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(SOOR)

INTERNATIONAL INDIAN OCEAN EXPEDITION
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Cables
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T I D E G A U G E S

Running Notes and Comments on Facilities and Personnel Arising from
R. G. Snider's Trip 13 November to 16 December 1960 to The U.K., Pakistan, India
and the East Coast of Africa Including Outlying Islands.

LONDON

Having made available Mr. L. P. Disney's memorandum on a tide gauge network for the Expedition to the British Admiralty's Hydrographic Office during a visit to the U.K. in October, I had an opportunity to discuss certain aspects of the tide gauge program with Commander D. L. Gordon, R.N. the tide gauge expert in Admiralty Hydro and with Commander F. W. Hunt, M.B.E., R.N. who has been active in the U.K. programming of Admiralty's Hydrographic vessels' participation in the Expedition.

From information at hand CDR. Gordon indicated that there had been an IGY tide gauge at Old Grand Port, Mauritius. The question was raised as to whether this would be in operation. Gordon had also written to the Chief Ports Manager in Mombasa, Kenya who is responsible for all harbors in Kenya and Tanganyika about tide gauge installations. In Nairobi (q.v.) I found this was a Mr. Earley who is Port Director for Kenya and Tanganyika and reports to the Railways and Harbors Administration of the East African High Commission. He was represented in the meeting in Nairobi by Mr. J. M. Fogarty. Mr. Earley was described by Miss Torrance, Economic Advisor in the Office of the U. S. Consul General in Nairobi as being very able and cooperative. Mr. Earley's address is - Mercantile House, Mombasa, Kenya.

Gordon's purpose in writing was to ask for a tide gauge in Mombasa, Dar es Salaam and in Mikindani or Lindi since Dr. G. E. R. Deacon had wanted a SW-NE line of tide gauges from Mikindani to the Seychelles to Addu Atoll in the Maldives. An alternative line would be Mombasa (Kenya), Mogadishu (Somali) and Masirah (Oman). U. K. Hydro does not want to get involved in tide gauges in Socotra because of staff shortages.

In Madagascar Gordon wanted one in the southeast and something between the southeast corner of Madagascar and Tamatave, and any others possible in addition to the continuation of IGY installations.

In Mauritius (q.v.) and dependencies, U.K. Hydro would like to set up a tide gauge on either Rodriques or Diego Garcia. According to their ship scheduling it would be easier to do this on Rodriques and my subsequent talks in Mauritius indicated that there would be more likelihood of permanent support of various observational programs on Rodriques. The question was raised about who would read tide gauges on any of these islands and what the weather conditions would be. It was also suggested that if U.K. Hydro made the installation on Rodriques that some vessel passing Diego Garcia early in the Expedition might make the tide gauge installation there.

CDR. Gordon also proposed a year's observation of tidal changes at Port Victoria on Mahé in the Seychelles and at least a month's observation at Farquhar Islands in the South Seychelles at about 10° S and NNE of Diego Suarez, Madagascar. He also expressed interest in an installation at Agalega which is a Mauritius Dependency. Subsequent conversations in Mauritius (q.v.) suggested the chances of making such an installation and who might be contacted to maintain the equipment and collect the information. It was suggested that ships visiting the area early in the Expedition assist in selecting tide gauge sites on islands and also in the installation of such gauges.

Comments on the U.K. National Program (q.v.) will describe the schedule of Admiralty Hydro's two vessels HMS DALRYMPLE and HMS OWEN both of which will operate in the Indian Ocean in '61 and which may also in '62 mount a very substantial program for the Expedition.

KARACHI

A paper delivered during the Pan Indian Ocean Science Association meeting Nov. '60 suggested that bench marks in East Pakistan and possibly in other parts of the Indian Ocean might not be standardized and as a consequence might result in misleading mean sea level and tidal extremes information..

The Survey of Pakistan establishes, maintains and observes tide gauges of which there are several in both the Arabian Sea and the Bay of Bengal. They in cooperation with the Pakistan Navy will set up, maintain and observe tide gauges as required by the Expedition's program. Details in regard to their locations will be forthcoming but there is one to the west of Karachi and one in Karachi. In East Pakistan there is one in Chittagong and at least one to the west of Chittagong.

