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OCCUPATIONAL MEDICINE

Dr M Harrington, of the TUC Centenary Institute of Occupational Health, is with Peter Levack, J Mathews and Peter Brock on board THPV 'Lodesman' during an investigation into factors affecting health of pilots which was undertaken at the request of pilots.

The Institute, which is located at the London School of Hygiene and Tropical Medicine, published its findings as one of several case studies in its annual report last November. This example, of prime interest to pilots, typifies the projects undertaken by this Institute in the pursuit of preventive medicine and a review is included in this issue.

Dr Harrington is continuing his investigation into coronary incidence amongst pilots. The German authorities are cooperating with the Institute so that the research can cover Germany as well as this country.

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TAKING A BOAT TRIP AROUND THE CORONARY PROBLEM

By kind permission of "World Medicine" we reproduce part of a review by **Peter Brock** *of the Annual Report of the TUC Centenary Institute of Occupational Health which was published in their November 24th issue.*

As the cutter heaved alongside the tanker, the pilot passed his battered briefcase over the tanker's side before clambering carefully down to us on a rope ladder. We were off Folkestone. Having brought the tanker safely out of London's clutches, the pilot was now giving her back to the skipper.

Watching from the cutter's deck was Dr Malcolm Harrington, lecturer in occupational medicine at the TUC Centenary Institute. His special interest at present: the cardiovascular systems of Channel and river pilots—and why the younger age group is throwing up a higher rate of coronary heart disease than the senior.

Harrington asks: "Why should people's work make them ill? If it does, what needs changing?" For this kind of approach, the pilots make an interesting study group. They are highly intelligent people with what the stop-watch brigade would describe as good job motivation. Their work is manly ("bloody hairy at times," as one put it) and important to the national economy.

The pilots are extremely sensitive about their physical well-being and feel deeply about colleagues who die of heart disease. It was this concern, in the late sixties—following two deaths among colleagues under the age of 55—that made them seek out medical advice for their group as a whole.

The institute seemed to be the right unit to undertake a mortality study and the request to do so arrived on the desk of Dr Peter Taylor (the then deputy director) via local GPs and an airline doctor. "We have never had this happen to us before," said the pilots. "We think it's because of job pressure."

Dr Harrington dug through the pilots' backgrounds from 1956 to 1968. He also began a "job evaluation study". He found that, overall, they were slightly fitter than the general population. But in the 35–50 age group there did indeed appear to be a higher death rate from coronary heart disease than in the "control" groups. But the figures were "statistically small". They showed seven deaths instead of a projected two for that age range.

So Dr Harrington dug back to 1946. There were, he found, no coronary deaths in pilots under the age of 55. When he pointed this out to the pilots he got a dusty answer: "We know—that's why we came to you in the first place." The question facing Dr Harrington was somewhat obvious. Did something occur in the late fifties and early sixties unique to the experience of river pilots?

"Since all the pilots in the study have deep sea background—all are master mariners and around 35 when they become pilots—this in itself raises an important query," he says. "Does the merchant navy background have any bearing on their present work in terms of both stress and coronary heart disease?" The logical approach is to take a shipping line and look at the younger men who are either first officers or skippers. One line is now showing signs of co-operation.

"Another possible factor is the increase in tonnage over the last 15 to 20 years—not only in terms of bigger ships but also the fact that more ships are on the seas and use the Port of London. Also, much of this increased tonnage is foreign. In the fifties the ratio of British to foreign tonnage was 2:1. Now it has swung—a 3:1 foreign-British ratio."

The bigger ships increase tension on the bridge and there are often language difficulties. Both come together vividly at one point along the Channel pilots' route where the traditional "Who are you?" signal is put out by an Aldis lamp instead of by radio telephone. It is easy to imagine the tension on a blustery winter's night, with a

skipper from a second-rate maritime nation worrying about his ship and the pilot having to divert his attention to signalling the reply. In situations like these it has been known for a foreign skipper conveniently to "not understand" and leave it all to the pilot, who has to make his way, fuming through an antiquated procedure while he is surrounded by modern equipment.

Not long ago the chance came of a comparative study which, as Dr Harrington put it, involved a situation "so similar that it was epidemiologically untrue". The place: Hamburg. The river: the Elbe. Its 70 miles of pilotage closely resembles the Channel's 50 miles in its shoals and tortuousness. Like their British counterparts, the Germans are all master mariners with considerable deep-water experience.

Dr Harrington has just returned from his first visit to Hamburg. There, among the initial data, he unearthed the fact that in the younger age group during a three-year period, 30 pilots had died of heart disease out of a total of 300.

British pilots are paid on tonnage, distance, and number of "turns". It averages out at between £3,000 and £4,000 a year and allowing for differences in living costs, the German pilots are on roughly similar rates.

With Dr Harrington, I visited both the Gravesend and Folkestone stations. They made a striking contrast to each other: Folkestone was all air conditioning and light, while at Gravesend, where the Channel pilots merged with the river pilots, working conditions were cramped and overheated and obviously long overdue for modernisation. At both stations the talk was of a pilot who had died of a coronary a few days before. It was also about job security and the things that made them worry. The cruiser *Belfast* was a good example. She had just passed up river to her final moorings and it had taken five hours to get her tied up.

