Notes and miscellanea

Medical aspects of trawler safety

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Because of the heavy loss of life in merchant ships during the early years of the Second World War a *Guide to the Preservation of Life at Sea after Shipwreck* was prepared by a Medical Research Council Committee on the Care of Shipwrecked Personnel and published as War Memorandum No. 8 in 1943; it became the wartime best seller in this series of Memoranda. After the war, the Talbot Committee on Naval Life Saving, which reported to the Board of Admiralty in 1946, estimated that more than 30,000 officers and men of the Royal Navy had lost their lives due to drowning or exposure – approximately two-thirds of the total naval casualties; and McCance Ungley, Crossfill and Widdowson (1956), in the Medical Research Council Special Report No. 291, analysed the depositions of survivors from 448 sinkings involving 27,000 men and women in ships of the Merchant Navy during the years 1940-44. Approximately 26% lost their lives before reaching the life-rafts or boats and another 6% died subsequently. A general lack of medical, as well as technical, knowledge of life-saving equipment and procedures undoubtedly contributed significantly to these appalling figures.

At the suggestion of the Talbot Committee the Council appointed a Shipwreck Survival Subcommittee of the Royal Naval Personnel Research Committee which met for the first time on 4 November 1946. From 1949 the next 11 years were devoted to writing Special Report No. 291 and to a series of carefully controlled, but essentially practical, laboratory experiments and life-raft studies in cold, tropical, and temperate latitudes on the physiological aspects of survival with particular reference to rations, water supplies, protection against cold and immersion and the design of life-belts to be used with the inflatable life-rafts recommended by the Talbot Committee. The detailed results of many of these experiments have been published only as

reports to the Royal Naval Personnel Research Committee. The practical findings of these investigations and of associated developments put in hand by the Standing Committee on Naval Life Saving were incorporated in an Admiralty Book of Reference 1329 – *The Life-Raft Handbook* – which was first published in 1955 and is included with the equipment in every naval life-raft today. A full-scale, free-drift life-raft trial under extremely severe weather conditions in the Atlantic in 1960 focused attention on motion sickness, the problems of which have largely occupied this sub-committee up to the present time.

An important observation by McCance and his colleagues (1956) was that, even if a man was supported adequately by a life-jacket, a lightly clothed man could not expect to live more than 15 minutes in water at 0°C or 1 hour at 5°C. Survival at sea rarely raises problems in the Royal Navy in peacetime, however, and the tragic picture of the war years has largely faded from memory, even the memory of those of who were intimately concerned with these problems during the war. The news on 7 February 1968 of the dramatic survival of Mr. Harry Eddom, the mate of the Hull trawler 'Ross Cleveland', after immersion and several hours in a life-raft under very severe weather and icing conditions off the coast of Iceland, whilst wearing the clothing he was usually accustomed to wear on the upper deck, and of the loss of the 'Ross Cleveland' and two other trawlers in the same area, focused attention once again on the fact that a properly clothed man can survive the most extreme conditions without injury, while the inadequately clothed man will die, and it brought to a head the growing concern in recent years about the working conditions and hazards to which trawler fishermen are exposed (*The Times*, 1968).

In *The Fishermen*, Tunstall (1962) commented that 'in every single year since 1952 the deathrate has been

higher than in coalmining. Taking the fishing deaths in two-year periods, the death rate has varied between being nearly twice as high (1956-57) and six times as high (1954-55). On this evidence fishing may well be the occupation with the highest industrial death rate in Britain today'. Schilling (1966), summarizing from the reports of the Registrar General of Shipping and Seamen, found that 'between 1948 and 1964 there were 757 deaths of British fishermen caused by accidents at sea; about three-fifths of these resulted from accidents to vessels and the rest from individual accidents such as drowning. A further 229 fishermen died at sea from disease during these years'. He concluded that the fishermen's fatal accident rates at sea were about twice the rates for coalminers and about 20 times the rates for British manufacturing industries and drew attention to the lack of direct governmental responsibility for the fishing industry. The latter was divided between several departments with the Ministry of Transport and the Ministry of Agriculture, Fisheries, and Food primarily responsible, though neither was organized nor empowered to promote occupational health in the fishing industry. The Factory Inspectorate of the Ministry of Labour had considerable experience in this field but it had no responsibilities for health and safety in fishing vessels, either in port or at sea. In contrast, Norway, Canada, the Federal Republic of Germany, Eire, and Japan were the only countries with extensive occupational safety regulations for fishing vessels, and the mortality rate, for Norwegian fishermen, for example, was substantially lower than the rate for British fishermen. All this, despite the fact that the United Kingdom was, and is, one of the first 10 fishing countries in the world and lands more fish than any other country in Western Europe except Norway.

