THE EXPLORING SCIENTIST

H. W. SIMPSON, M.D., Ph.D., M.R.C.Path., F.R.G.S.

Dept. of Pathology, Royal Infirmary, Glasgow

It seems natural to want security and certainly this is much sought after in modern westernised culture: indeed insurance companies foster this obsession to the extent that they will even guarantee you a fine funeral. But this quest carries two curious paradoxes - one is the extraordinary perverse human quality of inventing new insecurities - admittedly often trivial - as fast as the others are eliminated, and the other is the frequent unhappiness of this utopian dream. Exploration in the full sense of the word - scientific research or travel into the unknown - is certainly near the other extreme. Nothing is foregone or secure at the outset, and when humans no longer want to explore they will no longer be human. Indeed insecurity seems deep in the roots of vitality itself and when there is no challenge no response follows.

I go on scientific expeditions because the experience is so utterly satisfying and complete. A combat with the elements. The anticipation of solving biological problems by widening knowledge. The project can almost become an obsessional fetish. Cherry Garard's 'Worst Journey' to solve the secrets of penguin embryology: the religious fervour with which Scott held on to his heavy geological specimens even to death. Anyone on an expedition reviews his reasons for being there. Time and time again. Especially when things go wrong - when cold, wet and hungry or in danger or when putting others into danger. There is plenty of time to think of one's project and improve it.

My medical research is concerned with the relatively unestablished subject of biological rhythms - chronobiology. This field promises an exciting new perspective for human physiology and pathology within the context of time. In effect the chronobiologist believes that in living tissues structure in 'time' is every bit as important as the structure in space. That many vital processes possess intrinsic rhythmicity underlying the classical servo mechanisms and negative feedback controls of Claud Bernardian physiology. The heart beat is a good case in point to illustrate this. The beat originates in the sino-atrial node and indeed this part may be cut out so that the tissue can be seen rhythmically contracting in a dish; of course the heart beats faster in a fright but this is merely a modification of the underlying rhythm and such effects have certain clearly defined limits probably between 40 and 400 beats per minute. The brain, of course, has fast rhythms (cycles per second) as well as a relatively slow sleep rhythm and probably many rhythms in amine

production. The gut has peristalsis, the ovary and pituitary menstruation; but my own interest is particularly directed towards circadian rhythms, e.g. the excretory rhythms of sodium, potassium and 17-OHCS. These are a family which normally keep perfect 24 hour time but under circumstances where there are no clues of the earth's period of rotation (e.g. living in a cave without a clock) the rhythms maintain a period in man almost invariably longer than 24 hours say 24½. These may be out-of-phase with the adopted sleep-awake routine.

What then happens to man at the North Pole? The sun appears above the horizon on 21st March and has no diurnal change of altitude; and if circadian rhythms lose their timing at high latitudes where do they pick up again? If they do lose the 24 hour time do they all and at the same rate; is there internal desynchronisation; could a disorganisation of phases in the CNS amine rhythms be the reason why explorers have a morbid fear of the Arctic night? Was this why Peary's scientist, who went mad on the Polar pack and who was murdered by the Eskimos had such extraordinary behaviour? Why Nansen felt unable to work during the winter on Franz Joseph land? Is this the reason why the Polar Eskimos have a frequent history of hysterical mental conditions known there as pibloctoq. All the Eskimos in the North know about this condition; in fact it is an excuse for any sort of bizarre behaviour. It seems to occur at certain seasons of the year and in a typical case the Eskimo suddenly goes completely berserk, rushing out of his house, throwing his hands in the air, taking his clothes off, jumping in the sea or climbing up icebergs. Could all these peculiar conditions in the Polar regions be something to do with light?

Our quest was to characterise certain rhythms in polar regions while travelling through the seasons. Late Winter, Equinox, Spring. The first stage was to find out if rhythms do lose 24 hour time in these circumstances. Then later we would look for any decrement of mental and physical performance. In the field we would measure body temperature rhythm and collect frequent urine samples in order to follow the circadian excretory rhythms of electrolytes and adrenal steroids.

