

BY THE OLD HYDROGRAPHER

As it Was

I was in command of the British surveying ship HMS Challenger in 1951 during a world voyage, with geophysicists Tom Gaskell and John Swallow onboard, to measure by seismic methods the thickness of the various sediments on the floor of the three great oceans. (See *As It Was*™, Hydro international Vol. 2 No. 2 1998). Wishing to examine the seabed structure of a deep region we entered the area of the Marianas Trench where the famous Challenger Expedition of 1872-76 had obtained their deepest sounding of 4,510 fathoms. We were to find depths here greater than any yet discovered which led to investigations by other maritime institutions showing that the Challenger Deep is almost certainly the greatest depth in the world's oceans.

Above the Marianas Trench John Swallow used his seismic equipment as a reflection sounding machine to measure the time of the passage of a sound signal to and from the ocean floor. He recorded increasingly deep soundings until 5,663 fathoms was found. This was about 1,000 fathoms beyond the range of our echo sounder and steam sounding machine at that time. However, using the taut wire distance measuring equipment with 140 pounds of scrap iron attached to the end of the wire a sounding of 5,899 fathoms was thus measured – a new depth record for the world's oceans.

During the 19th century Challenger voyage the U.S.S. Tuscarora was in the North Pacific where she recorded a depth of 4,655 fathoms in the Kuril Trench north east of Japan using wire from a steam sounding winch for the first time.

The first ship to sound at greater depths than 5,000 fathoms was the British HMS Penguin in 1895. The Captain was Andrew Balfour who had been a sub-lieutenant on the Challenger Expedition. He took two soundings with wire from a steam operated sounding machine in the Kermadec Trench, the deeper being 5,155 fathoms from which he was able to retrieve a sediment sample with the Baillie rod which released its weights on reaching the seabed. (Hydro international *As It Was*™ Vol. 3 No.5 1999).

The German ship Planet shifted the scene of greatest depth again to the northern hemisphere - in the Philippine Trench close eastward of the islands. Here some years later the Dutch vessel Willebord Snellius subsequently found 5,539 fathoms using early audio-frequency methods. The U.S.S. Ramapo moved the scene to the Japan Trench with 5,673 fathoms, using audio-frequency methods, but the German ship Emden returning to the Philippine Trench found a few more fathoms to make it 5,686.

This was the state of great depth sounding during World War II; but at the close of the Pacific War the United States took the lead again in this friendly rivalry. Dr Hess, a university professor, had studied the ocean floor for many years and had produced the best bathymetric chart of the North Pacific available before the War. Joining the U.S. Navy during the War, he eventually commanded a large fleet oiler U.S.S. Cape Johnson. He had no difficulty in persuading his crew of Reservists that it was normal for the Navy to carry out routine oceanographic observations as a vessel proceeded on her normal duties. So the ship was able to add much useful knowledge of the ocean floor and with her echo-sounder a depth of 5,740 fathoms known as the *Cape Johnson Deep*™ was found in the Philippine Trench. From here the Danish research vessel Galathea later dredged forms of life including small anemones and some living bacteria.

We in Challenger were now determined to make a further survey of Challenger Deep and to obtain a sediment sample. During a visit to New Zealand we received assistance from technicians in the naval dockyard at Devonport who managed to boost our echo sounder to search greater depths, and we received extra wire for the steam sounding machine.

Back at the Marianas Trench we were no longer restricted to spot soundings. Wearing headphones and watching the stylus on the echo sounder we could hear the small answering signals returning from the trench in 14 seconds timed by a hand-held stop watch. Sounding lines were run at right angles to the axis of the trench which showed a considerable area in excess of 5,900 fathoms, with a deepest sounding of 5,960 fathoms (10,900 metres) in position 11°19'N 142°15'E fixed by a series of star sights and one set of Loran A position lines.

After three attempts and many hours a sample of *red clay*™, the sediment of the great depths, was obtained in a Baillie rod lowered from the steam sounding winch. The sample now rests, with countless others, at the British Museum of Natural History in London.

In January 1960 Jacques Piccard and Lieutenant Don Walsh of the U.S. Navy descended in the bathyscaphe Trieste to the floor of Challenger Deep, recording 10,900 metres on their depth gauge.

Later Dr Robert L. Fisher of Scripps Institute of Oceanography visited the vicinity of Challenger Deep on a number of occasions. In 1962 with the Proa Expedition in M.V. Spencer F. Baird, using advanced precision depth recorders with stable electrical frequency sources by then available, Fisher recorded a greatest depth of 10,915 metres.

In 1984 the Japanese Hydrographer reported a greatest depth of 10,924 metres recorded by his survey vessel Takuyo using a multibeam echo sounder during a run of about 500 miles in the vicinity of Challenger Deep.

- “Seven Miles Down”™ by Jacques Piccard and Robert S. Dietz. Longmans - London (1962)
- “No Day Too Long”™ by Rear Admiral Steve Ritchie. Pentland Press. Durham (1992 & 1994)

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