

# Ashore and afloat with the National Institute of Oceanography.

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*R.R.S. DISCOVERY II circa 1960. Operational until 1962*

*R.R.S. DISCOVERY circa 1975, in 1991 lengthened by 10 metres, and operational until 2012*

I joined the National Institute of Oceanography NIO Witley in 1954, I was previously at the Admiralty Signal and Radar Establishment ASRE Portsdown.<sup>1</sup> NIO and ASRE scientific staff were

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<sup>1</sup> In 1941 the Admiralty Signals Establishment ASE requisitioned properties in Haslemere, and also King Edward's school in Witley. Temporary buildings were erected in the school grounds, and in 1943 a large permanent building. After the war, the school was returned to KES, but ASE remained in part of the school grounds. In 1948 the word RADAR was added to the title, ASE became ASRE. In 1952 ASRE moved to Portsdown, In 1953 NIO moved to the "1943 building."

members of the Royal Naval Scientific Service. I visited NIO, requested a transfer and joined the Applied Physics department headed by “Tom” Tucker. The department’s main job was to supply instrumental support to oceanographers, a project run by Henry Charnock, studied air/sea interaction on a large reservoir at Staines which served as a miniature ocean (minus the salt!) We developed apparatus for the measurement of wind/water interaction, thermocline movement and seicheing.

Witley railway station with frequent trains to London was a few minutes walk from NIO, staff were expected to attend conferences in London and in-house conferences and talks at NIO, it was an opportunity to learn what going on in other departments, there were many cross-disciplinary interests (upwelling etc.) Junior staff had the privilege of a day off each week to complete their studies.

NIO, founded in 1949, acquired R.R.S. Discovery II, hereafter referred to as DII, she was previously used by “Discovery Investigations” researching the ocean circulation and biology (including whales) of the Southern Ocean. Some scientists from the four long cruises of the 1920’s and 1930’s joined NIO (including James Marr who in 1921 as a scout sailed to the Southern Ocean with Shackleton in the “Quest”) also some scientists who had taken part in the final DII Southern Ocean cruise in 1950/51. I had never been to sea, I listened to these “veterans” talking of icebergs, whales, penguins, visits to remote islands etc. In the southern summer it was almost perpetual daylight, in winter almost perpetual darkness, but work carried on.

The International Geophysical Year IGY was in 1957/58. NIO and the American Woods Hole Oceanographic Institute WHOI decided on a hydrographic survey of the North Atlantic at intervals of 8° of latitude. We left Plymouth in October 1957, DII carried sails, they were rarely used, captain Dalglish ordered the after sail to be set, our speed increased from 9½ to 10 knots, the sail also dampened the ship’s roll, (DII was notorious for its roll.) After a visit to Tenerife we sailed to the eastern end of 24°N for the survey (of the vertical structure of salinity, temperature, oxygen, and certain chemicals). Bottles clamped to a wire were lowered by winch to depths of up to 5000metres, the bottles had their end caps open and thermometers fixed on their outside. With the wire fully out a “messenger” (a brass weight), was slid down the wire and on striking the first bottle initiated three events, the closure of the end caps, reversing the thermometers, and releasing another messenger to “fire” the next bottle. Reversing the thermometer trapped the amount of mercury appropriate to the depth of the bottle. In 5000metres of depth we might take 36 samples in batches of twelve taking up to 5hours. On recovery of the wire and the bottles the thermometers were read and samples of the water were taken, this method of collecting samples and measuring temperature hadn’t changed for 80years, but in the 1950’s salinity measurement by titration was replaced by salinometers which measure the electrical conductivity of the water sample, we carried two, one designed by NIO, the other by WHOI. While steaming some analysed the samples and others repaired and/or prepared for the next station typically a degree of longitude away. Work went on day and night weather permitting; which it didn’t always, on this occasion we had a 48hour delay due to heavy swell in the Sargasso Sea, I was amused by a resulting piece of minor bureaucracy, all time was entered in the logbooks, either to scientific work or passage, so the principal scientist and the chief engineer wrangled over who was to absorb the lost time and so apparently diminish his efficiency.

We finished our work and made port in Nassau, Bahamas. Our social activities included an invitation to a garden party at the Governor’s residence (we still had our empire). We mingled with the other guests, drank cocktails and nibbled various Caribbean delicacies, a police band played, mainly excerpts from Gilbert and Sullivan. “God Save the Queen” signalled the end of the party, we stood to

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I joined ASE Haslemere in 1944, there was a regular ASE shuttle “the ferry,” I occasionally took the ferry to visit the “1943 building” in Witley. When I joined NIO 10years later in the same building, I immediately “felt at home”

attention and left. The police challenged DII to a football match, after three weeks at sea, running round a football pitch for 90 minutes was quite an effort, at half-time they were only one goal up, the final score, Nassau Police 10, Discovery II nil.