The expedition was to be small. Two men and a woman. I am a firm believer that three or four is the best size for a field party; by best I mean fastest and least dangerous. With more there is more chance of appendicitis, and the danger of 'splinter' expeditions

because of multiple tents each on its own line of thought to combat the difficulties. With less, the burden of non-consummable equipment (e.g. radio) becomes relatively great. Moreover one always moves at the speed of the slowest man in a large party and somehow, because of numbers, a sense of false security may lull one into risking an accident. All of us had skied across Greenland* All of us were over thirty. Possibly not at the peak in physical power but certainly mentally more adaptable to cope with difficulties.

Our charter twin aircraft droned over North Ellesmere in the twilight. It was 21st February, 1969, two weeks before sunrise. Would Pilot Phipps manage to get us down on the lake? What if there were hard wind carved sastrugi from the Winter storms? The £200,000 plane banked round for landing. A few bumps, the roar of reverse thrust and Weldy Phipps had done it. Our expedition was bundled out of the de Havilland Otter. Skis, sledge, ration boxes, tent. Not much else. It looked

North Pole Expedition 1969

enormous on the sledge - a 12' Nansen. Sixty days of logistic. Weldy was fidgetting to be off as the photographer frantically tried to get some pictures in the faded light. Three seconds at f2, he moaned.

We were glad to see them go. We relayed the loads out of the lake basin and the three of us thankfully crawled into a double ended, two walled sleeping bag. We had been up the night before and were instantly asleep.

In the morning we found we could not move all the 750 lbs. load at once. 250 lbs. each. Capt. Scott reckoned 235 lbs. per man maximum so it was hardly surprising. None of us was particularly muscular. It took two days in the coldest, bluest dawn ever to see the whole load at the edge of land and beginning of the sea, the polar pack.

The edge was an ice cliff some 25' high. Perched on top were some enormous ice boulders - all ready to push over. One could only surmise that long ago an iceberg had dumped them there since now there was no berg high enough. We pushed some boulders over to make a ramp - they moved extraordinarily easily. Below the polar pack was a chaos of ice blocks, gigantic ice rafts, small ice tables and some deep deep soft snow. Weaknesses in this defensive barricade - such as narrow rifts or helpful rafters were few. We turned to our pack frames since back packing was the only recourse. We were glad there was no dog food to carry but I was frightened every time the radio was lifted. It only needed one slip and we would be out of all contact; and we had to maintain contact to stave-off an airborne search and rescue.

In the coastal pack the route was often exciting. It sometimes ran along extraordinary rifts just a few feet wide yet with towering tottering walls 30' above us. Like a medieval street in York or Salisbury. Then a big floe where skis could be slipped on for half a mile. But it was slow.

Though the cold was intense the weather was marvellous. -59°F the thermometer minimised one night. Never above -40°F. We soon found out the significance of the fact that heat loss is proportional to the difference in temperature between inside and out. Our primuses roared in the tent* and would normally have kept us stupefyingly hot but here they were just holding their own. Inside the tent there was so little room that if anyone moved he had to ask the others to move too. Cross-legged positions were best. Myrtle cooked the invariable meat bar stew on the primus while Roger

*We had one Black's mountain tent (7' x 4' floor) built with a double wall.

*See "White Horizons" by Myrtle Simpson, Gollanz, London 1967.

At Arctic Ocean some 5m. North of Ward Hunt Island. Hugh Simpson beside the expedition 'Black's' tent – Roger Tuffl looking out. Photo M.L.S.

wrote up his weather log. I collected the urine samples and after cataloging the volumes I stored 15 ml. aliquots in polyethylene tubes. Sometimes we would get into contorted positions trying to collect these samples but it was always better than doing an 'ob' outside. There the worst thing was to record the volume. If you pick up a pencil at -40°F movement in the fingers is impossible before you finish writing the volume and time.

Now and again we found a 'bonus' route through the pressure. A recent split in the right direction had frozen. Thankfully our sledge was pulled on to it and soon we were laughing and joking about progress. Nothing succeeds like success or fails like failure.