Like the family doctor, the pilot is an independent contractor who has opted for the "blankets"—coming ashore to work the sea from home. When he's on call he sits and smokes and worries. For instance what sort of ship will he draw? One of the big "moderns"—preferably Russian or British on which crew efficiency is high—or a tramp, clapped out and devoid of equipment? What was good for Masefield does not always hold good for the pilot.

In the conclusions of his first report, Dr Harrington says: "Long periods of inactivity are interspersed with severe exercise in boarding ship followed by intense concentration while on the bridge—in a given week, the pilot will do, on the average, two to three trips and each trip will involve approximately 20 to 22 hours away from home. Out of this time only between five and six hours will be spent at work on the bridge.

"No one knows what sort of vessel he will have to pilot, or when, until the day of the trip. This means that planning nights out with friends or going away for the week-end is virtually impossible. This may add marital stress to an already unsettling state of affairs.

"Reviewing the possible aetiological factors involved in their coronary artery disease as an occupational group, the most important ones seem to be smoking and emotional stress. One could postulate that cold wet weather also contributes if this indeed is proved to be atherogenic.

"So far as activity is concerned, if the pilot is fit, then the climb up and down the rope ladder is probably without effect, but it would involve considerable cardio-vascular strain in the less fit, particularly after three hours of inactivity in a warm environment."

Dr Harrington adds: "Many authorities now feel that there may well be a distinction between angina pectoris and myocardial infarction, on aetiological and epidemiological grounds."

Also, from studies of pathological and clinical data from Russia, Scandinavia, and Britain, two types of coronary deaths are postulated.

"One type involves classical thrombotic episodes in the atheromatous coronary vessels leading to the myocardial infactions which may be multiple. Death occurs in this group—if at all—a considerable time after the onset of overt ischaemic changes.

"The other type tends to be a 'sudden death' syndrome in a younger patient, often with little premonitory ischaemic episodes, and at necropsy occlusion of the coronary vessels is less in evidence. These so-called 'electrical deaths' where the patient often

EDUCATION AND TRAINING OF MARITIME PILOTS

LIVERPOOL POLYTECHNIC SEMINAR

The Department of Navigation and Nautical Studies of Liverpool Polytechnic, in conjunction with the Department of Maritime Studies of the University of Wales Institute of Science and Technology, held a Pilotage Seminar on the 5th and 6th of April on the subject of education and training.

Three UKPA members, R. H. Farrands, J. A. Edmondson and J. M. Farmer, presented papers and C. A. Rhodes chaired the session "Future Requirements for Pilot Service" as well as introduced the discussion on "Future Education and Training". We hope to be able to publish some of the papers of this seminar, the first to become available being Mr Farrand's which is included in this issue.

Aims of the Seminar

There have been many changes in recent years in the problems which the Maritime Pilot has had to face, the environment in which he has to operate and the means at his disposal to expedite the passage of ships. The changes have been in many areas—electronics, naval architecture, marine engineering, port structure, communications, ship types and trades, manning level etc.

There have also been changes in the academic and training spheres with the introduction of new qualifications (e.g. OND, ONC, HND, and BSc in Nautical Studies). There are also new training methods (for example simulation for radar and other equipment).

At a time when pilotage is undergoing some re-organisation and re-direction it is important to consider the role of the pilot in the future and the present training pattern in the light of educational opportunities open to the profession.

Modern Radar Training Facilities

In connection with the training provided for Merchant Navy personnel at Liverpool Polytechnic, and Mr Smart's article in our January issue on radar training for the novice pilot, it is interesting to note a significant extension of their facilities with an advanced radar recording system.

An EMI RR 100 system is being installed which will record radar pictures, or returns, on magnetic video tape. It will be used to obtain recordings from operational radars on ships at sea and from the Polytechnic's own shore-based radar complex. The radar recordings, played back on PPI displays in the class room, will enable students to obtain a greater knowledge of radar con-

(*continued from page 4*)

has a fatal episode of ventricular fibrillation seems to be the type that constitute the majority of cases in the modern epidemic of coronary heart disease.

"It is initially important to verify or refute these hypotheses, as we may be dealing with a new disease and not just a variant of classical atherosclerotic heart disease."

Certainly, other workers feel it is worth differentiating the "sudden death" coronaries from others and to investigate, epidemiologically and clinically, people who appear to be high risk cases for this type of death.

Dr Harrington wants the survey to be pushed back to 1945 and widened to include all British pilots (not all are former merchant seamen). This might clarify the aetiology as well as sharpen up the assessment of mortality trends.

He also suggests a clinical and epidemiological study in greater depth, the clinical examination to include casual blood pressure and cholesterol measurements as well as psychological categorization.

There should also be an improved occupational medical service for the pilots. At present, there is no detailed examination after the initial medical each man receives on entry to the service. The minimum requirements, according to Dr Harrington, would include a qualified nurse and a part-time occupational physician.

ditions and situations at sea than was previously possible during their course.

The system utilises a relatively new recording technique which will suit any type of radar system or operational requirement. The helical scan video tape recorder employs one inch wide videotape and can record or replay continuously for up to seventy minutes at a time.