Our next port was Woods Hole, the northerly flowing Florida current aided us. We were greeted by a large crowd, this in spite of the fact that it was the third visit of DII that year due to IGY activities. We had social invitations and visited the laboratories, and admired the New England fall. WHOI also provided DII with some scientific personnel for the IGY cruises, it was of high quality, Val Worthington who had joined in Plymouth left, Henry Stommel and Fritz Fuglister joined for the survey at 32°N. WHOI had already completed some “stations” on the western end of this latitude, in calm seas we completed the other stations and sailed to Gibraltar for refuelling, we also did some shopping and then sailed for Plymouth, and home for Christmas

The DII cabins --The captain, principal scientist and radio officer were on the wardroom deck. Below on the main deck were the laboratories (biological, physical and hydrographic,) the galley, bo’sun’s store, net man’s store, etc. On the deck below were cabins with portholes, on the deck below that there were cabins for the crew, junior officers and scientists, they had no portholes, each had a skylight, but only a feeble light filtered into the cabins even at midday, it was often two to a cabin, imagine the 18 month Southern Ocean cruises. To compensate for the dismal cabins, there was a magnificent wardroom, the best approach was from the main deck and mount the wide mahogany staircase, on each side there was an impressive balustrade, the wardroom was mahogany panelled, there was an ancient leather bound edition of Encyclopedia Britannica, useful for settling arguments about facts. There were two long tables, on each a fiddle, in rough weather they helped one to eat without too much mess, and were only removed in very calm weather.

Our officers were members of the Royal Fleet Auxiliary Service, who normally served in supply ships of the Royal Navy, but were in fact “Merchant Navy.” The “British Field Post Office” BFPO forwards the mail of military units “on the move.” We were not military but had this privilege (and Discovery later), wherever we were, the address was, “RRS Discovery II BFPO Ships,” an inland postage stamp was sufficient. We lost this facility in the 1970’s and were obliged to provide family and friends with the addresses and dates of every port agent on our cruise. The last cruise of DII was in 1962, I never went to the Southern Ocean in DII, and knew her only in her last years, but it was sad to think of R.R.S. Discovery II being towed to a breakers yard.

Our new ship R.R.S. Discovery was built in Aberdeen, she had air conditioning, larger cabins (as in DII some were double, but even those below had portholes), more laboratory space and a space for use as a library or cinema, also a bar which had a tiled fire place with an imitation coal fire, in the Indian Ocean we sat round this glowing “coal fire”, there was no on/off switch. Ladies could now take part in cruises, on earlier cruises some toilets and showers were reserved for them, and when ladies entered the dining room some, particularly officers, stood to attention, this didn’t last long

Discovery’s shakedown cruise was in January 1963. Following a publicity visit to Tower Pier in the Thames, we left for seas north of Tenerife, but a steward was ill. Most of our crew were from Plymouth, the home port of Discovery, it was decided to call there, the steward was put ashore in the motor boat, but as the boat was being recovered it fell off the davits, it was retrieved and returned to us. We remained at anchor in the Sound and went through the lock gates in the morning, the davit problems were serious, we were obliged to sail to Liverpool for repairs, finally we sailed south. On our arrival at our “worksites” we deployed various apparatus but had problems with all the winches. The hydrographic winch jammed irreparably, the midships winch relied on gravity to pay out the wire, but friction in the system was too great. The biological winch worked but the wire was heavily

greased, messengers sent down the wire accumulated grease and stopped in mid-flight, we held pieces of aluminium against the wire when paying out, and cleared the grease. The trawl winch had critical problems, the flanges of the winch drum were inadequate and splayed out when hauling in. The ship's engineers did all that they could to solve the problem, but without success. We returned to Plymouth and the winch problems (and others) were solved.

In 1963 and 1964 Discovery took part in the International Indian Ocean Expedition IIOE, for two periods of about 7 months, taking part in physical, biological and geophysical research. Some personnel were on board for 7 months, others for 2 or 3 months, we could now fly to and from the ship for certain periods of the cruise. In 1967 on a Red Sea cruise NIO and Cambridge geophysicists made seismic refraction measurements using explosives as a sound source. Radio transmission back to the ship from the sonar buoys (listening to the sound from the explosion) was difficult during the day, we were obliged to work at night. I have two particular memories, one was that as the explosive (the shot) was fired, a beautiful wave of light spread out to about 100 metres diameter as some near surface animals emitted light in response to the shock wave, in about a second the light ceased. The other is of being woken by the explosion, it was frightening, especially in cabins down below, the ship seemed to shudder, one tried to get back to sleep knowing that it would happen again in half an hour. In 1978 I was in RRS Shackleton for the Joint Air-Sea Interaction expedition. In Glasgow we embarked a Romanian student, two Australian scientists "missed the boat" At sea the Romanian transferred to Discovery (which was returning earlier) to go to a wedding. The two Australians came out in a small boat from a Scottish isle and joined us. On return to Glasgow captain Selby-Smith had to explain to an irate immigration officer how he had lost a Romanian and gained two Australians.