The first glimpses of sun over the Ellesmere hills were like a celestial search light bridging the Universe but it was the 8th of March before we really saw the mist properly - a ball tortured by refraction, a deeper red than ever. Not a trace of warmth "It's always coldest after the sun rises" said Roger. We did not feel like arguing. Cold was very real to us. We could not stay out too long at this time even with nylon fur suits. After four hours one would feel the body core temperature dropping; then hands and feet. It didn't seem to matter how hard one worked it came on just the same. It's the cold air, I thought, you've got to warm it up in

breathing, and if you work hard the excess muscle heat is more than balanced by it. There is a net loss.

During our first few weeks on the ice I frequently wondered how and when the pressure ridges were formed; clearly enormous forces must some time be at work to pile up these millions of tons of ice. To date our nights and days had been silent. Perhaps they come about at a different season, perhaps they occur elsewhere then drift here? One beautiful sunny day the question was answered. We saw a cloud to our left clutching the top of the pack. A chill mist penetrated our clothes. A rumble of thunder, another and another. A continuous roar. We could yet see nothing move. We pulled to the right, away from the nightmare. We pulled harder than ever before but this made only a pathetic increase in speed. Ahead our progress was suddenly barred by a narrow lead 3' across. It was slowly widening! I jumped across. Roger pushed the sledge from behind. The young ice at the edge caved in; but the sledge was over with only a wetting at the back. The rumbling was nearer. Around us the ice was creaking and clinking. Like thousands of car jacks. The noise of the jack, the reacting grunt of the car. Up came the rafters of ice. Occasionally they toppled or snow fell off. Then the noise slowed down and stopped. Somewhat shaken we breathed a sigh of relief.

Roger Tuffl and Myrtle Simpson manhauling over a pressure ridge in Arctic Ocean, March '69
Photo H.S.

Day by day our progress improved. It needed to badly. Sometimes at the start we only made good one mile after triple relays meant walking five It required mental stamina to push on in spite of the fact there were still about 500 to go. March 6th, two weeks after the start, was the first time we moved without a relay. Even without delays our progress was piteously slow. The reason was not the pressure, not the deep soft or open water but the sledge runner friction on old wind packed snow. This seemingly ideal surface pulled like a dead drag. Time and time again the sledge would come to a sastrugi crest and stick in the see-saw position. Just at that moment the friction seemed greater than ever. We would turn around and look furiously at the sledge, wondering what was stopping it - only to find nothing. Only friction which we couldn't see. We lived for the day when the temperature would go up. We knew then the friction would be all right. This rise happens dramatically in the Arctic the first week in April. -40°F all March then suddenly it pops up to zero. I think we'd have committed suicide if we'd known that the moment would never materialise - that we would be cheated in the end. And all this in spite of our 'cofix' shod runners. High molecular weight polyethylene, the latest thing in slide. Later tests showed that cofix is better than tufnol (the usual material) so goodness knows how awful that would have been.

When we weren't exhausted by sledging there was time to enjoy scenery. The sun shining on the huge fairy

snow crystals. Millions of rainbows. Huge icicles. Turquoise blocks. Grotesque shapes. One is never tired of ice and snow. It seems to have infinite capacity to vary. When water freezes in these temperatures the film is first smooth and black; then in a few hours curious flakes seed out on the surface and look like complex plants. A luxuriant spreading follows and the seedlings become joined in rank overgrowth. The beauty is largely gone but it's now safe to step.

Often we used skis. One was hypnotised as the sharp scandinavian upturns cut the snow ahead. Wonderful on breakable crust, life-saving on thin ice. The leads would freeze quickly after they formed - but from the edges. At the middle there was usually a crack and on each side the thinnest ice. Sometimes the crack was a foot or two feet wide. Then one inched out on skis feeling the edges dip as weight was transmitted and seeing a ripple pass along the water in the crack

In the evening we would look for the middle of an old floe to camp. Statistically there seemed to be less chance of a break up of ice: or pressure. I just hated camping on thin ice but sometimes when very tired we were glad to put up the tent anywhere. Paradoxically we had our worst night in what seemed the safest place. The middle of a thick floe. Lying in the sleeping bag, one could imagine in a nightmare section of the whole camp, a human body lying on infinitely thin ice over an infinitely deep ocean. It does not help to hear cracks -

Roger Tuffl and Myrtle Simpson – Manhaul sledging on skis over very thin ice around the edge of the land ice off Ward Hunt Island after the return to land. April 1969

Photo: Hugh Simpson

pistol shots running through the ice past your head. On considering the situation you realise there's no real point in moving since one place is just as dangerous as another. However when shudders occur and build up to a crescendo and more cracks split the question comes under frequent review. Sleep is at best fitful. Shackleton was once able to snatch a man from his doom when a crack opened and a man fell in - inside his sleeping bag.