The Department of Navigation will use the EMI RR 100 system in conjunction with its Marconi "Raymarc 16" radar installation to replay special effects, such as rain or sea clutter on the radar screen, and for replaying marine traffic situations.

In addition to its teaching role, the recording equipment will be used for research purposes; for example, in the analysis of marine traffic flow or ocean wave patterns.

An unusual feature of the EMI equipment is the realism it will afford to students who can tune the recorded picture on the PPI display and adjust for gain and sea clutter. For recording periods at sea, the RR 100 is adaptable to operate off shipboard power supplies and to connect easily and simply to a ship's radar to avoid interference with the normal working of the ship.

ESTUARIAL PILOTAGE

R H Farrands *(London, North Channel)*

A Paper presented at the Liverpool Seminar 1972

At the first Pilotage Seminar organised by the University of Wales Institute of Science and Technology, Captain Jones of Liverpool asked the question "What is pilotage?" The answers varied a great deal and evidenced the fact that pilotage can be broken down into various categories under a common heading. This can be readily understood as the function of pilotage may be labelled, such as deep sea, estuarial, river, dock, and in many cases is a combination of some of these elements. It is natural for pilots of certain categories to think that their own particular expertise is the most important and they do not readily appreciate the difficulties of other types of pilotage. It has been readily admitted that when pilots were transferred from one district to another they had underestimated the difficulties of new problems in unfamiliar waters, the time required to become proficient and the new techniques to be acquired.

It can therefore be stated that pilotage covers many aspects. The aspect on which I have been asked to contribute is that of estuarial pilotage as opposed to ship handling or berthing, but it must be emphasised that part of the function of estuarial pilotage is shiphandling in addition to its navigational and conning aspects. The slotting of ships of all sizes in and out of congested anchorages and the conning of large vessels under conditions of minimum underkeel clearance in narrow tidal fairways requires an expertise in navigation and shiphandling of the highest order. It may also be said that a pilot, having completed a long and difficult estuarial approach, may consider his troubles are over and the subsequent berthing of the ship relatively simple. On the other hand, if the estuarial approach is wide and deep, with little shipping traffic, the berthing may be relatively difficult.

In dealing with estuarial pilotage, I must of course derive the material for my thoughts principally from experience gained in the Thames Estuary, augmented by experience gained aboard ships and in port installations of many continental countries where, through the medium of the European Maritime Pilots' Association, technical visits have been encouraged and facilities granted.

The function of pilotage, in general terms, may be stated at the outset. It is, in effect, to take charge of the navigation and shiphandling of a vessel in restricted waters where the master's knowledge of the locality is insufficient as a result of his lack of, or infrequency of, experience in such waters. It requires a thorough knowledge of local regulations, bye-laws, and procedures to make use of all navigational aids ashore and afloat and a knowledge of the whole spectrum of port operations as affecting the entry and departure of all forms of shipping.

In recent years, the responsibility placed on the shoulders of the pilot has appreciably increased. Ships have become larger, faster and deeper in draught. Safety margins have become reduced to assist shipping economics and productivity. Larger and larger ships are being brought in and out of ports which were never originally designed or engineered for such traffic. As the saying goes—trying to squeeze quarts into pint pots. A minor technological revolution in shipping has meant that ships are costly to build and run. Time is now all important and delays in passage due to navigational difficulties or accidents can prove very expensive. There is also the threat to the environment and public safety, should ships carrying dangerous cargoes be involved in a marine catastrophe.

Communications

It may be said that one of the most important, if not the most important, necessity in all shipping operations is the need for efficiency in communications. The efficiency of any ship operation, particularly in restricted waters, varies directly with the efficiency of communications with shore authorities, navigational aid facilities and in ship to ship communication. This requires procedures based on brevity and speed and in a language common to all users. The pilot acts as an essential link in what is a combined operation and where language difficulties can result in disruption and lead to casualties.

Some 20 years ago, it was common for ships to arrive at the limits of a pilotage district unannounced, with no estimated time of arrival and no information relating to its destination, berth or docking time. The introduction of *vhf* R/T has made a tremendous impact on the efficiency of port operations. The provision of shore navigational services can now provide an exchange of information relating to shipping movements, tides, weather and the programming of ships in and out of port. The ability of ships to talk to one another has increased the safety factor and helped to avoid close quarter situations of a dangerous nature. This exchange of information is often in a language foreign to the master of a ship; this adds to the responsibility of the pilot who, in moments of pressure, cannot always keep the master abreast of the current situation. The necessity for good and instant communications requires that the *vhf* R/T is incorporated into the console at the conning position. Pilot stations should also have a supply of portable *vhf* R/T sets so that they can be provided to ships with defective installations or where no *vhf* is fitted. Supply of such sets should also be adequate to allow them being used aboard ships for communication with tugs and wharves when the ship's installation needs to be maintained on the shore navigational service.

