTA, the George Cross Island and the greatest fortress in the Empire. Its history stretching back for six thousand years to the builders of great temples at Tarxien and Hagar Qim, and a score of other, unique sites. Later Roman and Norman influences gave way to the Arabs, until the Knights of St. John arrived in the sixteenth century. They developed Grand Harbour and built Valletta, the best fortified city in the World. The Great Siege of 1565 established the importance of Malta to the defence of Europe and Britain has exploited her valuable position since the Napoleonic Wars.

No better site could have been chosen for the first joint Royal Navy and Imperial College diving expedition. Our team of twenty-five divers, drawn largely from the Royal Naval Engineering College at Plymouth, with the representatives from Imperial College and two from the Royal Air Force, St. Mawgan (Cornwall), enjoyed the hospitality of H.M.S. "Falcon", the Fleet Air Arm base in the south of Malta. Our diving boat, a 65 ft. M.F.V., came from H.M.S. "St. Angelo", the famous fortress in Grand Harbour which, alone, withstood the 200,000-strong army of Suliman-the-Great, and which is today the headquarters of the C. in C. Mediterranean.

The special task of the Imperial College contingent was to prepare and direct the scientific programme. Our programme was two-fold. The first job was to search for as many underwater caves as we could in the time available. Each discovery was to be plotted and briefly surveyed. The second part of the plan was to come into operation after we had been on the island for a fortnight, by which time I hoped we would have found a variety of underwater caves. I proposed that we should select the most interesting of them for a thorough examination. Within the limits of time, equipment and experience, I hoped that we would make an accurate survey of the cave using a new rapid technique developed during the 1961 expedition, and to make a preliminary exploration of its history and contents. Luckily we were able to satisfy both parts of this ambitious programme during our four weeks in the field.

Before diving began in earnest, I joined the leader of the R.N. contingent on a helicopter flight along the cliffs of Malta and Gozo. Cruising along halfway up these massive limestone cliffs, we were able to get a wonderful impression of the shape and disposition of the many sea-caves above sea level. Sitting in the rescue doorway with my feet dangling in the slipstream I enjoyed a wonderful view of the coast and, leaning out, I took photograph after photograph of the passing caves. These pictures (over seventy of them) have since proved invaluable in classifying similar caves found underwater and in establishing the exact position of our diving sites.

Life in the wardroom followed "tropical routine", which involved being awakened by a Maltese steward at six o'clock for breakfast before a quarter to seven. After breakfast we made our way to the boat moored at Kalafrana, either on one of the R.N. buses that link the airfield at Hal Far with the repair shops at Kalafrana, every twenty minutes, or in our expedition van, a disastrous vehicle hired from a local Maltese garage. "Decorated" with traditional Maltese abandon, this Bedford minibus ran without instruments, silencer, or brakes, and once shed its prop-shaft on the way home from a particularly "hairy" evening in Mdina.

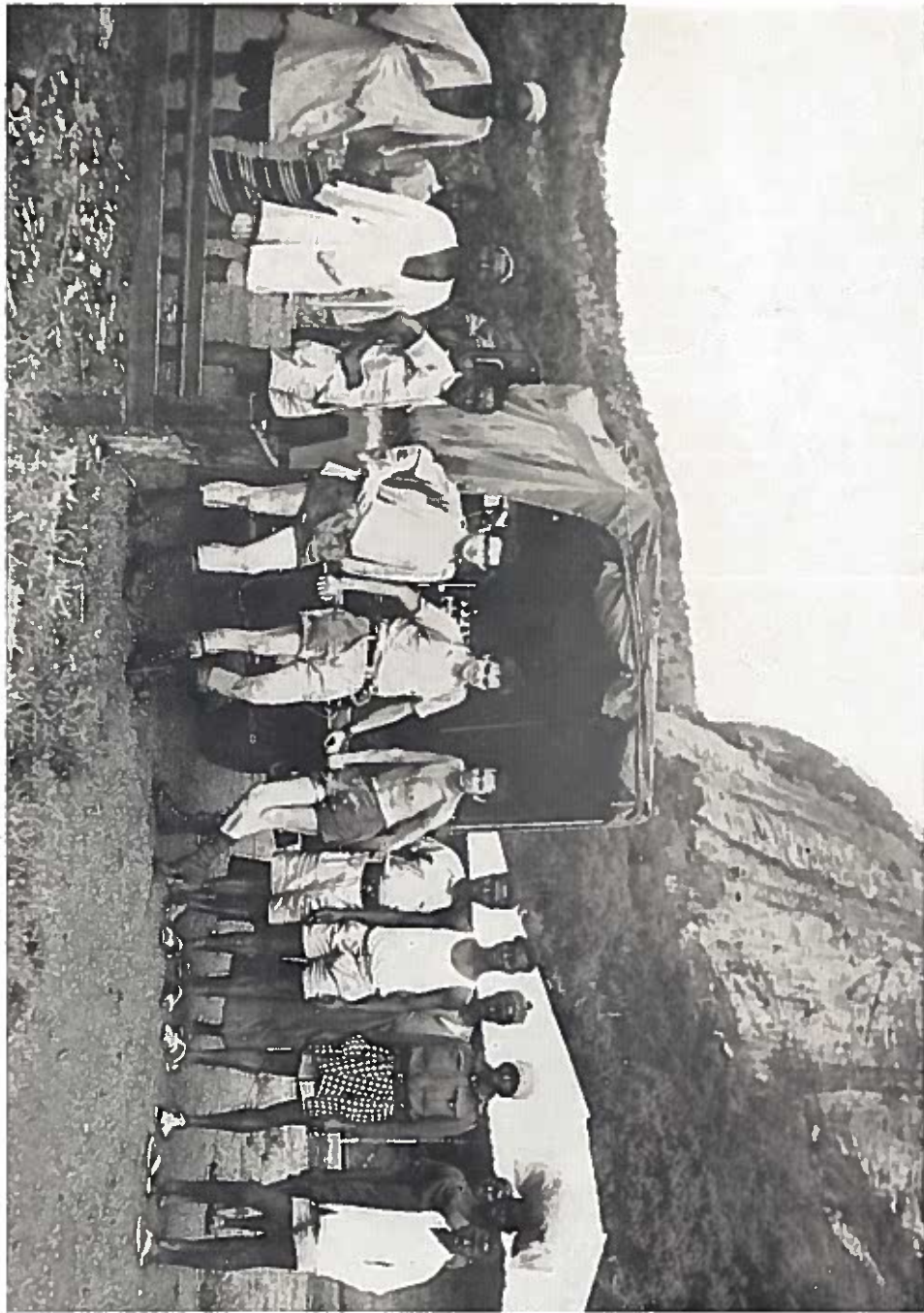


GOZO 'A' CAVE



Back from the deep. The polythene bag contains a sealed bottle of sea water for later Winkler Oxygen analysis.

Members of Sierra Leone Expedition return from an ascent of Kakola Hill.



The boat was usually underway by 08.30 and the first divers would be on their way by nine o'clock. Each day we anchored at one of the sites chosen during the helicopter survey, and searched a stretch of coast on either side of the anchorage. The precipitous cliffs along the coast continue down underwater to depths of between one and three hundred feet, with a narrow ledge at about sixty feet on which we anchored. Anybody who has dived in Malta knows that the visibility along this western coast is superb. We found it sufficient for a pair of divers to scan the entire underwater cliff from halfway between sandy seabed and the surface. Searching for caves in these conditions was easy. Pairs of divers, each covered by a rowed dinghy, worked their way along the cliff starting at the M.F.V. and continued until their air ran out or they discovered a cave. The end of each pair's traverse was marked by the surface cover and became the starting point for the next pair, and so on. With our team of over twenty divers we were able to cover a large section of the coast each day.

Our boat, a 65 ft. Admiralty Motor Fishing Vessel (M.F.V.) was very much the focus of our expedition. All the diving equipment was stored on board, and our aqualungs were filled from cylinders containing 4,000 Atmospheres pressure of NATO-quality air from the Kalafrana torpedo compressor. We carried a dozen of these nine-foot cylinders, which gave us enough air for two to three days hard diving. We used to take lunch on board for day-trips and at week-ends. The M.F.V. was capable of six knots (seven with an improvised sail and a following wind) and the time spent between Kalafrana and the diving site was an ideal opportunity for a quick nap before the exertions of cave searching. Indeed, it soon became apparent that the more social of our members chose to spend their evenings and even nights at parties and other establishments along the Valletta "Gut", and the only sleep they managed to grab was during this lazy early morning cruise. The rest of us were able to enjoy the porpoises playing on the boat's bow-wave. It soon became apparent that they, in fact, visited us to watch the antics of the human photographers on the bows above them.

Despite these distractions, the long morning trip to our diving site began to drag after a few days, and we started to plan two-day trips. The first move towards this end proved to be a party for the local Wrens, at which they were invited to accompany us on the excursion. To their credit, and our surprise, they accepted without hesitation, despite the conditions about washing up and cooking which had inspired our offer. From then on our plans went smoothly, with frequent two-day trips to Gozo, Malta's sister island. We anchored each night at Xlendi, a beautiful creek which in 1961 had been the site of feverish activity following the discovery of ancient wrecks on the Xlendi Reef. Some of us dived to examine this memorable site, and I was pleased to note that the main 3rd century wreck was still in the state in which we left it in September 1961. Perhaps, some day, a professional archaeological expedition will visit the 200 foot site. Until then, it is best left untouched. After all, it has been there for over two thousand years, another decade or so won't effect it.