The pressure ice varied enormously in its form. Sometimes there was a conventional line or wall of ice flagstones precariously perched on top of one another. These were easy to climb across. In other places ice fingers and blocks were strewn around for hundreds of yards and interspersed with deep powder snow. Very exhausting since from every block of ice lay a long finger drift of soft snow. Laboriously we would pull up one side for a few seconds of glory as gravity pulled it down the other. Then zonk! into the trough. Our sledge upswing was too short for these conditions; if we go again it will be with the Peary upswing in the front. In other places the pressure-ice was just chaos. Sometimes we just cut our way through with ice-axes - in those temperatures the great blocks could be shattered with one blow of the axe. In difficulties we usually climbed the nearest pressure ridge to recce. All too often one was disappointed. The ice was random. A good bit here, a bad bit there. Rarely a North-South lead - recently

frozen - would help us. On one such occasion I saw a curious line right through the pack as far as one could see. A gigantic lead. Was this the big lead of Peary? We sledged over to it through randomised pressure. Evidently the ice had broken here before. On the far side an iceberg was ploughing slowly into the pack. Being affected more by the currents because of its size and depth it was possessed with the demoniacal power to carve up or pressure the lesser ice. Huge heaps of rubble maybe fifty feet high were piled around it. Evidently it changed directions now and then. Grinding noises came from the berg with hideous regularity.

We looked at the lead. Various unsafe ice. Also water. We thought we saw a way - a bridge across. We stepped on to the young ice of the lead and pulled the sledge on. So far so good. The ice ahead was thinner but still O.K. On its far side and, separating us from success, was the youngest generation. Myrtle stepped on it. I followed, then Roger with the sledge. "Mind out!" said Roger. The ice was rippling under our weight. We crept back like fairies hardly daring to breathe. We slept the night and there was nothing to the crossing in the morning.

The mileages crept on up. 5, 6, 7, 8 in a day. Our radio scheds were a brutal interruption of our peace and equanimity. The palaver of warming the generator.

copyright

*Land in sight! Ward Hunt Island and the mountains of N. Ellesmere, N.W.T., Canada beyond (Roger Tuffl and Myrtle Simpson).
April 1969*

Photo Hugh Simpson.

Undoing the leads all stiff in the cold. Fixing the aerial. Three hours once the operation took. The Canadian operator said "have you anything important" I was so dumbfounded I just said "No!" So ended our three hours one minute radio sched. We hated the radio and the generator. Great heavy brutes on the sledge. Quite uneatable. Psychologically I was always surprised when the radio worked; never when it didn't. That wretched thing that made success or failure of our expedition. Off land we had to be self sufficient. It was impossible to find us among the pressure. Special radio beacons were the only thing and these we just did not have because the right sort were not obtainable.* We had been forbidden to use distress frequencies - except in SOS situations and rightly so. So if anything happened to the radio we would either have to reach the North Pole station or go back to land before a search ensued.

93 miles out from Ward Hunt Island the generator went up in smoke. A component called the "reactor" that smoothed out voltages. Liquid plastic dripped down. No power. The tranceiver lights made a sickly pale glow. No go. This was it. It always happened that our worst moments came in the best weather. Glorious sunshine. An easy lead ahead. Powdery crystalline snow. We took the reactor off; but what was the use. It had melted. The works manual said "if this part is defective - replace". We had all the recommended spares. This was

not there. I dismantled the electrical end of the generator. Everything looked O.K. The utter hopelessness of the situation. Myrtle wanted to go on; to me a certain massive Arctic search operation. Enormous expense to someone. Risk to searchers. No more explorers' licenses. Roger felt the same. We should have started back immediately. Myrtle suggested we stay a day to think, numbed by the situation. I felt so disheartened I couldn't disagree.