Ships' Bridges

For many years, navigation bridges have been designed principally for open water conditions and the pilots' particular requirements have not been taken into consideration. In recent years, pilots have taken steps to influence shipowners and naval architects in the design of purpose built bridges which will allow the pilot's requirements to be recognised. This is a prime necessity for ship operation in restricted waters where navigational hazards are greatly increased. The pilot must have a central conning position, with instrumentation which should include at least wheel and rudder indicators, engine telegraphs or bridge control with revolution indicators, compass repeater, speed log, *vhf* R/T communication and radar with alternative means of presentation. Design of the bridge is most important as it is the control position from where the passage is effected by combining navigational information derived from a visual appreciation of the area and data from instruments, augmented by information from shore facilities. In the past, estuarial pilotage was effected by the visual appreciation of navigational marks, sandbanks and the general topography of the approaches. With the advent of radar, navigational position devices, racons etc., the visual appreciation is aided by intrumentation and, in periods of dense fog, is by instruments and communications alone.

Radar

As fog can be patchy, it is necessary for a conning radar display to be mounted on

the fore side of the wheelhouse, and preferably giving the option of various forms of presentation. It is necessary for the pilot to keep a visual lookout as well as a watch on the radar in varying visibility; this precludes the conning radar at the back of the wheelhouse or in a separate enclosed dark room. The pilot has to ensure that courses or wheel orders given to the helmsmen, usually in a foreign language to him, are instantly carried out and not misinterpreted. This requires a visual sight of the helmsman.

During daylight hours, the radar screen presents a problem when visual lookout has to be alternated with screen viewing, resulting in consequent difficulty of eye adjustment to differing light intensities. Radar manufacturers should give some thought to radar presentation that does not require the use of a hood or curtains during daylight hours, so that both master and pilot can view the screen at the same time.

The pilot must be conversant with the various types of controls on radar sets and be able to adjust them as necessary to obtain maximum effectiveness. This is no easy matter when there are so many makes and types on the market, each with individual layouts and further complicated by the various languages to indicate the controls. A standardisation of controls and their indication is to be welcomed. The operation of radar in estuarial pilotage waters, both day and night, is an aid to visual pilotage. The more that radar is used, the more familiar a pilot becomes with the radar aspects of a district. Such intensive use of radar will give the pilot an instant appreciation of the district when piloting in restricted visibility and the ability to determine navigational marks such as buoys when there are slow moving, stopped or anchored, vessels in the vicinity. A help in this particular aspect is the adjustment of buoy positions, where possible, to form a regular pattern thus making recognition easier. The installation of racons on buoys or light vessels at focal points is also a help in this respect.

Unfortunately, the majority of ships still only have the ship's head-up presentation and consequently it is this presentation with which a pilot is most familiar, and therefore confident, in using. However it is to be welcomed that more and more vessels are being fitted with stabilised displays but, regretfully, true motion facilities lag a long way behind. Ideally it might be said that estuarial pilots would welcome two displays side by side so that two forms of presentation would be available at the same time.

In some modern ports with busy estuarial approaches, shore based radar has been installed in the form of a radar chain covering the whole length of the area. This form of surveillance can be of particular help to the pilot under conditions of restricted visibility if an efficient fog service is operated. The area is divided into sections and a running commentary on allocated *vhf* channels is provided describing the traffic detail, position and identification of ships under way. Such a service enables the progression of shipping and ultimate berthing to be effected even under conditions of dense fog.

In 1965, the pilots of a continental country whose coastline contained three major estuarial approaches, successfully argued that licensed pilots for the district could provide a much more efficient service on shore radar than master mariners who were previously employed on a round the clock operation. It was argued that practising pilots, with current experience in the district, had a practical knowledge of pilotage problems and ship behaviour; consequently the pilot on board would have, in addition, the confidence of knowing that the information and advice was coming from someone with the requisite responsibility and expertise. The outcome has been that casualties in these estuaries have been reduced by nearly 50% since the pilots have superseded master mariner operation on the shore radar chains. Also, economies have been effected in that pilot operation is only brought into being when visibility falls below a certain distance, or when ice entails withdrawal of navigation marks, or when gales require sea cutters to be withdrawn from the outer limits to more sheltered positions. Experience has shown that pilots require some two weeks training on shore radar displays to reach the required standards necessary for interpretation and dissemination of information to shipping. In effect, the constant experience with radar sited on board a moving ship does not need much amplification for pilots to become proficient in the interpretation of the relatively easier problems of displays sited in stationary positions. Those in opposition to the principle of pilot operation of shore radar have suggested that a pilot ashore would tend to influence the pilot on board and lead to confusion. Experience has shown this not to be the case; pilots in pursuance of their profession are a disciplined body with the full knowledge that the centre of operations is aboard the ship and that the overall responsibility cannot be divided. Indeed the European Maritime Pilots' Association agreed many years ago that where the circumstances warranted it and the requisite equipment is installed, the licensed pilots of that district should operate the shore radar,

Traffic Regulations

Before the advent of efficient communications, the regulation of estuarial shipping traffic was to a large extent carried out individually and independently by the pilots themselves with little or no co-ordination possible between the ships and the berthing and docking requirements. With the advent of radar and *vhf* R/T, together with commercial pressures for quick transits and turn rounds, there is a need for ships to arrive and leave under all weather conditions. This resulted in large ports with busy estuarial approaches suffering a certain amount of congestion during periods of restricted visibility when ships without radar could effectively block the approaches by anchoring in the fairways. On the clearance of fog, large numbers of ships would endeavour to get underway together and it was a case of each ship for itself. An increasing problem also was the pressure on ports to take ships of ever increasing size and draught and where safety margins were being reduced to an absolute minimum. Some degree of traffic regulation may be necessary in such cases where the passage of very large ships may be endangered by the unrestrained movement of smaller and more manoeuvrable ships. Regulation may also be required to ensure a certain sequence of arrival and departure in order to prevent congestion.