Commander S. R. Islam, P.N., Hydrographer of the Pakistan Navy and Convenor of the Pakistan National Committee (Napier Barracks, Naval Headquarters, Karachi, Pakistan) agreed to comment on the proposed tide gauge network for the Expedition as it applied to Pakistan. His comments are expected within the next few weeks.

DELHI

Only general comments were made about the proposed tide gauge network at the meeting of the Indian National Committee which I attended on 23 November. However, a copy of Mr. Disney's memorandum including the proposed network had been forwarded to Mr. Chugh of the Survey of India and he is responsible for tidal measurements. It is expected that he will respond in the near future.

NAIROBI, Kenya

A meeting on 29 November was chaired by Lt. Col. S. P. Fearon, Administrative Secretary of the East African Council for Agriculture, Animal Husbandry and Fisheries Research acting for Mr. E. B. David, Administrator of the East African High Commission whom I had seen on 25 November. Mr. J. M. Fogarty of Railways and Harbors Administration of the East African High Commission speaking for Mr. Earley, Port Director for Kenya and Tanganyika said permanent tide gauges were maintained by his agency at Mtwara, at Dar es Salaam and at Mombasa.

For making arrangements for tidal observations in the Seychelles (and this would probably include Farquhar since this is under the Seychelles' government), communications should be addressed to the Port Officer, Mahé, Seychelles Islands, Indian Ocean. Contacts, by name, of plantation managers and retired individuals living in the Seychelles who might be responsible for the tidal observations should be obtained from the Colonial Secretary, Mahé. Mr. Fogarty expressed a desire to know in what form to send tide gauge information from the installation. I agreed to call this to the attention of Dr. Rossiter of the Permanent Mean Sea Level Commission at The Observatory, Birkenhead, England. My impression was that there would be full cooperation from the East African territories in the tide gauge program.

TANANARIVE, Malagasy Republic (Madagascar)

I talked to Captain Lionnel in charge of the Department of Lighthouses and Harbors in the Ministry of Public Works. He stated that there was one tide gauge operating continuously at Tamatave, the major port on the east coast of Madagascar and there is one installed at Fort Dauphin on the SE corner of Madagascar which was currently inoperative due to a failure of a drum gear which is on order. Both of these are 24 hour systems.

He indicated that on Ile Juan de Nova which is under the administration of the Outre-Mer Department of France and is in the Mozambique Channel WSW of Cape St. Andre, it might be possible to install a tide gauge if desirable although the existing pier is out of water at low tide. The island is a copra and guano source with a colony of about one hundred people. Two ships a month visit the island which from an economic point of view, is controlled by the Rogers & Company in Port Louis, Mauritius of which Mr. Hector Paturoe is the manager. Within this organization M. Amedia Maingard controls the M/V MAURITIUS which services Juan de Nova and M. Maingard represents Cal Tex, Air France and various shipping interests at Port Louis. M. Giraud is a director of the company and has an office in Tananrive. There are three Mauritians on Juan de Nova who could manage a tide gauge.

Tromelin (see meteorology notes) has no tide gauge. Mayotte in the SE part of the Comoros Islands is under French jurisdiction but is serviced by a beacon and buoy tender from Diego Suarez. A tide gauge could be installed there. French Navy would handle this and arrangements would have to be made through Paris.

Bassas-da-India, a coral atoll 60 miles NW of Ile Europa, could possibly serve as observation center and an observation buoy could be installed in the atoll. The reef is about 3 meters high.

At Tuléar on the SW coast of Madagascar there is a tide gauge now installed in good condition which can be considered as part of the reporting system for Madagascar. The existing tide gauge installations of Madagascar are as follows:

Brille electric clock installed Diego Suarez, Majunga and Tuléar. 24 hour Richard mechanisms at Tamatave and Fort Dauphin. The installation at Majunga is not operating well at the present time and has a 4 meter scale and needs a 5 meter scale because of the tidal range. On the east coast of Madagascar the range between high and low water is about half a meter and on the SW the tidal range is about 3 1/2 meters.

Additional note on Ile Juan de Nova - there is an airport with a capacity to handle planes up to and including a DC-3 (Dakota). There are also quarters for ten persons on the island and there is a good anchorage 1 1/2 miles north of the island and a radio transmitter. Arrangements could be made for handling a small scientific party if desired. Mr. Hector P. Paturau (Consul de France) address is - St. Pierre, Mauritius, telephone - Moka 212, cables - HECPA.