It was during one of these trips to Gozo that we discovered the largest of our underwater caves, officially designated "Gozo A", but irreverently called after a famous American oceanographic station by some of our naval members. This large cavern (see reconstruction) more than fulfilled our wildest hopes. It is enormous. I have estimated that it held a quarter of a million tons of sea water. This was obviously to be the subject of our detailed investigation, the second part of our expedition programme. The first five days were spent making a careful survey, so that we could relate any finds in it to the plan. After some slight confusion as to which side of the cave should be called Port and which Starboard, the work progressed steadily.

The first task was to fix a datum line along the axis of the cave. A heavy sinker made of concrete was taken to the far end of the cave using an inflated kit-bag to balance its weight. A 200 ft. nylon line was stretched tight between this anchor and a large boulder at the cave entrance, and marked at ten-metre intervals. Each mark became the centre of a section drawn normal to the axis line. After sketching each section, the divers measured the depth of each feature marked on it with a depth-gauge, and its distance from the centre mark with a nylon line marked at one-metre intervals with red fluorescent paint. Six cross-sections were plotted in this way and, together with further sketches of the inner chamber and special details of the main chamber, they formed the basis of a three-dimensional reconstruction shown.

The history of the cave's formation and growth can be deduced from its shape and situation. The average depth of the sandy sea floor in this part of Gozo is forty metres, and either side of the cave the cliff drops sheer to this depth. But in the vicinity of the cave, the cliff is interrupted by a broad platform at thirty metres. The entrance of the cave is a continuation of this platform and presumably it is associated with the sea level that cut the platform. Inside there are notches at 29, 20 and 16 metres, and these must have been formed after the cave had been fully formed, perhaps during successive oscillations of the sea level rise on its recovery from the last glaciation. The cave itself may have been formed 40,000 years ago when during a warm phase the sea stood at thirty metres below present level.

When I first discovered the cave, my immediate reaction was that it would have made an excellent home for Stone Age men, if there were any around when it was dry, some 10,000 years ago. Its situation on the coast, with a broad sandy beach in front is reminiscent of Gorham's Cave in Gibraltar, which contained remains of *Homo Neanderthalensis*. Unfortunately, it seems unlikely that Malta and Gozo supported an independent human development and 8,000 years B.C. is a little too early for colonists to cross the sea from Sicily or Africa. However, the islands were teeming with animal life, as the fossils of the famous Ghar Dalaam bear witness, and excavation of our Gozo A might produce similar material, the first from a submerged cave.

The cave also offers much for the marine biologist. Within it there is variation in light that corresponds to a descent of many hundreds of feet. The temperature of the cave, however, remains that of similar depths outside. Thus by comparing the inhabitants of this cave with the flora and fauna living in similar light conditions in free water, the biologist may discover the effect of temperature and ventilation.

In one month the expedition discovered a score of submerged caves including the enormous Gozo A, for which we claim a world record. But the scientific programme has produced more questions than answers. The achievement of our work has been to get to grips with submerged caves and to publicize the opportunities for research that exist in them. Here, in a single coastal feature, is work for the geologist, biologist and archaeologist, all of whom must use the aqualung, for there is no other way of discovering and entering submerged caves. The expedition was successful in other, less tangible ways, too. The opportunity it provided for the close co-operation of University and Service divers has been of great benefit to both, and will no doubt be repeated in the future.

SIERRA LEONE 1963

By Peter Sellar

'PALAVER' is a word which has become firmly established in the West African vocabulary. It means 'trouble', and we were soon to realise its significance. On paper, arrangements for the expedition were complete; return charter flight to Lagos, and deck passage from there to Freetown. After eight months of continual investigation, we had at last managed to arrange a relatively cheap means of transportation to our destination in Sierra Leone.

Thus we thought, as we sat back in comfort, watching the coastline disappear beneath us. The bright green of the English countryside soon gave way to duller hues as we flew south over France and Spain. We looked down upon the famous holiday resorts of Barcelona and Majorca, basking beneath us in the relentless sun, and bathed by the waters of the Mediterranean. Algiers appeared and disappeared, and we were soon flying 13,000 feet above a scene of desolation. Even the more persistent vegetation covering the parched brown earth, soon seemed to disappear, and nothing could be seen but the dry wastes of the Sahara Desert, interrupted by one of the trans-Sahara 'roads' disappearing, straight as a die, into the distance. Gradually, the sun went down beneath the curved horizon, and we continued the eleven-hour flight in darkness.

Our stay in Lagos was to have been of short duration, but on arrival we found that our deck passages had not been booked, and we experienced a colour bar which, for once, was working *against* the white man. No ship's captain would allow Europeans to travel on the deck (the return Lagos — Freetown journey costs only £14), and in spite of numerous interviews, we were forced to book third-class accommodation on a French Line boat sailing for Monrovia. This meant an eight-day stay in Lagos, where we lived in the University Hall of Residence. During this time, we became accustomed to a city of contrasts. The city centre, with its modern, air-conditioned office buildings and shops, and the shanty town on the sea front, with its small shacks, crowded together, and crudely protected from the rains by scraps of rusted corrugated iron. The main roads, metalled and in good repair, and the rough potholed tracks which led from them. The city store, which would not look out of place in Oxford Street, and the simple market stalls, with the proprietor often fast asleep in front of his wares. The clean central square, with its fountains surrounded by orderly flower beds, and the unpleasant odours of the provincial villages, with their heaps of putrefying rubbish. The list is endless, and although we were still fascinated by Lagos and its people, we were anxious to move on to Sierra Leone and the interior.

We were pleased therefore, to see Lagos disappear into the distance, at the beginning of our sea-passage to Monrovia. Suddenly, we were aware of the exquisite coastline, with the rollers of the Atlantic breaking upon golden sandy beaches, shaded by the large palm trees behind. On the first day, we arrived at Cotonou (Dahomey), where the boat anchored, and passengers and cargo were unceremoniously brought out by lighters. A similar procedure was necessary at Lomé (Togo) on the

second day, whilst on board, we managed to enjoy most of the first-class amenities, apart from food and cabins, which were decidedly third-class. The following day however, we docked at Takoradi (Ghana), and were able to visit the mainland with its steep cliff faces descending to the sea, in comparison to the sandy beaches we had seen previously. We were able to see little of the town in an hour ashore, but were impressed by its spacious, clean appearance, with modern buildings, and no evidence of shanty dwellings.

Abidjan (Ivory Coast) was reached on July 28th, and the whole day was spent ashore. We were immediately impressed by the attractive inland harbour, with its orderly quayside. Further on, we found a completely modern city, lazing in the sun on a hot Sunday afternoon. Again, there were no shanty dwellings, and instead, contemporary office blocks, flats and hotels were to be seen, connected by tarmac roads with 3-lane traffic and numerous fly-overs. Town planning had not been neglected, and we walked in the large central square, and down avenues shaded by the trees on either side. In the small market, bats hung precariously from the trees overhead, whilst beneath we could purchase the many souvenirs, including plastic combs, guaranteed genuine ivory! The day went all too quickly, and we again embarked to sail to Sassandra (Ivory Coast), where we anchored for three hours on the following morning. The final stage of the journey was spent below decks, avoiding the heavy rain which ensued.

On July 30th, the boat docked at Monrovia and we passed through the customs, our first experience of the tight security maintained in Liberia. Alas, we could not sun-bathe on the inviting sandy beaches, nor stroll through the city with its wide streets, typically American, like the almost incomprehensible drawl of its inhabitants. We soon learned that the eighteen-hour sea-passage to Freetown would not be possible for at least five days, and went on to investigate the possibility of overland transport. 'Taxi!'—on an expedition it seems legitimate to try anything once, when landed in such a situation. Imagine our surprise when the taxi driver agreed to undertake the 250-mile journey to Koindu, a small market town on the Sierra Leone border. For his part, he received 65 dollars, and a reunion with his family, who lived in this area.

We left in the late afternoon, along the good, metalled road, which lasts for about 100 miles before giving way to laterite. Passing through Monrovia, we saw the imposing modern residence of the President, which was nearing completion, but soon solid brick constructions were replaced by wattle and daub dwellings, protected from the rains by the characteristic palm thatch. On either side were big rubber plantations with the trees, set out in orderly lines, being tapped to collect the valuable latex. Further north, the forests gave way to woodland savanna, laid out upon a gently undulating countryside. Darkness was soon upon us, and with it came the laterite road surface and torrential rain, which greatly reduced our visibility and speed. It is the action of such rains that has given rise to the red laterite, which is the insoluble part of basic igneous rock, remaining when all the soluble salts have been washed out. Few roads are metalled in the bush, and it is necessary to bump along over ruts and pot-holes caused by the passing of heavy vehicles after rain.

Four check-points had to be passed before we eventually reached Sierra Leone. We were something of a novelty to the inspectors, who went to great lengths in order to check our identities, and had often never seen the latest Liberian entry permits. We stopped at about 1 a.m., and spent the rest of the night in a village about an hour's drive from our destination. Early the next morning, we took leave of our hosts

(friends of the taxi driver), thanking them for the comfort of a large double bed, and, in brilliant sunshine, we drove on to the border and Koindu.