The degree of traffic regulation imposed should be that which is required to safeguard the safety of navigation and to ensure the expedition of all shipping in and out of port. The degree, of course, may vary quite considerably depending on the complexity of the approaches and the density of shipping traffic. An open port, with deep, wide approaches and little shipping, may require little or no regulation. An estuarial port, with difficult approaches terminating in tidal locks and with a high density of shipping, may require a measureable degree of traffic regulation.

Proponents of strict traffic control from the shore usually instance the Panama, Suez and Kiel Canals or the St Lawrence Waterway; but these are particular cases where strict control has to be exercised. Proponents of strict control also endeavour to compare ships with aircraft and call for a system similar to that of air traffic control. However, if one wishes to draw analogies, there are many elements in road and railway traffic regulation or control which might be more suitably compared e.g. one way traffic lanes, lay byes, roundabouts, traffic lights, signals and sidings. Proponents of strict traffic control from the shore instance Rotterdam as an example of the way it should be exercised. Here on close inspection, the only control enforced on shipping is during restricted visibility when the number of ships accepted on the radar chain is limited to a time bracket; also tankers are not allowed to enter or leave if visibility falls below a certain distance. The order in which ships enter the New Waterway is left to the pilots themselves, who arrange over the portable *vhf* the necessary sequence based on commonsense as the situation demands.

But, of course, there are many buoy moorings or lay by berths within the various harbours to which ships may go if their berth is not ready; alternatively, they may be left outside the New Waterway approaches in the various anchorages. If the various Rotterdam harbours were enclosed and entered by tidal locks, then of course more traffic regulation would have to be imposed. In other words, it is suggested that the degree of traffic regulation, where it is required, is that sufficient for the particular port and its approaches, and one in which, before the rules are drawn up, the pilots are consulted on them and on their application. Those responsible for the practical operation of traffic

regulation ashore must also have the confidence of pilots in their ability and experience of shipping and shiphandling. Under these conditions, pilots will support the degree of regulation necessary as indeed part of their job is that of regulating the passage of ships in order to fit into the general pattern of traffic in an estuarial approach to a port.

Very Large Ships

A particular problem in relation to estuarial pilotage is that pertaining to the advent of very large crude and bulk carriers where the sheer size and draught tax the pilots' abilities to the limit. This is particularly so where the estuarial approaches are complex in character and where tides and depths require the passages to be programmed to a very strict time schedule. In order that such ships may enter with the maximum draught possible, it is usually a requirement that they berth at, or just before, high water. So as to do this, a vessel may also have to be programmed to maintain safe underkeel clearances at various critical shoal points en route. A vital factor of course is the calculation of tidal heights in advance at the various points, and the supply of actual tidal heights to ascertain whether the tide is running to prediction. Effects of wind and pressure can cause considerable variations from predicted heights and thus present a problem of whether it is safe to proceed with a programmed passage if there are indications of abnormality in the making of a tide. This involves a great responsibility on the pilot making such a decision, when one bears in mind that the factors causing tidal variations are often unknown or can only be roughly assessed.

On my Station, a second pilot has been provided for four years, voluntarily and unpaid, on all tankers over 40 feet draught or 50,000 tons gross. We do this in the interests of the safety of navigation. In no case has this second pilot been refused and, in fact, has always been welcomed aboard by masters and officers.

One of the critical factors in the pilotage of very large ships is the assessment of speed through the water, or over the ground. Due to shallow water conditions, the accurate indication of speeds under 5 knots is often unobtainable due to the effects of turbulence on the speed log. In addition, from the very great heights of modern after-bridges it is difficult to assess the speed through the water at night times, especially if there is little or no shore lighting to watch for speed in change of transit. Due to the vital necessity not to exceed certain speeds approaching a berth or anchorage, installations need to be fitted with doppler radar, or ships with sonar doppler, so that the pilot can be provided with a continuous visual presentation of accurate speed measurements.

A further hazard in very large ships is the fact that often the ship is committed to the fairway many miles from the berth. The vessel passes the point of no return due to the absence of emergency anchorages or insufficient room to turn round or insufficient time to proceed outwards due to falling tide. If such vessels are caught unexpectedly in dense fog, the vessel has the alternative of either stopping and going aground or endeavouring to make the berth, possibly through shipping and anchored vessels. The meteorological experts themselves admit that the forecast of fog is not an exact science by any means and thus the pilot has to use his weather experience in appreciating the possible chances of fog, knowing the dire consequences should the ship be caught.