Several members of the Royal Naval Personnel Research Committee's Survival-at-Sea Sub-committee were meeting for another purpose on the morning that Mr. Eddom's survival was reported. Arrangements were made by the Medical Research Council for a member of its Scientific Staff, Dr. L. G. C. Pugh, to fly to Reykjavik the following day to interview Mr. Eddom and to report on the medical aspects of the trawler disasters. Pugh (1968) subsequently advised that emergency packs containing lightweight waterproof suits should be fitted to life-jackets or placed in rafts which should be equipped with bailers and emergency radio sets, that trawler crews should be instructed in the prevention and treatment of hypothermia, and that all crew members, not only those on the upper deck, should possess warm clothing. He noted that the trawlers were entirely dependent for medical care on the good will of the Icelandic Medical Authorities in these waters.

Following the 1968 disasters, the President of the Board of Trade appointed a Committee of Inquiry

into Trawler Safety, with Admiral Sir Deric Holland-Martin as Chairman and Professor R. S. F. Schilling as the medical member, which published an Interim Report in September 1968 and a Final Report in July 1969. The terms of reference were to examine major factors affecting the safety of deep sea trawlers and their crews, and to make recommendations. The need for a weather-advisory ship with a medical officer on board, communications, supporting services for trawlers at sea, design and construction to ensure stability, equipment, particularly the adequate guarding of dangerous machinery such as winches, conditions of employment, training, management, industrial relations, the cost of safety and who should finance such measures were considered at length. The Final Report laid great emphasis on accidents and casualties during normal fishing operations, the working environment of ships' companies, the conditions of work, fatigue amongst trawler crews (for example, there is a dearth of reliable evidence concerning the complex relationships between hours of work and accident rates) and the need for research on these and other aspects.

The Committee also referred to the health and fitness of trawlermen in general and made interim recommendations concerning working hours including those of young trainees. Accidents at sea were found to be a cause of death equally as important as the sinking of ships; less than half of the deaths in the period considered were associated with the loss of, or damage to, ships. The most common cause was men being lost overboard. Accidents were noticeably less frequent on the more modern stern trawlers than on the conventional side-winders which are still by far the most common. Deaths were more frequent in vessels operating in 'distant' waters than in those operating in 'near' and 'middle' waters. The most common type of non-fatal accident involved mishaps on deck from a variety of causes, ranging from slips and falls to accidents with the winch and deck machinery or gear. The skippers, mates, boatswains, and deckhands were significantly more at risk than the other members of the crew.

Over 60% of trawler mishaps were strandings or collisions. Fires were the next most frequent cause of damage. Foundering, capsizings, and other accidents were relatively less common but the period studied by the Committee did not include the losses of two British trawlers in 1955 and three in 1968. Although Annual Returns on Shipping Casualties and Deaths are published, more comprehensive detailed statistics on accidents at sea were considered to be necessary, such as those published annually for manufacturing industries by the Department of Employment and Productivity, if progress in improving standards of health and safety were to be measured with confidence. In particular, the Committee placed heavy responsibility on the shoulders of

management and recommended that owners should ensure that skippers are aware of their duties to log accidents and examine the need for revising watch-keeping arrangements to avoid dangerous fatigue during arduous periods of fishing. The requirement for more comprehensive annual medical returns and periodic medical examinations was also underlined by the high mortality rates for cancer of the lung and stomach, hypertension and bronchitis and the frequency of peptic ulcer and other gastrointestinal diseases.

It is notable that Moore (1969a, b), who analysed the mortality and morbidity of deep sea fishermen sailing from Grimsby during the year 1963, also found that the greatest incapacity from disease was due to gastro-intestinal, cardiac, psychiatric and respiratory illness and that men working below decks were more prone to these disorders than men working on the upper deck. Eight deaths in that year were due to natural causes; five were due to cardiac disease. In his study there was remarkably close agreement between the diagnoses logged by the skippers and those certified for National Insurance purposes by general practitioners.

The Holland-Martin Committee recommended that all new entrants to the industry and all men who have been off work through sickness or injury should be medically examined before they are allowed to go to sea and that those who have been in the industry for 10 years or more should also be examined, the examination to include at least a chest radiograph and an electrocardiogram. The cost of such an occupational health service, it was observed, could be offset partly by reducing the need to interrupt fishing to land sick trawlermen at foreign ports and the cost of treatment.

The need was emphasized for satisfactory upper deck protective clothing for all members of a trawler's crew – Mr. Eddom's undoubtedly saved his life – and the Medical Research Council and the TUC Centenary Institute of Occupational Health have in hand a project to improve and develop the design of clothing suitable for fishermen. There is less reference in the Final Report to other aspects of survival equipment and training, and one is left with the thought that there may be a need for a small booklet, similar to the MRC War Memorandum or the *Life-Raft Handbook* of the Admiralty, to be written specifically for trawlermen and other small ship sailors whose occupations expose them to foul weather or other adverse conditions on the high seas. The essentials of what is known today and of what has been learnt during the past 25 years, such as the information condensed in W. R. Keatinge's excellent monograph, *Survival in Cold Water*, published earlier this year, could easily be made generally available to laymen in this way.