PORT LOUIS, Mauritius

Tide gauges come under the direction of the Harbour Master (LCDR. A. G. Booker) in the Ministry of Industry and Commerce and External Communications. Mr. G. Bunwaree, Principal Assistant Secretary of the Ministry of Industry and Commerce and External Communications is the individual agreed upon by me and the Colonial Secretary - the Honorable T. D. Vickers, C.M.G. as the single official contact for arrangements about the Expedition.

LCDR, Booker reported that the tide gauge which was set up at Grand Port was damaged during the cyclone in March 1960 and that it is now being stored by the Harbor and Quay Department. It could be set up again if required. The tide gauge at Diego Garcia which was used during the IGY is reported by him to be still operating. Booker said he had been asked to keep it in operation by the Lamont Geological Observatory of Columbia University which had supplied the equipment.

On Agalega a tide gauge could be installed either near the meteorological station at one end of the island or near the oil company at the other end of the island. There is no sheltered water at Agalega but there is a fair anchorage. As indicated in the notes on meteorology, there is at least a possibility that the coconut plantations on both Agalega and Diego Garcia may be closed down. This will seriously effect the logistics of each of these islands since it is the oil companies' ship which supports the existing meteorological stations and the existing or possible tide gauge operations. The two companies are Diego, Ltd. and Agalega, Ltd. with headquarters in Port Louis. M. Joseph Lamusse is the Director of both companies CAPT. Raoul Lanier is at present the manager at Diego Garcia and M. Philippe Talbot is the manager at Agalega. Another island under the control of Diego Ltd. is Peros Banhos where there is a coconut plantation and the manager of which is M. Robert Talbot. Peros Banhos is 120 miles north of Diego Garcia and the harbor or anchorage can handle any draft ship. A third island under Diego, Ltd. is Salomons also in the Chagos Islands where there is only 2 1/2 fathams of water. M. Serge Guillemain is the plantation manager.

Rodrigues has a permanent population and a tide gauge could be set up there. The Harbors Department did the installation of a tide gauge during the IGY and they could undertake the installation of one if the equipment was available for the Indian Ocean Expedition. Personnel could be found through CDR. Booker to operate the tide gauge. Booker might also make an installation at Farquhar which although it is in the Seychelles gets some of its logistic support from Mauritius.

LOURENCO MARQUES, Mozambique

Tide gauge installation, maintenance and operation in Mozambique is under the direct control of the Hydrograph Brigade of Mozambique. The Chief of this organization - Missao Hidrografica de Mocambique - is COM. Barahona Fernandes who is also the commanding Officer of the Portuguese Hydrographic vessel "ALMIRANTE LACERDA". This unit reports directly on technical matters to Lisbon and is under the general military control of the Naval Commandant of Mozambique who is also Chief of the Departamento de Servicos Marinha - Con Admiral Moriera Rato.

The Hydrographic vessel has taken about a dozen 29 day tide gauge stations at various places along the Mozambique coast and there are four stations where there is a year or more of tidal observations with permanent equipment. These latter are at Lourenco Marques. Beira, Mozambique Island and at one other point between these. I received every possible informal indication that these permanent stations would participate in the tide gauge network and there seems to be a high likelihood that Portugal will be participating in the Expedition (see note in memo on National Participation).

CAPE TOWN, Union of South Africa

A discussion with CDR. J. N. Mallory, S.A.N. the Hydrographer of South Africa revealed that the tide gauge at Port Elizabeth has been in continuous operation since 1954. The tide gauge at East London has been in continuous operation since 1936. The gauge at Durban since 1948. They will analyse the records from these gauges for mean sea level computation from January '62 for at least a full year. There are no suitable sites for other tide gauge stations between Durban and Port Elizabeth. However, tide gauges at Mossel Bay and Kuysma will also be in operation during '62 and the records will be analysed.

SOMALIA

Although I made no direct contact with Somalia, I did talk briefly in Cape Town with Professor Trotti of the University of Genoa who is Visiting Professor at the University of Cape Town. He indicated that Somalia has a very shallow water coastline and few if any harbors. He said that ships had to lie out between one and three miles and he doubted whether there would be many suitable places for tide gauge installations. In Nairobi I had found that the Head of the U. S. Operations Mission (USOM) to the Republic of Somalia is Mr. Will Muller and that there is a Fisheries Advisor attached to this Mission and located at Mogadishu whose name is William Napier.

RGS:jas

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