Large Container Ships

The advent of the container revolution poses difficulties to the pilots, with particular reference to large container ships. Such ships stacked high with containers, present an enormous wind surface area and may become unmanoeuvrable at slow speeds. The Americans in particular have refitted vessels designed for other trades by "jumboising" them, or adding to the length of the original vessel, without increasing rudder area or engine power. This is exacerbated by the fitting of turbines in some cases giving only 30 to 40 per cent stern power. A pilot has the responsibility of assessing whether or not to proceed onwards with certain conditions and direction of wind.

Finale

From the foregoing, one may appreciate the responsibility of a pilot having to make decisions, often without much help from masters or officers who cannot be expected to be conversant with the district, local procedures, local weather and many other factors. The pilot has to rely on his own experience and other pilots' experiences to a large extent, the sum total of which has been built up over many years in all forms of shipping and under a vast permutation of conditions. In furtherance of the safety of navigation, the pilot in estuarial waters, as do all pilots, welcomes advances in technology as applied to navigation and shiphandling. One may hope that in the not too distant future, a team including the pilot will be embarked or disembarked outside estuarial approaches by helicopter and have at their disposal equipment and navigational facilities of a standard which appears to be the norm in the aircraft industry.

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1,300 MILES—AND 'UPHILL' ALL THE WAY

The Great Lakes navigational complex is perhaps North America's greatest natural asset, providing access by water to the industrial centres of two vast countries, saving unquantifiable sums in transhipment costs. Wm. Cory bulk carriers—the . . . *garth* vessels—have often served far west Canadian and American ports with cargo after the transatlantic crossing.

However, inland seas can be as rough as the oceans, and locks with fast-flowing streams add to the difficulties of navigation, also the long North American winter closes off the entrance to the lakes—sometimes sooner than expected. Only last year *Knightsgarth* and *Monksgarth* were both trading to Lake Superior ports, the most westerly of the Great Lakes routes, and owing to unusual congestion for the time of year, combined with the threat of early bad weather, there was some likelihood of their not getting out until spring 1972.

Captain NEIL RICHARDSON of the *Dukesgarth* writes this account of his experiences of trading in the Great Lakes which we reproduce with the kind permission of Wm. Cory & Sons Ltd.

On entering the St Lawrence River the terrain is hilly with extensive coniferous forests. Snow is still prevalent in early May and this only gradually disappears as Lake Ontario is reached, until in the Welland Canal we find a complete change of landscape. Lawns and fruit trees starting to blossom are a pleasing contrast to the harsh countryside of Quebec.

Fog is extensive in the approaches to Montreal in spring and summer, and is also met on the rivers and lakes of the system. Ice is encountered up to April and from early December. It is the area near the entrance to the Seaway which freezes first and clears last with the Welland Canal remaining open several days after the Seaway has closed. In the winter two pilots are employed after the navigation buoys have been lifted and ships move in daylight only.

Staggering

Distances are staggering: Montreal to Duluth at the far western extremity is 1,342 miles. Vessels headed into the lakes pick up their first pilot at Les Escoumain, about 24 hours steaming time from Montreal, the entrance to the Seaway, depending on the state of the tide, which at flood can offset the two-knot outflow. At this point they have come the best part of a thousand miles from the open sea before their lakes voyage can begin.

The St Lawrence Seaway gives a lift of 550 feet to vessels which lock in at St Lambert, near Montreal, before they steam out into Lake Erie after 400 miles and 14 more locks. A twelve-knot ship makes the voyage from Montreal to Duluth in 5½ days.

Seaway—Canadian Section

The entrance to the seaway is alongside

the site of Expo 67. After obtaining clearance from the seaway inspectors in Montreal Harbour, who check equipment like winches, radio and steering gear, permission is granted by the Seaway Authority to enter the system. After St Lambert, which gives a lift of about 4 feet, the St Catherine lock lifts the vessels about 40 feet in a canal which by-passes the notorious Lachine Rapids.

Lower and Upper Beauharnois connect Lake St Louis with Lake St Francis where vessels pass through Iroquois Indian reservations, notable for the large number of derelict cars lying about, and give access to the American section.

Seaway—American Section

Here Snell is the most difficult lock to make because of the exceptionally strong current of up to 6 knots flowing out of the hydro-electric dam. Eisenhower is linked to Snell by the ½-mile Massena Canal, while Iroquois, with a lift of only 2 or 3 feet, provides no problems and ships usually steam slowly through.

After leaving Iroquois Lock it is fairly straightforward navigation in the buoyed channel, with speed restrictions in several populated areas. The American Narrows requires very careful attention to navigation as the channel is very narrow with strong currents.

Very Narrow

After leaving the American Narrows upbound, one of the most attractive sections of the journey is reached in Lake Ontario. This is the area known as the Thousand Islands, where affluent Americans have built their holiday homes, all different, some fantastically perched on tiny islands where the only communication with the shore is by boat, of which there appear to be millions in the summer season.

The minimum depth in the channel is 27 feet but is usually slightly more depending on the general level of water in the Upper Lakes. The draft permitted was originally 25 feet 9 inches but is now 26 feet. Maximum size of vessel is 700 feet with 75 foot beam. This size is governed by the dimensions of the locks in the Seaway and Welland Canal. Above the Welland Canal several ships are now in service with greater dimensions although with the same draft restrictions.