Koindu is situated on a tongue of land projecting into French and Liberian territory, and every Sunday morning it is the site of a famous international market. We said farewell to the Opel taxi, which was only licenced for Liberia, and managed to hire a plush Volkswagen to complete the journey to Pendembu. The immigration check-point is some 30 miles from Koindu, and the inspector in charge of the very efficient police station felt very honoured to meet a group of Europeans, whose intended arrival had been announced on the radio, and who were now creeping in through the 'back door'.

Sierra Leone prides itself on the fact that the first railway to be built in British West Africa, runs through its territory. The small 2 ft. 6 inch gauge railway stretches from the capital, Freetown, westwards to Pendembu, a distance of 228 miles, with a branch line to the north. After a night in the rest house at Pendembu, we boarded the train at 6 a.m. on the morning of Thursday, August 1st. Our destination was Mano, a journey of 120 miles which was decidedly uncomfortable, sitting on the long, wooden seats of a third-class compartment. Interest however, was never lacking, and it would take a book to describe one's experiences on the Sierra Leone Railway. We travelled at an average speed of about 16 miles-an-hour, stopping at the many stations en route. The station buildings were almost non-existent, but they seemed to be replaced by the girls and boys who walked up and down selling peanuts, bananas, kola nuts, soap, perfumes . . . the list is endless. Occasionally, we felt the hands of a beggar tapping on our shoulders, craving the 'copper' with which the white man is blessed. His sunken eyes and foaming mouth made him look more genuine than the many we had seen outside Kingsway stores—the Harrods of Lagos—many of whom are reputed to have had their legs broken at birth, because begging is so remunerative there.

Passengers crowded into our compartment. Women, with heavy loads on their heads and babies on their backs, were often seen to follow the large baskets and boxes which they pushed on board in front of them. It soon became 'standing room only', and as we approached the town of Bo, the journey became more reminiscent of rush-hour travel on the Underground. Apart, that is, from the view of the passing countryside, with its tropical forest rapidly being cut down so that the land can be used for cropping, and then left for 4 to 7 years to develop into a 'farm bush', enabling the land to recover some of its hard-gained fertility. Rivers passed beneath us, greatly swollen by the heavy rains, and flowing southwards to the Atlantic. Daru, Segbwema, Kenema, Blama, Baoma. . . the towns and villages passed by, and eventually we arrived at Mano, where we left the train, and boarded a lorry to take us twelve miles north to Njala.

Njala is the headquarters of the Agricultural Department, which is under the Ministry of Natural Resources, who had so kindly made themselves responsible for our transport and accommodation whilst in Sierra Leone. Nothing could seem further from the classic impression of Africa, as we walked across the green lawns to one of the screened bungalows which was put at our disposal. Electric light, running water, two bathrooms, electric fans and comfortable beds, gave us the opportunity to relax and prepare ourselves for the journey to the Northern Province where we were to establish the expedition base.

As we set out on Sunday August 4th, we were anxious to see what the north

of Sierra Leone had to offer. Why could Roy Lewis describe "a land where the naturalist can still find new species . . ." and where ". . . agricultural officers have told me with conviction that they would not work in any other part of the world for choice"? (*Sierra Leone — a modern portrait : HMSO 1954*). We were soon to find out.

Driving north, we noticed a gradual change from the high bush to which we had become accustomed. The land opened out, and the trees became less tall and sparser. Tall grasses grew in lush abundance in the middle of the rainy season, and the swollen, muddy rivers cut deep channels with almost vertical banks. Our vehicle climbed gradually in the hilly country, which rises to over 6,000 ft. in the Loma Mountains to the east. Villages were scattered at intervals along the road, and we saw the women hard at work weeding in the rice fields, washing in the nearest stream, or walking in groups along the road before us. We were conscious of an inquisitive, friendly people. Heads turned as we passed, soon to be followed by waves and smiles, which we duly returned.

On we passed through Magburaka and Makeni, until, at dusk, we arrived at the town of Kabala in its beautiful setting between two hills, on one of which stands the District Officer's house. Kabala is the administrative headquarters of the Koinadugu District, and although some 200 miles from Freetown, it boasts many social amenities including a hospital, electricity, court-house, and even a prison! On a later visit, we also saw the new secondary school with five Roman Catholic missionaries engaged in the construction of new dormitories before the approaching Autumn Term.

Another twelve miles separated us from our base camp, the Musaia Animal Husbandry Station. Waiting to greet us on our arrival was the local forestry officer, and we immediately realised why the government rest house had been christened 'Paddington Station'. Here was a spacious bungalow with 4 large rooms, and its own supply of water, pumped up from the river below. This was to be our base and field laboratory for the next five weeks, and every night we returned there from our daily excursions.

This was a biological expedition, collecting plants and animals for Kew, the British Museum, and the Commonwealth Mycological Institute. Bob Lester and Neil Wilding, the two zoologists, were concentrating on insect collection, whilst Dave Haswell, Howard Mead, and myself collected both flowering and non-flowering plants. We chose to work in an area of approximately 10 miles radius from our base, although on some occasions we ventured further afield.

On one such occasion, we accompanied the Veterinary Officer, to see cattle being inoculated against pleural pneumonia. This took us up to Gberia Fotombu, on the French Guinea border. For the first time, we experienced the inadequacy of the local wooden bridges, which do not take easily to motor transport during the rains. The supporting logs had become dislodged, leaving a gaping hole which had to be speedily filled, before we could continue the journey. On our return, we saw a man stricken with cerebral malaria, and too ill to be transported to the nearest dispensary, about 10 miles further on. He was a sorry sight, and we were thankful for our prophylactics and mosquito nets, giving some protection against the malignant tertian malaria, common in this area.

Another time, we visited Kakoia Hill, a 2,000 ft. rock face, weathered into buttresses and bastions, where Krifi, guardian spirit of the Limba people, dwells in

a cave behind a white slab of rock. Unperturbed, we set out, intent on reaching the summit to collect the many lichens covering the rock outcrops. Hacking a way through the long grass and thorny scrub, we eventually reached the base of the mountain and began to climb. The going was difficult, and we roped up, as we ascended the steep face, made slippery by a recent downpour of rain. We had scarcely reached the cave of Krifi, only half the distance to the summit, when we were forced to return, in order to avoid a descent in darkness. Two days later however, we made a second attempt, this time finding an easier ascent further west. Again, we had to hack through the long grass, and by mid-day arrived, almost unexpectedly, at the summit. Before being enshrouded in swirling mist, we were able to look down on the gently undulating countryside below, with its small villages scattered in the woodland savanna.

Many animals were observed during the expedition. The smaller monkeys were often seen, and on two occasions the screeching of chimpanzees enabled us to locate them as they swung through the trees, eating the ripe plums. On two nights, we went in search of hippos, keeping a long vigil near the river bank, but although tracks were seen on both occasions, we did not encounter the ungainly beasts. Snake hunting was more successful however, and our collections included a deadly Puff Adder, for which a home has now been found in Dudley Zoo. The common African Agamid Lizard occurs throughout West Africa, from the rocks in the heart of the bush, to the walls of the skyscrapers in the big cities. The local people were eager to augment our collections, and we received weaver birds, chameleons, tortoises, scorpions, deer skins and even snakes which had been battered to death, and were then offered to us dangling from the ends of long poles. They returned to search for more, encouraged by the cigarettes, sweets, or chewing gum which we gave in return.

The five weeks went all too quickly, and we were loathe to take our leave of Kabala and Musaia and the very hospitable people there. The time came however, and after 24 hours of packing, we eventually loaded our lorry for the return journey to Freetown.

As we drove south, we passed for the last time the herds of native Ndama cattle, characteristic of the Northern Province. For the last time they caused us to stop, as our shouts and the horn urged them off the road into the tall grasses on either side. Well have they been named Koinadugu policemen!

It was an uncomfortable journey in the back of the lorry, seated on the tea chests containing our collections and equipment. As we descended to the sea coast, we were aware of a gradual rise in temperature and humidity, which even at Musaia had been sufficient to allow a liberal growth of fungus on damp material, leather and even a few of our plant collections.

Our day in Freetown was spent making arrangements for the flight to Lagos. Looking down from Fourah Bay College, situated on one of the hills overlooking the harbour and estuary, is an awe-inspiring sight. Below is the noise and clamour of the town, with its green double-decker buses, whose route takes them along roads with such familiar names as Walpole Street and Westmorland Street. The buildings on either side extend from the modern Paramount Hotel, to the wattle and daub constructions on the outskirts. The inhabitants are chiefly Creole, a community established nearly 180 years ago by settlers from all over West Africa, many liberated from captured slave ships, and others discharged from service in the British Regiments.

Continued on Page 26

PLANT COLLECTING IN THE TROPICS

By F. N. Hepper

THE tropics present special problems for the plant collector which are seldom appreciated by residents of temperate countries. As living plants, except those of certain families such as orchids, are not usually required from the tropics, this article is concerned with the preparation of herbarium specimens. Contrary to popular belief the drying of plants for scientific reference in a herbarium is a skilled and often arduous task and it should never be undertaken lightly. Unfortunately, many student expeditions have attempted too much in too short a time with inadequate equipment.