The Committee pointed out that the inquiry was

concerned with safety and did not feel it should recommend restrictions on the employment of young people in the fishing industry on social or humanitarian grounds alone. They thought that many boys of 17 years of age are nowadays physically mature enough to undertake a deckhand's work and a thorough pre-employment medical examination would eliminate boys who were not physically strong enough for such exacting work. Boys under 17 years of age were particularly vulnerable and required special precautions to ensure their safety; for example, they should have a minimum rest period of at least 12 hours a day and deckhand learners should not make their first trip on a distant water side trawler in winter. The Final Report concluded with the recommendation that a National Trawler Health and Safety Committee be appointed to advise Government Departments and the Industry on the major factors affecting health and safety in the deep sea fishing fleet.

Moore (1969a, b) provided a very useful review of the literature in recent years. He was somewhat critical of the *Ship Captain's Medical Guide* (Board of Trade, 1967) as a handbook for trawlermen. This suggests that there may be a need for a new handbook to deal with not only common medical conditions but also the management of typical trawler accidents and injuries, resuscitation, the treatment of hypothermia and the various types of ophthalmic and dermatological disorders peculiar to this industry.

The Holland-Martin Committee's finding, in an appendix to The Final Report, that the standardized mortality ratio for fishermen was 17 times that of the male population as a whole during the years 1959-63, and that fishermen in the age group 15-44 years were particularly at risk, underlines the urgency of implementing its recommendations, keeping the conditions of work in this vital industry under continuous surveillance and providing efficient occupational medicine and survival training services. The medical profession has an important part to play, particularly in planning and conducting research on the medical aspects, in framing sound and workable proposals based on such research and information already available and in ensuring that these proposals, when approved, are implemented at the working level.

I am indebted to the Medical Director-General of the Navy, Surgeon Vice Admiral E. B. Bradbury, for permission to publish this review and to Admiral Sir Deric Holland-Martin and Professor R. S. F. Schilling for most helpful comments on the first draft.

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Received for publication October 2, 1969.

Who started it all?

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It used to be said that if you shouted down a hole anywhere in the world the answer invariably came back in Cornish. But that was after the collapse of the Cornish copper industry over 100 years ago, when miners left Cornwall in their thousands to start new mining industries in all corners of the earth. Towns like St. Day, a great mining centre of 100 years ago, became ghost towns almost overnight. Today, St. Day is a village surrounded by miles of derelict copper workings.

Names like Wheal Basset, Wheal Unity, Wheal Virgin, Cooks Kitchen, Ding Dong Mine are now but names on a map. 'Wheal' means working and most Cornish mines were called 'Wheals'. The Cornish for mine is 'bal' and the mine manager was the 'bal captain'. The owners were called 'adventurers', and the girls who sorted the ores were called 'bal maidens'. The odd sounds which echoed through the workings were the work of the 'knockers', the imprisoned spirits of dead miners. At a distance of 100 years it all sounds pleasantly romantic yet these names conceal a grimmer reality.

The metal in Cornwall was either in or under granite; the mines were deep and readily filled with water. For almost the whole of its history access was by ladder. In the deeper working a miner might take an hour climbing in the morning to reach his work and an hour and a half in the evening to return. Toward the end of the nineteenth century a few mines installed a curious labour-saving device

called a 'man engine'. Even this has left a grim memory behind, for in 1919 one of the very few still working collapsed at lonely Levant Mine near Lands End and killed upwards of 30 miners (Abbott, 1920).

Cornish copper was refined either in Swansea or in Bristol. The vessels which took away the ore returned with coal for the pumping engines. Many attempts to set up their own refining business were made by the Cornish mine owners but, with few exceptions, they came to nought, largely, it is said, through the intrigues of the interests in Swansea and Bristol. Bristol boasts a fascinating monument to the Cornish copper industry in Arnos Castle. Built by a Bristol copper refiner it is made with bricks of black copper slag in the manner of an eighteenth-century Gothic folly. It lies within a stone's throw of the main Bath road.

Cornwall was the cradle of the world's industry, for not only did she teach the world the hard lessons of metalliferous mining, but it was to get the water out of Cornish mines that Newcomen invented the atmospheric engine and Watt the steam engine, so giving mankind the key that has unlocked every door since – man-made power. For many decades she was the world's major source of copper. Hayle, near St. Ives, which had the only copper refinery in Cornwall, also once boasted the largest iron foundry in Europe. Even up to 1914, Harveys were producing cylinder castings for pumping engines of prodigious girth which are among the largest iron castings ever