Eight Locks

The Welland Canal is 27 miles long, linking Lakes Ontario and Erie in Canadian territory. Port Weller is at the northern end and Port Colborne at the southern or Erie end. There are eight locks numbered 1 to 8 starting at the Ontario end.

Twenty-one bridges across the canal are of the 'lift' type—except number 17. This is the 'golden bridge'—a swing bridge carrying the Pennsylvania Railroad—so called because of the frequent claims for damages when touched by ships.

Before entering a lock, all vessels moor at a lay-by berth. The mooring is done by the ship's crew, two men being swung from a landing boom on to the jetty to haul the mooring lines ashore and make them fast. These lay-by berths are very colourful with every inch of space having a different ship's name painted upon it and some are beautifully decorated.

Sightseeing platforms (commonly called bleaches) have been erected each side of the entrances to the locks and are thronged with visitors during the summer season. Seamen working in the ships feel a little like performing animals.

Lake Erie, the shallowest lake, is heavily influenced by weather systems. Loading in the Ohio port of Lorain at the western end, we were horrified to find that with a SW gale blowing, the water level in the Black River had fallen 3 feet, while at the eastern end of the lake an increase in depth was experienced. It is not uncommon for ships attempting to leave Toledo in such conditions to find themselves aground and having to remain so until the wind drops and the water returns.

Few Flowers

Lake Erie is connected by the St Clair River, Lake St Clair and Detroit River to Lake Huron at its western end, while to the east the Welland Canal takes vessels parallel to the Niagara River to Lake Ontario, smallest of them all.

Lake Erie shores are green. Cleveland is a city of parks and trees, but few flowers as the growing season is too short.

Lake Huron is linked with Superior by the St Mary's River as well as the Soo Canal, while the Straits of Mackinac give vessels access from Huron to Michigan. To the east it gives on to Georgian Bay where most of the Canadian Lakes seamen traditionally live.

Lake Michigan is 24 miles long and attracts more bad weather than do the other four and has few safe harbours—it is known as a ship's graveyard.

Lake Superior is the deepest and coldest of the five Great Lakes which form part of the border between Canada and the United States. It is also the highest at 602 feet above sea level with water so pure that even in these days of industrial pollution it can be used for drinking water.

Inward cargo generally consists of steel products, cars, general cargo and containers.

Classrooms

Outward cargo is mainly grain and steel. On one occasion we carried prefabricated school classrooms to St John's, Newfoundland, and made the news on radio and TV.

As the season is so limited, everbody works 24 hours around the clock and delays are minimal, weather permitting. Tornadoes and violent thunderstorms are all too frequent in July and August. There are no tides, so ships berth and leave at all times of the day or night. Agents are very much in attendance and are very helpful.

In my opinion, the people of Cleveland and Lorian proved to be the most friendly of the Great Lakes population, indeed in Cleveland there is a club run by the townspeople which provides all manner of entertainment for all the crew, free trips to the cinema or theatre, sightseeing rides, pool, organized football games, etc.

SUCTION DREDGERS

The International Union of Hopper Dredger Owners has celebrated its first decade of union by publishing a beautifully illustrated booklet, *Union* 10, with colour pictures of several of these modern vessels. Unlike the familiar, often rusty, bucket dredgers used in shallow estuaries, these vessels are capable of maintaining the deeper channels required by many of the larger freighters of today.

Modern trailing suction hopper dredgers are highly mobile and productive vessels that have brought a new era to the dredging industry. Such vessels are built, and behave, in a manner similar to a ship. They dredge by trailing flexible suction pipes over river or sea bottoms. A dredge pump loads the material through the suction pipe into the hopper of the vessel.

After loading, the dredger sails to the dumping area, where the bottom doors are opened and the cargo released. Alternatively, trailers fitted with discharging equipment can pump the dredged material through a connecting shore line directly to a reclamation area.

As described in *Union* 10, the trailing suction hopper dredger is an effective unit for working in exposed locations and in poor weather. Being classified as a self-propelled sea-going vessel it can dredge in navigational channels and shipping lanes without hazard to other shipping.

FORMATION OF THE RETIRED CLYDE PILOTS' ASSOCIATION

A number of the Retired Members of UKPA in the Clyde area have formed themselves into a local association, the aims of which are:

1. To establish social contacts among retired Clyde pilots.
2. To maintain contact with the active Clyde pilots.
3. To establish contacts with retired pilots from other pilotage districts.
4. To keep retired pilots in touch with pilotage affairs in general.

Mr Murdoch Mackenzie, its Honorary Secretary, in describing the formation of the Retired Clyde Pilots' Association, emphasises the need for pilots on their retirement to retain their membership of UKPA as "Retired Members". To this end, the formation of local retired pilots' associations is a form of encouragement which other areas might care to study. Clydeside experience indicates that few pilots are aware of the special UKPA membership terms to which they are entitled on retirement.

Obituary

TED ALLMAN

Charles Edward (Ted) Allman died in hospital at Cleethorpes on the 11th March aged 63.