Most tropical floras are now reasonably well-known and the great need is to concentrate on under-worked areas and to collect high quality specimens to fill in the gaps. Dashing around in over-loaded vehicles is sure to produce poor quality specimens. Similarly, large-scale ecological programmes with their great scientific interest may impress potential financial backers of the expedition, but such ideas are doomed to failure if the fundamental need for identifying the plants is not appreciated and steps are not taken to do something about it. There is no easy answer to this either, since many of the plants encountered will be sterile and sterile herbarium specimens are often useless and not wanted by anybody and, as very few tropical countries have complete floras, it is not often possible to work out for oneself the identification from the literature. Hence it is better to take specialist advice and concentrate the collecting expedition on one small under-collected area and to take advantage of the facilities available. A simple rest-house or hut can be turned into a dry base camp for the storage of specimens and equipment, supplies can be centred there and excursions made into the surrounding country. It is as well at an early stage of planning an expedition to study the climate of the country it is intended to visit: Collecting in some areas in the dry season may be like trying to collect in Britain in mid-winter.

Selection of Habitat and Material

Selection of habitat is very important. Forest margins, rocky hills and boggy places will all yield interesting plants but cultivated ground will probably only support the common weeds and introduced species. A tropical forest presents its own difficulties for the boles of the trees may be without branches or leaves for 100ft. or more. Ingenious methods have been devised for obtaining specimens such as shooting off twigs with a shot gun; training monkeys to fetch them from the canopy or even by felling the entire tree. It is interesting to note that many forest trees can be identified from the characteristics of their outer and inner bark; the latter showing when its bark has been slashed with a machete. However, none of these methods is recommended for student expeditions which will find lower growing vegetation more satisfactory.

Selection of the material is also important if high quality specimens are to be obtained. As complete a specimen as possible should be gathered including the

underground parts. Careful examination of the base of the plant before disturbance will often indicate the type of roots possessed by that species. A fern trowel (fig. 1 c) can deal with smaller subjects in softer earth, but a small trenching tool (Fig. 1 h) is useful for digging up stout rootstocks and bulbous plants which would otherwise be unobtainable in hard tropical soil. Where it is noticed that there is variation in a population it is well worth while gathering samples of the extremes as well as of the intermediate types. Good notes on such gatherings will be very valuable to later workers on the group.

Flowering and/or fruiting material should always be selected and delicate parts can be pickled in 50% spirit, taking care not to mix similar genera in the same jar. Wide-mouthed jars of glass (Fig. 1 i) or of polythene (Fig. 1 j) are suitable. Large fruits should be dried separately, kept in boxes, and, like the pickled material, can be re-united later as long as each bears the number of collection.

Equipment

The type and quantity of botanical equipment required will depend on the climate of the country being visited. An expedition to rain forests or in rainy season conditions will need more drying paper and a means of drying specimens by artificial heating than an expedition to a drier savanna country. In assessing the requirements of an expedition it will be necessary to decide on how many duplicates of each species it is proposed to collect. This is an important fact which is often overlooked and it may be useful to consider why more than one specimen of each gathering need be collected when in Britain, for reasons of conserving the flora, only one specimen should be gathered. In many tropical countries there exists an active herbarium which may be attached to the Department of Agriculture or Forestry, or run by a university, but the staff there may have no means of accurately identifying the specimens, so they are dependent on say Kew for plant names. This means a minimum of two good specimens of each gathering and it is advisable for other major European herbaria to have a specimen, too, for comparative purposes and as a safeguard lest others are destroyed. It will be appreciated that numerous duplicates will involve the collector in an enormous amount of additional work and a good working figure would be three or four duplicates for each gathering. The number of days a specimen takes to dry (say 2 for a grass and 4 for trees, an average of 3) with an average of say 15 gatherings with 4 duplicates each day will give an idea of the number of drying sheets required: $3 \times 15 \times 4 = 180$ sheets of drying paper required. The quantity of other equipment such as presses and note books can be estimated on a similar basis. Other pieces of collecting equipment are mentioned in the next section. Personal equipment are beyond the scope of this article but it is obvious that the tropics demand special items, and advice on such things as anti-malaria precautions should be sought.

Techniques

The metal vasculum (Fig. 2) so favoured by botanists in temperate countries has limited use in the tropics because its interior is likely to become very hot. It can be used to carry bottles of pickling spirit and for the transport of bulbs or bulky fruits. Leaves soon wilt in a vasculum and it is preferable to collect direct into a portfolio

or a press that has been modified for field use with a carrying handle, which can easily be made from two wooden slats and a case handle (Fig. 1 F). Each specimen should have a jeweller's tag fastened to it bearing the number of the collection: the numbering of gatherings is a detail whose importance is often not appreciated. The same number should never be used for different collections and should always accompany each duplicate and separate fruit or flower in spirit. Special field notebooks (Fig. 1 D) are available but some collectors prefer to use numbered invoice books to obtain a carbon copy of each set of notes. Note-taking is a vital part of any collection and the notes should convey as much information as possible without repeating the obvious. Certain habit characteristics will be lost on pressing and these should be recorded at the time of gathering, together with any other details such as flower colour that might be lost in the course of drying. In tropical countries where perhaps the geography is poorly known, the locality recorded will need to be one that can be found on an ordinary map, perhaps supplemented by longitude and latitude. Brief habitat and ecological data are always useful as well as vernacular names and notes as to the uses if these are obtainable.

Absorbent drying paper is used in a plant press which is a double frame of wooden slats bound round with two webbing straps. Each specimen should be placed separately in a thin paper folder, usually known as a flimsy, which will simplify the technique of paper changing and protect the specimens once they are dry. Both sides of the leaves should show and the flowers carefully laid out. The plants are dried under pressure between the absorbent paper which must be changed daily (and dried off for further use) until the leaves are perfectly dry. Nothing must protrude from the press for it will either wither on drying or break off in due course, and in any case the specimens must be no larger than the herbarium mounting paper. Kew size sheets are $16\frac{1}{2} \times 10\frac{1}{2}$ inches; the British Museum (Natural History) are $17\frac{1}{2} \times 11\frac{1}{2}$ inches.

Thin presses left in the sun will dry the plants in them quite rapidly but in humid conditions or when sunshine is lacking, other methods for obtaining quick drying must be used and a comparatively small source of heat can be used to great effect. A charcoal stove surrounded by presses in the manner shown in (Fig. 1 A) will give supplementary heating for many hours and even an electric lamp could be used if electricity is available. Another, and very efficient method is shown in (Fig. 1 B). A hurricane lamp or stove beneath a full press will help to dry the plants when corrugated boards are used and the whole surrounded by a tarpaulin or some other suitable cover so that warm air is forced through the press. These boards are made of cardboard or aluminium and the corrugations should run vertically when the press is in position. There is an obvious danger of fire when these methods are used and precautions should be taken to prevent it. If the heating operations are not carefully supervised the plants may stew in their own juice, as it were, or become cooked and very brittle: both these conditions will ruin the specimens. When corrugated aluminium sheets are used between every specimen, the press can be expanded to the extremity of the straps. Such a thick press would require two hurricane lamps and it is possible to leave the specimens without changing the papers, for both the specimens and the absorbent paper dry very rapidly. Corrugated aluminium sheets, however, are difficult to obtain and sheets of expanded aluminium may be more easily bought, and they appear to be even more efficient than the corrugated type. It should be remembered when packing up the equipment that aluminium sheets in quantity are surprisingly heavy.

A special technique can be adopted for water-plants. After collecting them into a polythene bag, they will make excellent specimens if they are later carefully floated

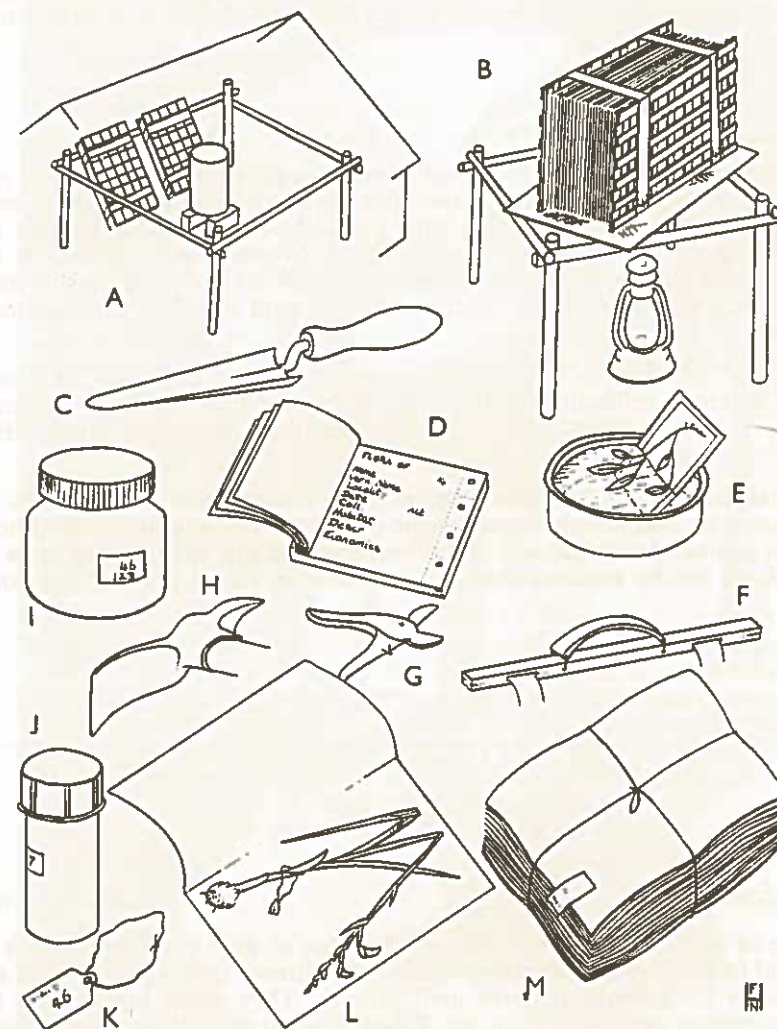


FIG. 1. A. A simple method of drying plants around a charcoal stove. B. A hurricane lamp beneath a press with corrugated boards inserted between the drying paper. (In use, the whole would be surrounded by a cover to force warm air through the press). C. Fern Trowel. D. Field note-book. E. Floating aquatics on to paper prior to drying. F. Press Carrying handle. G. Secateurs. H. Trenching tool. I. Wide-mouthed glass jar. J. Stout polythene jar. K. Jewellers' tag. L. Fresh plant in position inside 'flimsy' prior to pressing. M. Bundle of dried plants between millboards.

on to a sheet of paper (Fig. 1 E). Succulent plants on the other hand need to be killed by dipping in boiling water. Bulky bulbs and rhizomes can be sectioned longitudinally to facilitate subsequent mounting of herbarium sheets and accompanied by sketches and measurements of the fresh material. If bulbs are not killed in some way, they may commence to grow in the herbarium or regard their new environment as an extensive dry season!