There was, of course, glorious weather to help us on the return. The sledge freed of its useless metal generator moved more easily. The sun now had warmth. We would be cheated that month of easy travel - the glorious pay off to our struggle with sixty days of logistic.

The depression made the return into a drudge. Only difficulties shook us out of gloom. Multiple leads. Shortage of kerosene. Our tracks helped to begin with but the ice road where they ran had frequently been tortured into pressure. Tracks going vertically into the air - like the tracks of a car just over London Bridge after opening - often we lost them at a break and found them yards to right or left. The stronger the sun became, the more beautiful the scenery. Crystals sparkling in the sunlight. Deep virgin snow longing to be defiled by our

**Except with military aircraft.*

skis. A feeling like writing on a fresh sheet of notepaper. I found I could forget about us returning. Forget about the failure to reach the Pole. It was easy to drift into a dream as the skis slid along. As the sledge became lighter detours were less and less necessary; our route was the direct Roman approach. Up slabs, over bridges down on to young crystalline ice. Another camp. Now the sun dried out the canvas. The routine ever simpler as we had so few possessions. I hated the silent uneatable radio so utterly useless without its power; like a car without gas. But we couldn't throw away one thousand dollars.

At last there were only two miles to land. "I think there's mist in the air" said Roger. It was a lovely day. We shivered. It must mean open water. We climbed a berg and scanned the brightness toward land. One could almost see the Ward Hunt Hut. To the East and West were mocking mirages - pulling out the scenery like distorting mirrors. Ahead there was a glint. Little wisps of mist - open water. The longer we looked the more our suspicions were confirmed. There was a complete separation of the coastal pack from the shore - as far as one could see in either direction. This was certainly not our lucky expedition. We had run down supplies so that there was just sufficient for land - we were not prepared for a major hold up. Especially kerosene.

At 84° N.

We sledged to the edge of the open water. We had now been six weeks on the pack. Hardly surprisingly at close quarters the water didn't look any more crossable. Moreover the lead was still active. Widening in fact. Going to the right was the best bet. We found a place where, because of an ice island, the gap was only fifty yards. We camped. No kerosene left so we filled the primus with the generator gas kept in case an aircraft smoke signal was needed. All cooking had to be done outside in case the primus blew up. But the weather was calm and only about zero fahrenheit. The sleeping bag was impregnated with ice. Stiff and lumpy. Daylight showed everywhere inside because of balling up. Better to have synthetic filling than down I thought. To warm

it up we filled the spare primus tank with spirit and using pyjama cord as wick, we all got inside it. Soon the inside was warm and we went to sleep.

Next day the ice was still precarious. Myrtle and I did a prolonged recce. We could have crossed if one had been willing to ski on ice that perforated with one prod of a ski stick. I wasn't. We still had food. We spent a night waiting for it to thicken. Another night and it was better. Several times the surface rippled: but there was no real danger. If there was we soon forgot about it since a large bearded seal popped up and looked at us - with an utterly astonished expression.

At the land shelf ice edge we found a low point. Only a 30' cliff. After climbing up, the cornice was easily knocked off and after building a ramp we were on dry land again.

An uphill pull now on the glacier in brilliant sunshine. Some breakable crust. Goaded on by the thought of some different food in the huts we did not stop. On and on. Past the marks of our day 2 camp. I looked down at the tracks. I imagined our happy feelings at the time and now our despair. We struggled desperately as the slope steepened toward the hut. Anxious to go without delay. Go it in one. Myrtle's patience exhausted first. "Well I'm going to see what's in these huts" she said leaving the sledge. It was April 7th - 45 days after starting. Longer than we took to cross 450 miles of Greenland.

At the hut one day, two days, three days ticked by. No plane came. Occasionally one droned high overhead. Should we try our emergency beacon? It had a speech facility. Was one entitled to use it to avert a search operation - to prevent expenditure of money and risk of life? But one doesn't use 243 Mcs lightly. It is an SOS. We decided to hang on. Rather it was decided that Myrtle and I should ski to Alert radio base, 140 miles along the coast. Just with food, sleeping bag and stove. No sledge or tent for lightness. Roger had a small frostbite ulcer on his foot so clearly he was out.