Cruises were biological, physical, or geological/geophysical, or multi-disciplinary. On biological cruises there were two scientific watches, a day 0800-2000 and night 2000-0800hrs. This fitted in with the daily migration of many animals, upwards at dusk and downwards at dawn, it was necessary to do a series of day trawls at specific depths and then to repeat the work at night, (in calm seas it is fascinating to see this migration of zooplankton clearly detectable on the echo sounder, slowly rising at dusk to near the surface, and descending at dawn to 200-300 metres). Physical oceanographers had a "10-7-7" system changing at 0800, 1800, and 0100hrs, the logic of this was that everyone got an early or late breakfast and dinner, those off watch at lunch had the choice of food or sleep. On multi-disciplinary cruises all co-operated and the watch-keeping was adapted to the activity in progress.

The watch keeping didn't leave much spare time except when work stopped due to bad weather or we were on passage to a new working area, or returning to port. We played various games, liar dice, monopoly, bridge, scrabble, and "kriegspiel" introduced to us by the Americans, required 3 chessboards, 2 players and a referee. The two players sitting back to back with their own boards knew their own moves but not their opponents. The referee with the third board recorded the moves, announced whether a move was legal, whether a piece was taken but not what it was, it required fine intuition but it was not a game for chess purists! The officers were keen on Ludo, known as "Uckers" in naval circles. We had keep fit classes, a library, a bar, an occasional cinema, and sing-songs, particularly on biological cruises, and especially when sailing home at the end of a cruise. All joined in, I recall in particular Bob Aldred (voice and banjo), Julian Badcock (voice and guitar) and Peter Foxton's solo rendering of "My brother Sylveste".

Research ships are not usually high speed and stop for measurements, so one sees so much life at or near the surface, whales, dolphins, turtles, flying fish, (sometimes found on the deck in the morning,) the strange moonfish, motionless with only its large fin protruding above the surface, in the Red Sea giant manta rays leaping from the sea, remaining airborne a few seconds before crashing back under the surface. We sometimes steamed for hours through swarms of jelly fish, salps, and saphirinas, (a

copepod whose flashing resembles a sapphire). When hove to “on station” at night with lights over the side, squid and other animals such as sharks were attracted by the lights. Bird watching was another pastime, before becoming a sea-goer I thought that birds were never far from land except during migration, it was a pleasant surprise to see in mid-ocean storm petrels, shearwaters and skuas. At night, some, confused by the ship’s lights fly on-board and flop around the deck, we put them in cardboard boxes and released them at dawn.

After 2 or 3 months at sea one learnt more about the character of others on-board better than after years working with them at NIO. I thought about my family daily but never telephoned them, all communication was via the radio officer. There was no TV, no internet, no newspapers, the ship was a world of its own, some officers had short-wave radios to listen to another world, on some cruises we had a “ship’s daily newspaper” (an A4 sheet). It was normally 3 to 4 weeks between ports, on arrival we eagerly awaited the distribution of letters from home, and posted ours. If there was no equipment to repair or results to be worked up shore visits were possible, often well off the normal tourist circuits. It could be very relaxing but most on board had the attitude, “never sorry to arrive in port, never sorry to leave.” Some of the older members of the crew never went ashore even when we were in port for 2 or 3 days.

In 1906 Albert 1<sup>er</sup> founded the Institut Océanographique in Monaco, he also built an institute in Paris with laboratories and an attractive conference hall, one objective was to present a series of talks to the public. In the 1960’s Professor Maurice Fontaine (a marine biologist) organised the talks, Dr. Jack Carruthers (a colourful NIO personality) invited him to NIO, they visited the laboratories, I mentioned some of Discovery’s work during the IIOE. To my surprise he invited me to Paris to give a talk on the subject, I spoke to our director, who said, “Do it! We should encourage more people to give talks in other languages.” I got a lot of advice and help, the NIO photographer Arnold Madgwick provided slides, Peter David, head of the biology department and a photographer of marine animals, provided thirty large format slides with a list of the name and size of each animal, and the depth at which it is normally found, I projected these at the end of my talk.

Professor Fontaine invited my wife and me for dinner the evening before my talk. I thought it would be just the four of us. We were greeted by the butler and served drinks by the maid, three other couples were invited, and professor Koji Hidaka from Tokyo who was in Paris for a conference. The butler opened the dining room doors and announced “Madame est servie” I was seated next to professor Hidaka and our conversation included reversing thermometers. My talk the next evening was at 21.00. I was honoured by the presence of professors Henry Charnock, Koji Hidaka, Paul Tchernia, Henri Lacombe, Maurice Fontaine and an audience of about 60. Each year the Monaco Institute presents a medal to a distinguished oceanographer. After my talk professor Fontaine presented the (very large) medal to professor Hidaka, it was celebrated with champagne, two photographers from the Japanese embassy were present. Professor Hidaka stood by me saying “I must have a photograph with Professor Moorey.” (I was never a professor.) Oh happy days, how fortunate we were to have been part of NIO.