Packing

Once the plants are dry it is not sufficient to neglect them for they will rapidly deteriorate in tropical conditions. The specimens should be bundled up tightly between two millboards (Fig. 1 M), sprinkled with paradichlorobenzene and kept in a dry, termite-free place until despatch can be arranged. Wooden crates should be tightly filled and special packing is necessary to ensure the safe transit of the pickled material in glass bottles which should be filled to capacity with liquid to avoid damage to the contents.

In a short article such as this, one cannot attempt to cover all the facets and aspects of botanical collecting and the reader is referred to the booklet "Instructions to Collectors, No. 10, Plants" (2/-), issued by the British Museum (Natural History) in which full details are given.

Plant collecting is a fascinating and rewarding occupation which makes use of both the scientific and artistic talents of the collector. The aim of any field botanist must be to add to knowledge, and this is best achieved not by collecting large quantities of plants but by ensuring that the ones he does preserve are of high quality.

SIERRA LEONE

Continued from Page 21

A mixture of peoples which have blended together to give a life and culture half, African and half European. We passed them in the streets, their mode of dress almost as variable as its different patterns and colours. They speak together in Krio: English, corrupted even more than the Pidgin English we had become accustomed to in the north. We managed to learn a few words such as 'sabby' meaning 'to know'; 'pikin', an infant; and of course 'palaver'.

We were soon to appreciate the meaning of this word once more. As we crossed the Sierra Leone River to Lungi Airport, and looked back on the Freetown Peninsula, we looked forward to the flight to Lagos, over the high rain forest of tropical West Africa. Two days, and we would be returning, over the Sahara, Majorca, and Barcelona — *if* our plane had arrived in Lagos on time, and not 24 hours later. Oh yes, we sabby palaver!



Fig 2. Placing a fresh Plant directly into the Press. Vascutum is a useful repository for bulky fruits and jars of spirit material.



Top Camp Berserkerbrae Glacier. (Hjornspids in the background).



Abseiling on the traverse of the summits of Grandes Jorasses.

STAUNING ALPS, 1963

By M. Key.

THE embryo of this expedition was formed in the autumn of 1962, when a small group of enthusiasts began to study the literature on Greenland with a view to finding a suitable location for a scientific and mountaineering expedition.

It soon became apparent that the Stauning Alps was an ideal area for such a project. The east coast of Greenland has many fine mountains but none offering better possibilities than the Stauning Alps where many peaks were still unclimbed, and the reports of previous expeditions left one in no doubt as to the high standard of the climbing.

The mountains are interwoven with a system of well-developed valley glaciers and although a small amount of glaciological research had been done already, there remained much to do and we evolved a glaciological programme based on flow measurements and moraine studies. The geology of the area was well documented because of the existence of valuable ores, and it was clear that useful specimens for paleomagnetic work could be collected from the basalt dyke swarms. However, the real deciding factor was the existence of a gravel airstrip at Mestersvig, just 15 miles from the N.E. edge of the mountains where a small Danish weather station is maintained. Since the East coast is icebound for most of the year, transport by ship is not practicable and Mestersvig is unique in the advantage of having an airstrip and being near enough to a suitable area to preclude the need for an air drop of supplies. The chartering of aeroplanes to Mestersvig is an expensive affair, and it was only by co-operating with three other British Expeditions that we were able to bring the costs within the limits of our financial support.

Despite all our difficulties we left Leith on 24th June on the M.V. Gullfoss bound for Reykavik (Iceland), from where we flew by DC4 to Mestersvig after some delay waiting for the airstrip at Mestersvig to dry out sufficiently to take the heavily laden plane.

We left the clouds of Iceland for the clear blue skies and midnight sun and a land of snow and ice set in a frozen sea. The weather of East Greenland is characteristically very good and it was shirts off at 2 a.m. as we unloaded the plane in hot sunshine. There was another side to the penny though, and we found that what we had expected to be an easy walk over a 2,200 ft. col was a nightmare of deep soft melting snow where we floundered up to our waists with 70 lb. packs.

We had about 2 tons of gear and food to get across the pass and over a swollen glacier melt river to our proposed base camp, and this took 9 days of constant pack-hauling and involved erecting a 250 ft. rope bridge across a gorge to cross the Skel river.

We succeeded after adopting the policy of carrying to the edge of the deep snow and waiting a few days for the hot sunshine to clear a reasonable route over the col and down the steep 2,000 ft. drop to the Skel river valley.

Meanwhile, an advance party had set up base camp and established stake lines on the lower part of the Berserkerbrae Glacier.

From this point the routine work of the expedition began, geared to an eight-day schedule determined by our 16-man-day food boxes.

Our eight-man group was divided into pairs assigned to a particular project for the duration of the eight-day periods, after which we all returned to base camp to collect food and change over our occupations. In this way everyone was able to participate in all facets of the work and get a rest from the strain of continually doing the same thing.

At this point, it would be in order to say just what we did. Our first pair, the base camp glaciologists were concerned with the flow and ablation measurements on the Berserkerbrae Glacier. This involved the establishing of three transverse stake lines at profiles about two miles apart across the $1\frac{1}{2}$ mile width of the glacier, and a longitudinal line up the centre. The 15 ft. stakes had to be drilled in to a depth of 8 ft. since the ice ablated away several feet in the melt season and many were the curses during this job as the drills have a nasty habit of jamming at about 7 ft. after 45 mins. of hard sweat.

The stakes and associated survey cairns were all established after two weeks, and the remaining work was a regular weekly survey of all the stake positions using a theodolite to offset readings on the transverse lines and triangulate the longitudinal line. Ablation readings were taken at each stake during this process. Apart from the weekly readings, of which we did 8 sets, we did tacheometric height profiles of each transverse line and a barometer and tape profile on the longitudinal line and triangulated the cairns from measured base lines. Some strain readings were taken on the lower stake lines and a daily flow measurement made on one stake for a week. Lastly, barometer readings were taken as an altimeter control.

The next pair, the mobile glaciologists, operated over a range up to a maximum of 50 miles from the base camp. They were concerned with looking at the snouts and moraines of most of the glaciers of the N.E. Staunings. Phototheodolite shots were taken from fixed cairns to record snout positions and features. Painted boulders were established in suitable cases as accurate fixes of snout positions. Slopes and altitude were measured above and on the glacier snouts, and an attempt was made to deduce the geomorphic history of the moraine system.

The activities of this pair, which were generally under the control of our chief glaciologists, were based on the recommendation of the Commission for Snow and Ice, and were directed towards evaluating the glacial history and present state of recession or advance of the glaciers.

Lastly, the remaining four were mountaineers. They moved up the side glaciers of the Berserkerbrae taking full camping and climbing gear and food for the eight-day period. These climbing camps were established right below the peaks that we intended to climb and involved packbacking 80-90 lb. packs up loose rocky moraines and on skis through deep snow.

The climbing varied immensely in type but was generally excellent. Nearer to base camp we had rock peaks with jagged, rather loose ridges bristling with an array of curious gendarmes which often barred what seemed a practicable route.

Further up the glacier were the granite peaks — reminiscent of Chamonix and

serious propositions by any route. We found direct face climbs on the rock generally too slow and difficult, leading to abseil retreats. The ridges too were by no means easy. The best routes were in ice and snow, by couloir and ice slopes leading to weak points in the ridges, and we had some superb routes of this type. A 20-hour outing on Grandes Jorasses and a bivouac on Westminster spring to mind as some of the finer climbs.

The figures alone cannot give an impression of the climbing but we made 24 ascents in all, of which 17 were first ascents, and the peaks are being named by us after London Boroughs (pending Danish Government approval). The height of the peaks was in the range 5,000 — 9,000 ft., of which 4,000 ft. was typically serious climbing since these mountains rise up abruptly from glacier surfaces between a few hundred to 4,500 feet above sea level.

The routine was broken halfway through the expedition when a group of four (two mobile glaciologists and two rock collectors) went to the Werner mountains to collect rock specimens and work on the glaciers, leaving only two in the climbing group.