Myrtle and I left the next midday carrying only 50 lbs. between us. The skis glided easily down from the hut on to the undulating shelf ice. Ward Hunt Island receded behind as we launched out over the end of Disraeli Fjord. On and on. Never a stop. Mist came and went. Slight crust then firmer sastrugi. Murder without skis, I thought, as the skis held on a bending lamina of crust. Fog crystals floated down. Ball bearings on the ground. Great glaciers pushing faster into the shelf leaving curious sheer lines at their edge. No crevasses. On and on. Barely changing scenery. I reached in my pocket for a spangle. Crunch. The sweetness took away the thirst. I looked back. Myrtle just behind. We must make Cape Aldrich to do twenty miles by bed-time. A cape loomed up. The strip of shelf ice narrowed and the sea

came in under the cliff. What luck a fresh frozen lead along the edge! There was an easy ramp off the shelf ice now it was fast flat sea. I dug in the ski sticks and away shot the skis. How effortless. We could easily do twenty miles on this. On the sea I worried about bears. We had no gun. They could be lurking behind floes but fortunately none appeared. Not even a footprint.

Ahead was Cape Aldrich. The sun was lost behind the hills. It was after midnight. I began to feel cold, tired and hungry. We traversed on some sloping snow - the skis wanted to run down. It was difficult holding on. Like shoes with only your toes in.

At last we were there. No tent is unsettling at camp time. You don't know where to go. The sleeping bag looked naked on the ground. I layed out all our 'grounding' meticulously. Rucksacks frames. Polystyrene sheets. It was -30°F and the cold came on us fast. With great care and agony from stiff exhausted limbs we insinuated ourselves into the sack. The slightest heave and the floor would separate and leave a cold spot. I got my sandwich out of my pocket. I bit. Frozen solid and uneatable. We had some chocolate. Somehow now in each others arms we felt safe from bears and were instantly asleep.

Next day a plane picked us up.

OBITUARY

Dr. Aaron Gordon Signy, M.B., B.S., M.R.C.S., L.R.C.P., F.R.C.Path.

Dr. Peter Sperry pays a sincere tribute to Dr. Signy in the Hon. Sec's. Report for 1971, but we all feel the loss of a dynamic enthusiast. Gordon Signy qualified in 1926, at Guy's Hospital and became an early Fellow of the College of Pathologists in 1964. He was Consultant Pathologist at St. Stephen's Hospital, London, for many years, but moved to the Royal Post-Graduate Federation only a short time before his death. He had a keen interest in haematology, and was only too glad to help with advice about anaemia and iron therapy in sportsmen. He was also a keen sportsman throughout his life, and an expert fencer. He is best known to most of us as Team Manager for the British Olympic Fencing Team, and was a fervent advocate of the scientific approach to team fitness both in training and in competition. He became a member of B.A.S.M. in 1964, and one of his last actions was the preparation of a manuscript on fencing injuries to the upper limb, based on a paper he gave at the B.A.S.M.'s symposium on "The Athlete's Arm." He was co-opted on to the Executive Committee of this Association, but his tragic death intervened before he could commence his duties. The B.A.S.M. extends its sincere sympathy to his family.

OBITUARY

Dr. William Stuart Tegner, B.M., B.Ch., F.R.C.P.

Bill Tegner was a founder member of B.A.S.M., and its first Secretary/Treasurer, and played a very big part in the establishment of the Association in its early days, laying down administrative procedures which have been passed on to his successors and still function with an organisation with ten times the number of members that he had.

He qualified in 1932, B.M., B.Ch., Oxon, and trained at the London Hospital, obtaining M.R.C.P. in 1935, and being elected Fellow in 1951. For many years he was Consultant Physician to the Physical Medicine Dept. of the London Hospital, and to Arthur Stanley House, a frequent location of B.A.S.M. meetings thanks to Dr. Tegner's arrangements on our behalf. During the past few years he was Medical Director of the Papworth Village Settlement, where his kindness helped many whose problems were not only just medical. He was a rheumatologist of international repute, and one of the first to issue warnings about the possible hazards of the abuse of steroid therapy. We know that all B.A.S.M. members of long standing will feel the sad loss of our founder-secretary.