In 1960 CSIRO of Australia designed a salinometer capable of measuring temperature and salinity to a depth of 100metres operating from a small boat. NIO built twenty of these for sale or hire. Dr Roberto Frassetto<sup>2</sup> an Italian scientist (and a lifelong friend of the NIO) studying sea level changes in Venice requested to hire one, I joined him and his colleagues in July 1969. By day Venice is a busy port, so at 2100hrs we boarded a fishing boat manned by two fishermen and made measurements in

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<sup>2</sup> Roberto had an interesting career in the Italian Navy, attaching limpet mines to British warships in Malta

the lagoon. At 0200hrs we had a meal of mussels, spaghetti and parmesan, prepared by the fishermen, and a local wine, we then went back to work until 0600hrs.

In the 1960's new instruments were possible mainly due to the development of the transistor, the CTD which measures Conductivity (salinity), Temperature and Depth, and gives continuous measurements from the surface to the depth that it is lowered, this is relayed to the ship while the CTD is deployed. (Bottles and thermometers attached to a wire were still used but the measurements are known only after all the equipment is back on-board, and the thermometers read and the water samples analysed) Trawl nets could now be opened and closed at specific depths by acoustic command. Buoyant instruments could be submerged for long periods and recovered from their anchors by means of an acoustic release. Occasionally premature release caused equipment to float to the surface, these were often recovered by French fishermen. Reg. Mitchell our transport officer and I would go to Brittany to collect them. This development of instruments was the result of enthusiastic co-operation between scientists and the engineering department.

The development of so much instrumentation affected the logistics of cruise preparation. In the 1950's a small lorry was adequate, now we were obliged to hire articulated lorries. The days prior to sailing became hectic, it was necessary to work extra hours, there was less time with the family. (Families adapted to our absence, my wife went with our son to her family in France, when it fitted in with school holidays.) At the ship the heavy items were loaded by the ship's cranes operated by the crew, but most of the manhandling was by the scientists. A Chinese scientist sailing with us, struggled with a package and said, "In China coolies do this work" In the 1950's, at the end of a cruise the principal scientist went ashore to telephone NIO, our lorry arrived the next day, we loaded the lorry and went home by train, usually the following day. In the 1960's NIO was informed by radio of the estimated time of arrival, a minibus and lorries would be on the quay, we loaded the lorries and went home by minibus.

At home one caught up with family news and world news, one was sometimes embarrassed when a conversation turned to a recent dramatic event in the world of which one was completely ignorant. At NIO one adapted from an 84hr to a 40hr week, and also recommenced some of the social and sporting activities, croquet, football, boules, volleyball in the gymnasium of our neighbours King Edward's school, an annual cross-country race, a lunchtime film club and occasionally an evening feature film, and a lunchtime Christmas pantomime.

In the 1960's all department expanded, Jim Crease created the computer department. It was a privilege to belong to such a dynamic organisation, our founding director was Dr George Deacon (later Sir George Deacon) a world renowned scientist who had taken part in Southern Ocean cruises in the 1920's and 30's. He would come round the laboratories on his own or with visitors, ask how a project was progressing, listen carefully to the reply, and then often say, "It seems complicated to me," (perhaps my explanation was complicated!), as he walked away he would sometimes turn back and say "Don't work too hard". His office was near the canteen and the canteen ladies passed his office on their way home, if it was raining heavily he would call out, "wait a moment" and take them to the railway station in his car. In 1971 he retired as director but continued to work at NIO.

Henry Charnock was at NIO before moving to Imperial College, then at a NATO research group at La Spezia, then at Southampton University, he became director of NIO in 1971. A world respected scientist, with the art of easy communication with all members of the staff and a quiet sense of humour. The enthusiasm of earlier years was still there, but outside influences were changing NIO, it was not an easy time to be the director. In 1973 NIO changed its name to the Institute of Oceanographic Sciences, the organization was now different but oceanography continued. In 1979

RRS Discovery did her first Southern Ocean cruise, Sir George Deacon taking part 42 years after he was in the Southern Ocean as principal scientist in RRS Discovery II from 1935 to 1937.

At 17½ years I joined the Royal Navy to become a sailor and see the world, I never saw a ship. I was sent by the navy to the RAF and trained as an air mechanic (electrical.) I served 2years 9months in the UK on naval air stations maintaining seafires, the folding wing navy version of the RAF spitfire. I finally got to sea after joining NIO.