Rocks were collected from syenite outcrops and basaltic dykes, and are at present being analysed in the Physics Department.

This concludes all the work that was done, and we began to break up camp on 27th August and spent two days getting all the gear back to the airstrip where we camped for one night.

The plane was about twelve hours late, and with snow falling on the airstrip we were just a little curious as to whether it would be able to land, but we left successfully on the 30th August.

To summarise, this was an expedition on which every member had a thoroughly enjoyable and rewarding time, and this encouraged everyone to work very solidly with the result that we were able to get through what at first seemed rather an ambitious diversity of projects for an eight-man group. Despite the difficulties of access to the region, we were able to keep the total budget of the expedition at about £1,500 which, by comparison with any other expedition to the area is remarkably economical. The personnel comprised a cross-section of undergraduates and post-graduates, and though some had previous expedition experience, most were quite new to this field. Nevertheless, all worked very well together and I feel, showed that any group of sufficiently keen people can organise an expedition — which is a point that should be more widely appreciated in the College.

THE SCOTT POLAR RESEARCH INSTITUTE

By G. de Q. Robin

THE Scott Polar Research Institute has now functioned for 43 years as a centre which collects and makes available information on polar regions. Additional objectives of the Institute are to stimulate interest in polar regions and to initiate and support new lines of research work.

Although formally a part of the University of Cambridge, the Institute serves both as a national and as an international centre of polar activities. It is organised primarily along academic lines and, unlike many polar organisations, it does not expend the major portion of its efforts on details of logistic organisation of expeditions. Although the members of the staff of the Institute possess considerable experience of expeditions to polar regions, as members of the staff of a polar research institute, their function is to provide background knowledge and help to a wide variety of expeditions in the planning stage.

The collection of information on polar regions is a continuing and central theme of the activities of the Institute. The need for some well-known repository of results of polar expeditions was recognized as early as 1912 when R. E. Priestley and F. Debenham were making a geological survey in the McMurdo Sound region of Antarctica. Since their work was amplifying the detail of an earlier geological survey, the question arose as to where the results of the previous work had been deposited. The absence of any recognised depository produced the idea of a polar research institute and this became a reality after the First World War in 1920 when the Institute was founded as a memorial to Captain Robert Falcon Scott and his companions who died on their return from the South Pole. The first financial assistance came from the residue of the Captain Scott Memorial Mansion House Fund.

After small beginnings and various moves, the present memorial building was opened in 1934 by Mr. Stanley Baldwin, the Prime Minister. Even today, the Scott Polar Research Institute is the only polar institute in the world which is housed in a building erected for this specific purpose. However, polar research has expanded so rapidly during recent years, that the present building is inadequate for present needs.

The main interest for University Exploration Clubs planning expeditions to polar regions, lies in the Institute's large collection of material on these areas. In addition to a very extensive library of published books, the Institute holds many unpublished expedition reports, diaries of expedition members, an extensive and detailed collection of maps and a very detailed catalogue covering the literature on polar regions. The catalogue is classified by subject, regions and authors, and can give a very useful lead to relevant literature for any particular study or expedition. In many cases the staff can help from their own experience with advice to expedition organisers, and if they have no first-hand knowledge, they can frequently put an expedition member in touch with someone else who has visited any particular area.

In the early months of each year there are usually several expeditions making use of the resources of the Institute in this way. Sometimes useful liaison is started between expeditions planning to work in the same or nearby areas, as a result of contacts established at the Institute.

An important activity of the Institute is the publication of the journal, *The Polar Record*, which appears three times per year. This contains articles of general interest on polar regions which may be historical, geographical, scientific or technical. The journal attempts to record some details of all major expeditions to polar regions and also contains various shorter notes on topics of interest. At the back of each number is a classified bibliography of recent polar literature which usually runs to something like 500 entries selected as covering the more important recent publications.

Another feature of the Institute, known to many visitors to Cambridge, is the display of historical and current information on polar exploration in the museum. The museum is also used for public lectures on some Saturday evenings during term-time. Many leading polar personalities have given these lectures during past years so that they have now become a feature of Cambridge life known to all interested in polar studies.

Any institute which exists merely to collect and distribute information will tend to stagnate if it becomes isolated from the activity on which it is reporting. The Institute has therefore always kept in close touch with current activities. Between the two World Wars, this contact was livened by younger expeditions to the Arctic and Antarctic from Cambridge which used the Institute as their headquarters for planning and writing up of results. Men such as Gino Watkins and John Rymill developed plans for exploration and research in East Greenland and Graham Land in close Association with the Institute.

During recent years, the Institute has not been able to provide space for individual expeditions to organise their activities in detail owing to the requirements of its own staff and the expanding library and archives. Members of the staff have developed research activities of their own which help to contribute both to historical knowledge and to the techniques of field investigations. At the present time, one major research activity in the Institute is the development of a portable low frequency radar equipment for sounding the thickness of polar ice sheets. Field trials of this equipment are being carried out in co-operation with the British Antarctic Survey at Halley Bay in the Antarctic, and in northwest Greenland in co-operation with the U.S. Army Electronics Research and Development Laboratory, Fort Monmouth, U.S.A. Another aspect of the Institute's current activity is that it has an extremely good collection of literature on Soviet Arctic regions, much of which is not readily accessible elsewhere. This collection is being used for studies of Russian activities in the Arctic.

Alongside the research activities of the staff are those of the research students attached to the Institute. Their research, under the supervision of a member of the staff, normally lies in a similar field to that of the staff member. At the present time, research students are working on diverse subjects such as the penetration of ocean waves into fields of pack ice, the early history of Ungava, applications of radar sounding methods to glaciological studies and Russian cultural and linguistic influences on the people of the Komi Republic, U.S.S.R. Although the Institute can only house about four research students at one time, more than half of the recent

students are graduates of Universities other than Cambridge, including several from North America.

Since 1957 when revision of the constitution resulted in the Institute becoming a subdepartment of the University under the Department of Geography, senior members of the Institute staff have held established University teaching posts. Although their teaching duties are not heavy, they do contribute to undergraduate teaching, not only in the Department of Geography but in some other departments. Although limited, this formal teaching does bring some undergraduates into contact with the Institute.

These preceding examples of the work of the Institute illustrate its activities, but do not do justice to the amount of work by the staff concerned with the information service. The librarian, who is also the chief information officer, takes a pride in digging out the answer to any query received, either from his collection of literature or from contact with appropriate experts. The Curator of Manuscripts has the fascinating task of looking after the unique collection of historical archives of early expeditions, including many diaries and paintings. These include original diaries and material from men such as Back, Parry, Franklin, Scott, Wilson, Worsley and others. The collection of water colours, including those by Edward Adrian Wilson, is greatly prized. A great deal of help in all this work has been given by the organisation, "The Friends of the Polar Institute." The funds raised, mainly by an annual subscription to the Friends, have been used to good effect over the years in preservation, binding, cleaning and mounting the unique collections housed in the Institute.

Before concluding the article, mention should be made of the activities of the Gino Watkins Memorial Fund. This was established to help small University expeditions run by younger men. In the immediate post war years when equipment was short, the fund maintained a stock of equipment for loan to summer expeditions to Arctic regions. However, with the increasing number of expeditions and the greater availability of equipment and knowledge of its use, the fund has now changed to a grant giving body. During the past two years, around £200 per year has been awarded to University expeditions. In helping such expeditions, the Institute bears in mind not only the possible value of an expedition for research, but also its potential value in providing training and experience for young men who are showing considerable initiative and enterprise in organising their own expeditions.

The staff are well aware of the notable era of exploration which led to the foundation of the Institute. They feel that its character and development depends not only on the acquisition of information and the quality of research but also on the help given to development of individuals. The words on the front of the memorial building help to explain this motive: *Quaesivit arcana Poli videt Dei*, which translates as; "He sought the secrets of the Pole — he found the hidden face of God."

THE DISCOVERY AND EXPLORATION OF JAN MAYEN

By J. W. Sheard.

"They saw a high mountain rising from the sea to the north, with mists clinging round it, and smoke pouring from the summit. They put in alongside a black vertical cliff . . ."

TO those who have visited Jan Mayen, the above account has a certain authenticity and is probably the oldest reference to the island. An Irish monk, St. Brendan 'The Navigator', is said to have visited Jan Mayen in about A.D.551 and the above extract is taken from the 'Navigatio Sancti Brendani', an account of his voyages written in about 910. St. Brendan has also been attributed with the discovery of America. It is unlikely that St. Brendan did in fact take part in all, if any, of the voyages described in the Navigatio, but a vague, though surprisingly accurate map of the North Atlantic can be discerned from the text and it is reasonable to assume that the voyages had been made by someone.

St. Brendan sailed north from Iceland and discovered Jan Mayen as the Vikings did when they discovered 'Svalbard'. The 'Landnamabok' of the Icelander Ari Frode for the year 1194 quotes 'Svalbard' as being four days' sail from northeast Iceland. The 'doegr' or day's sail of the Norse writers is an indefinite measure varying from 70 to 100 miles, but the average is considered to be about 75 miles. If Jan Mayen is considered to be 'Svalbard' and not Svalbard (Spitsbergen), as it is by most, then an average day's sail of approximately 85 miles is indicated. This is not unreasonable, a statement which could not be applied to a four days' sail to Spitsbergen which is more than twice the distance of Jan Mayen from Iceland. Ari Frode does not state the date of the Norse discovery and the question is raised as to whether the Irish learnt of Jan Mayen from the Norse. It is an established fact that the Irish had reached Iceland by 795, and the Norse from 860. There is therefore the likelihood that the author of the 'Navigatio' heard about Jan Mayen from the Norse, but an Irish discovery still remains a possibility.

In 1959 a female skull was found on the island. This find is of great interest because there is no record of a woman having died on Jan Mayen and perhaps all the more remarkable because the skull has Scandinavian characteristics. This find might reinforce the claim of the Norse discovery. Another early discovery of the island is often thought to be indicated by the Zeno brothers of Venice, who in 1558 published a book about their northern discoveries. They mention a convent of St. Thomas Zenobium and marked it on their map as being on the Greenland coast in the same position as Jan Mayen, relative to Iceland. This account is now disclaimed and is to be regarded with some caution.

The rediscovery of the island dates from the seventeenth century when rivalry between the Dutch and English whaling fleets promoted the exploration of the Arctic. Because of this trade rivalry, the first accounts of the discovery are not always reliable. In this country, Henry Hudson has generally been credited with the discovery

of Jan Mayen. Thomas Edge writing in 'Purchas His Pilgrimes' is responsible for this misconception. He states that in the year 1608, William Hudson as Master of the 'Hope-well' ". . . . in ranging homeward (from Spitsbergen) hee discovered an Iland lying at 71 degrees which hee named Hudson's Tutches". The story is obviously false as Hudson's christian name is incorrectly given and this particular voyage took place in 1607 and not 1608, neither would he have been likely to pass Jan Mayen on his return from Spitsbergen to the Thames. Hudson himself makes no mention of the island in his diaries. It has been suggested that a rumour of the discovery of Jan Mayen by the Hull whalers, previously kept secret, resulted in this garbled version by Thomas Edge. The Englishman Thomas Marmaduke and the Biscayan Jean Vrolicq are said to have visited the island in 1612, naming it Trinity Island and Isle de Richlieu respectively. Other old names are Young's Foreland, Mauritius, Pico and Sir Thomas Smith's Island.

The account of the Dutch discovery of the island is much more reliable. A request by the Noordsche Compagnie to have the discovery accepted as made in July 1614, is preserved in the Dutch Archives at the Hague. The claim was put forward because another Dutch whaler, employed by a rival company who visited the island in the following year, was pressing its claim to the discovery. Jan Jacobz May van Schellinkhout was the captain of one of the two vessels to make the discovery, Joris Carolus the mate. The original map made by Carolus in 1614, on which the island is named 'Mr. Joris Eylandt', is preserved in Paris. Blaeu's map of 1623 replaces the mate's naming of the island with the captain's name — Jan Mayen. It has, however, been shown that on June 28th 1614, a ship from Duinkerken, owned by a company belonging to the Englishman John Clarke, found the island and that Clarke won a lawsuit against the Noordsche Compagnie concerning the discovery of Jan Mayen.

The only other 'discovery' that it is necessary to quote is that of Robert Fotherby in 1615. As we have just seen, this is not the first authentic English visit, but his lucid description of the island must be included. "This Iland is about ten leagues in length, and stretcheth North-east and South-west: it is high land, and at the north end of it there is a Mountayne of a wonderful height and bignesse, all covered with snow, which I called Mount Hakluyt; the base or foot of it on the East side is about foure leagues long, it hath three such sides at the base lying out to the Sea, and from the fourth side doth the rest of the Iland extend it selfe towards the South-west, which is also as it were, a place fortified with Castles and Bulwarks, for on each side there be three or foure high Rockes which stand out from the land, appearing like Towers and Forts. It lyes in the parallel of 71 degrees, where the Needle varieth from the true Meridian Westwards eight degrees. The Land is so far as I have seene very Rockie and barren, and worse than the Land that I have seene in King James his New Land, under eightie degrees, for there is no grasse but mosse, and where I first landed upon low ground, all the stones were like Smiths Sinders both in colour and forme, the sand is generally mixed with a corne like Amber; the Beaches are abundantly stored with drift wood and many stones, like light Pumis, which will swimme on the water. I saw many traces of Foxes and the footing of Beares, but not any sign of Deere or other living creatures, and very small store of Fowle." This description is both pleasing and accurate. Although the Mountain is now called Beerenberg, the name Hakluyt has been retained for one of the peaks on the crater rim. Fotherby's keen observation is expressed by his remarks about the olivine crystals in the sand.

Whaling around the island is thought to have commenced in 1614 and continued intensively until about 1642 with bitter rivalry between the Dutch, English and Basque interests. In 1616 the Noordsche Compagnie sent all their 15 ships to

the island. There were also a further 7 Dutch ships, 4 English and 2 Basque vessels whaling in that year. Two Dutch companies, the Noordsche and another from Zeeland were given privileges of catching around Jan Mayen in 1617 and these privileges were renewed in 1622 and in 1633 for a further 12 years. The Dutch erected cookeries on the shore and 4,000 tons of oil were taken home that summer. Clarke also sent 6 ships to the island from Duinkerken but they were plundered by the Dutch fleet, superior in numbers, and only two were allowed to continue whale hunting under a promise never to return. In 1618 more cookeries were erected around the island and the remains of one of these can still be seen at Kvalrossbukta but unfortunately it has been badly disturbed in recent years.

The Dutch had pretty much their own way at Jan Mayen, but in 1632 they were unable to reach the island because of ice. Later in that year, Jean Vrolicq landed, robbed their cookeries and sold the plunder in Rouen. A guard of seven men was therefore left the following winter (1633-34) but all the men died of scurvy before the relief ship arrived. The journal and daily weather notes of the party makes sorry reading. Soon after this the whaling began to decline and when Zоргdrager visited the island in 1699, the equipment appeared to have been left as though the owners meant to return.

With the decline of the whale hunting, the economic potential of the island seems to have been fully exploited. However, sealing has been practised in the drift-ice to the west of Jan Mayen since the eighteenth century. The Norwegians have always been prominent but had a virtual monopoly throughout the nineteenth century and until after the Second World War, when Soviet Russia joined the industry. A number of hunting expeditions have wintered on Jan Mayen to catch blue and white foxes. The largest catch ever made was by an expedition from Tromsø in 1917-18 when no less than 252 foxes and 3 bears were taken home. Both the fox and bear are now protected animals and in any case bears have rarely been seen in recent years.

A visit by another whaling boat in 1732 records a most interesting occurrence. While lying becalmed off the south of Beerenberg, Captain Jacob Jacobsen Laab observed a volcanic explosion at the foot of the mountain accompanied by flames. The flames lasted for only one day but a dark cloud remained for four days, perhaps longer, as a change in the wind enabled the vessel to make way.

William Scoresby Jnr. visited the island in 1817 and surveyed the east coast of Beerenberg, and was the first to describe the glaciers descending to the sea. He landed at Jamesonbukta, climbed Eskcrater and was rewarded with clear views of the surrounding area, his map shows Eggøya as an island. The following year Scoresby returned to the island and observed weak volcanic activity in the same vicinity as Laab had in 1732. This eruption was also witnessed by the captain of a Hull sealer. These are the last records of volcanism on the island, although steam vents are still active on the summit of Eggøya, which is an old crater rapidly being eroded by the sea.

Lord Dufferin visited the island with 'Foam' in 1856, and his book 'Letters from High Latitudes' has done much to make the island more widely known in this country. His account however, does not compare with that of Vogt and Berna who made another sketch map of the island in 1861, in which Eggøya is no longer depicted as an island. The Norwegian North Atlantic Expedition of 1877 landed on the island for four days and Mohn's map is a distinct improvement on Scoresby's. However, it

remained for the Austrian expedition in the first Polar Year, 1882-83, to make the first accurate map, a map which was not substantially improved until the Norsk Polarinstittut published maps based on aerial photographs in 1954 and 1959. Fourteen men overwintered on the west coast and extensive meteorological, oceanographical and geophysical observations were made and a large amount of zoological and botanical material collected. The work of this expedition provides the basis for the later scientific work on the island.

It is impossible to recount all the visits made to Jan Mayen after the Austrian Expedition, they were all for brief periods and made by small parties. In 1921, a party from the University of Cambridge led by Wordie organised an expedition with the object of making the first ascent of Beerenberg and obtaining geological collections, both tasks being admirably accomplished. Wordie gives a very comprehensive account of the history of the island in a lecture to the Royal Geographical Society, and published in the *Geographical Journal*. The party sailed to Jan Mayen with Haggard Ekerold who had the task of setting up the Norwegian Meteorological Station at Jamesonbukta. This station was manned by four men until it was closed down in 1940.

The next expedition of any size to visit Jan Mayen was organised by the Imperial College party in 1938. The expedition resurveyed much of the island, finding the Austrian map to be badly at fault except in the central portion. The Beerenberg was again climbed and other work of the expedition included the first glaciological survey and extensive botanical and geological studies. This stimulated recent glaciological work on the Beerenberg mountain.

The importance of Jan Mayen during the second World War was due to its use as a base for a meteorological station. After the German occupation of Norway in 1940, British naval authorities decided that the meteorological station should be closed. Accordingly, the station at Jamesonbukta was partly burned on the 3rd September and the staff, who had been established by the Germans in July, were taken away. Later in the year British Admiralty received word that a small German scientific expedition was expected to land on Jan Mayen and the 'Fridtjof Nansen' was sent from Iceland to investigate. However, the vessel hit a reef off Eggøya and the crew of 67 only just had time to take to the boats. They occupied one of the remaining huts at Jamesonbukta until relief came a few days later. The German expedition was captured and their vessel destroyed.

During the winter of 1940-41 the Allies decided that the meteorological station should be reopened under Norwegian command. This station was established in the central part of the island in March 1941 and a garrison of 15 men took over in May. German aircraft frequently visited the island but kept well away after they discovered anti-aircraft guns had been mounted. In the summer of 1942 a number of German attacks took place but there were no casualties amongst the garrison, although one enemy plane was shot down. In 1943 the garrison was reinforced and an American direction finding station established. Radiosonde equipment was installed at the meteorological station in 1944. A U-boat landed an automatic weather station on an unaccessible part of the north coast in September of that year. This station was not discovered by the Norwegian patrol until March 1945.

After the war, a new meteorological station was built overlooking Nordlaguna. Nordlaguna itself was thought by Wordie to be a volcanic crater breached by the sea. The lagoon is very much deeper than others around the island but all evidence

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BEERENBERG, 1963

By J. W. Sheard

THIS expedition was organised primarily to continue the glaciological studies carried out by parties from the Imperial College in 1938, 1959 and 1961. Fourteen men took part in the expedition, ten of whom left Leith on the 1st July, in 'Haakon VII', a rescue vessel chartered from the Norwegian Lifeboat Institution. Members of the expedition were:— D. C. Birch (*mountaineer*), J. Bloor (*mountaineer*), P. C. Dibben (*meteorologist*), P. H. Draper (*assistant meteorologist*), F. J. Fitch (*geologist*), R. G. Fitch (*geologist*), P. J. D. Guile (*glaciologist*), C. J. Leaver (*botanist*), H. T. Lovenbury (*glaciologist and surveyor*), J. W. Sheard (*leader and botanist*), R. Stafford (*assistant geologist*), D. Thomas (*mountaineer*), W. N. Whaley (*assistant surveyor*) and A. F. Wilson (*assistant botanist*).

The voyage to Jan Mayen was uneventful and the weather good until we reached the island. Early on 5th July we arose to find ourselves sailing up the coast of Sør Jan in dismal weather, the cloud obscuring everything above the 300 m. high cliffs. We dropped anchor at the Loran station to discover that it was impossible for our stores to be transported overland to Jamesonbukta as had previously been arranged. Owing to the lateness of the season, Sørlaguna was still too high for heavy vehicles to negotiate the track around it. There was no alternative but to attempt a landing at Jamesonbukta. Fortunately we had one of the very few days during the whole of the summer when it was calm enough to land there.

The aims of the expedition were planned in relation to the results of the three previous glaciological parties. The 1938 expedition found that the glaciers of the island were following a world trend of glacial retreat, which on the whole has continued up to the present time. It was with some surprise, therefore, that the 1959 party found that one of the main glaciers had advanced, a trend which was found by the 1961 party to be extended to most of the glaciers. The 1959 results had shown that the advance of Sørbreen was associated with a fast flowing mass of ice near the snout, which had outrun itself by 1961. This year flow measurements were to be extended to cover the whole of the glacier so that it might be possible to detect other such surges. In connection with these glaciological studies, meteorological and botanical work was also being carried out. A geological programme involving two men was also to continue previous studies and collect specimens for paleomagnetic determination.

During the first few days of the expedition, the party worked from Jamesonbukta where a large twelve-man tent was erected to supplement the existing hut which was only intended to sleep four men. The hut was cleaned out, the stores organised and "Sørbreen Low" camp set up on a site used in 1961. This camp was immediately occupied by Sheard and Lovenbury who reconnoitred the glacier and established cairns on the lateral moraines where stake lines were to be drilled across the glacier. At the same time, Dibben and Whaley established the meteorological camp, "Sørbreen High", on the upper end of the west moraine at 700 m. and commenced taking records.

On 10th July, Guile and Birch arrived by air from Oslo. The following day, work on the glacier began in earnest when the first of the stake lines was established at 300 m. This work continued for a week in fairly clear weather but rain and high

winds caused some delay. During this period we worked at all hours so that lines could be inserted as quickly as possible. Much of the work was done at night (the midnight sun lasts until 27th July on Jan Mayen) when the snow was firmer and drilling in ice far easier. For the remainder of the expedition, however, we tried to keep a regular day. Altogether, 6 lines were inserted in the glacier; a total of 26 stakes.

After Birch's arrival, he and Bloor set up a mountaineering base at "Sørbreen High" and successfully reconnoitred the Beerenberg by reaching the crater rim and climbing Haakon VII Topp, in preparation for a descent into the crater. On July 17th, an advanced camp was established on a nunatak at the base of the summit cone by seven members in the course of a day's work on the glacier. During the next five days, the mountaineers traversed the complete crater ridge and entered the crater itself, both feats being done for the first time.

Meanwhile, Lovenbury, Guile and Whaley commenced the surveying of Sørbreen from "Sørbreen Low"; Sheard, Leaver and Wilson started the botanical work on the snout of the glacier and R. G. Fitch and Stafford, working from their camp to the east of Sørbreen made detailed rock collections, corrected the 1961 map and reconnoitred a route to the east coast where they were to work later. Most of this work was curtailed on the 22nd July when a gale-force wind increased in strength all day. The mountaineers radioed to say that they were evacuating their advanced camp in a blizzard and returning to "Sørbreen High". Here, Dibben and Draper had to dig themselves out a number of times but little damage was sustained. "Sørbreen Low" did not fare so well and the camp had to be evacuated at the height of the storm.

This storm heralded unsettled weather for the remainder of the expedition but the various programmes of research continued, although somewhat behind schedule now. This back log of work was only recovered in the last two weeks when great efforts were made to complete the programmes. The two geologists who were now on the east coast had worse weather than the rest of the expedition, and it eventually became necessary to collect all their equipment and rock collections by boat on the morning of our departure after they had been forced to leave them during a blizzard.

Birch, Bloor, Guile and Leaver flew back to Oslo on the 14th August, Thomas having arrived earlier on the same plane. The meteorologists now turned their attention to glaciology, making observations on the snow stratigraphy and taking ice temperatures. The mountain was again climbed in good weather. The surveyors continued to map the snout of Sørbreen while botanists moved round to the comparative luxury of the Old Meteorological Station. 'Haakon VII' rejoined the expedition during the last week bringing F. J. Fitch from Iceland. He, together with Lovenbury, Sheard and Thomas, visited both Sør Jan and Krossbukta in the north collecting specimens, making observations on raised beaches and noting the positions of glacier snouts.

On September 1st, stores were brought down to the Loran base with the help of the Norwegians, and that evening F. J. Fitch presented a silver platter to the base in commemoration of their help at the time of the accident in 1961. The following morning we sailed for home, arriving at Leith in the early hours of the 6th September.

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THE DISCOVERY AND EXPLORATION OF JAN MAYEN . . . Continued from Page 38

suggests that it is merely a bay cut off from the sea by a storm bar, which has been deposited by strong coastal currents. The lagoon was investigated in 1929 with a view to making a harbour out of it by breaching the bar. These investigations were again taken up in 1962.

A Loran navigational base was built on the southeast coast of the island in 1959, and in 1961 the meteorological station was moved to this base. A runway has been constructed at the south end of Sørlaguna and a rough road connects the base with the anchorage at Kvalrossbukta and the old meteorological station at Nordlaguna.

Of the numerous post-war expeditions only the two concerned with Imperial College will be mentioned. The University of London Jan Mayen Expedition, 1959, and the University of London Beerenberg Expedition, 1961 were both concerned with geological and glaciological investigations. Birkbeck College was responsible for the geological work and Imperial College for the glaciological work of both these expeditions. The 1961 expedition was marred by a tragic accident in which five members of the expedition lost their lives when a small boat in which they were travelling overturned.

IMPERIAL COLLEGE EXPEDITIONS

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1938 Jan Mayen Island Expedition — Greenland Sea.

1956 Eastern Iceland Expedition.
Carmargue Expedition — Rhone Delta.
Norway Expedition — Allfonbreen Glacier.
Swiss, Himalayan Training Expedition.

1957 Karakoram Expedition — Led by Eric Shipton.
Ghana Expedition.
Arctic Norway Expedition.

1958 Ghana Expedition.
Norway Expedition — Voss.
Eastern Iceland Expedition.

1959 Apolobamba Andean Expedition — Bolivia.
Azores Expedition — underwater.
Greece Expedition — biological.
British Guiana Expedition.
Eastern Iceland Expedition — geological.
Jan Mayen Island Expedition — Greenland Sea.

1960 St. Kitts Expedition — all woman.
Around the Atlantic Expedition — Africa and the Americas.
Iran Expedition.
Eastern Iceland Expedition.
Central Iceland Expedition.
Cornwall Expedition — underwater.
Spitzbergen Expedition.
Ghana Expedition.
Kashmir Expedition — overland.

1961 Beerenberg Expedition — Jan Mayen.
Oksfjordjökul Expedition — Arctic Norway.
Malta Expedition — underwater.

1962 Hornsund Expedition — Spitzbergen.
Sicily Expedition — underwater.
Southern Ethiopia Expedition.
Nigeria Expedition.

1963 Beerenberg Expedition — Jan Mayen.
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