After attending the Boulevard Nautical School at Hull, he commenced serving as a Humber Pilot apprentice in 1923. Upon completing his indentures, he went to sea "before the mast" to obtain his necessary sail time. His first voyage on the four masted barque "*Garthpool*" came to an abrupt end when the vessel was stranded in the Cape Verde Islands and Ted subsequently completed his sail qualification on the topsail schooner "*Jane Banks*". In the depression of the early thirties, he sailed with various companies before being appointed as a Humber Pilot on the 1st March, 1937.

Always keen and conscientious, he did service as a Humber Pilots' representative and as a director of the Humber Pilots' Steam Cutter Company. He attended his last Conference in 1969 when he took part in the debate on the National Pension Fund. In August of the same year, he piloted the Royal Yacht "Britannia" when Her Majesty visited Humberside.

A confirmed batchelor, Ted's great loves were golf and angling. He was delighted when he was elected captain of Cleethorpes Golf Club for this season and retired prematurely last August in order to give all his time to the job. His sudden illness, three months later, and subsequential death, came as a great shock to everyone as he had always enjoyed good health.

Ted's great popularity was reflected in the size of the congregation that attended the funeral service at the Grimsby Crematorium. Four days later, a pilot launch slipped quietly out of Grimsby in the morning fog, and, following a short service, the Port Missioner scattered the ashes of Ted Allman on the Humber river which he had served so well all his working life.

Corrigendum

The reference made by Mr W. R. Bulmer (Cardiff) in his comments on Pilots' Eyesight Tests (page 10 of the *Pilot*, December 1971) is withdrawn.

Obituary

STANLEY HARRY EAGLE

We sadly record the sudden death, at home on January 17th, of Captain Eagle who was Choice Pilot at Southampton for the Union Castle Mail Steamship Company. The son of a pilot, he was born in November 1912, educated at King Edward VI School and went to sea in the British India training ship *Australia*, later transferring to the Union Castle line.

His Father, the late Captain H. B. Eagle, will be remembered as a UKPA Executive Member in the 40s and 50s and as a Trustee from 1962 to 1968. In the same tradition, Captain Stanley became a pilot in 1946, joining the Inward Service in December and transferring to the Outward Service in December of 1955. The Southampton Master Mariners' Club will miss one of its keen supporters. He leaves a widow and a son.

BILL GARTHWAITE

We have just learned, at the time of going to press, of the sad and untimely death of Bill Garthwaite. He was killed in a car crash on the A1 on March 10th. He joined the pilot service in April 1934, became apprenticed in 1925 and was 63 last October.

The loss to Middlesbrough ends several generations' association of the Garthwaite family with pilotage. Bill is sadly missed.

(*continued from page 15*)

Heinz Lange, 2000 Hamburg 55, Wientapperweg 5h, to arrange an interchange for his daughter, Lita, age 17, during the forthcoming summer holidays, for a stay of about 3 weeks between 13th July and 26th August, with the family of one of our member pilots.

Captain Lange will be delighted to offer reciprocal arrangements for a son or daughter of the host family in this country to stay with his family during a suitable time at his home in Hamburg-Blankensee.

A prompt reply from any member who is interested in this interchange would be greatly appreciated.

Coastlines

Stan Williams buys a boat

At the end of December, 1971, Stanley Charles Williams retired after 43 years and nine months as a Trinity House Pilot, which is believed to be a record. Aged seventy years young, with fifty four at sea, his retirement featured in the *Evening News* of January 17th as "the unbeatable Captain who can't give up the sea" because, interviewed at his home, a sea-front flat overlooking Dover Harbour, he said he didn't want to retire and was going to buy a boat.

The vessel now under his care is an Albacore 15 ft. racing dinghy and, from their flat in The Gatesway, his wife will be able to watch vice-Commodore Williams, of the 100-year-old Royal Cinque Ports Yacht Club, apply his skill and experience to the weekend sailing races in the 650 acre harbour.

Stan's service, combined with that of his Father and Grandfather, both of whom were river pilots, amounts to 115 years of association with Trinity House. Born in Gravesend on the 10th September 1901, he started apprenticeship with Watts Steamers. He passed for Second Mate in 1921 and joined BP Tankers, where he served for fifteen months in the Persian Gulf and then between Abadan and Swansea. At twenty four years of age, he passed for Master (FG Certificate) and, for about a year, joined the barquentine *Hilda* to obtain the square rig sail experience then necessary for the London Trinity House Sea Pilotage.

In 1926 he left the *Hilda* and joined Manchester-London Steamers to obtain the necessary coastal experience and, in 1928, was called to the Trinity House Pilot Service. He joined the Cinque Ports Station, serving for three years at Margate before being transferred to Dover. He became Senior Cinque Ports Pilot in 1965 and Senior Trinity House Pilot in 1968. In the Birthday Honours List of 1970 came the award of MBE.

We look forward to hearing of his next achievements with interest and admiration.

Horace Burton MBE

Photograph by courtesy of the Northern Daily Mail, *Hartlepool.*

We were pleased to see, in the New Year's Honours List, that Tees Pilot, Horace Burton had become a Member of the Most Excellent Order of the British Empire.

He was apprenticed to the River Tees Service in 1926, and was granted a licence in 1936. During the war, he was transferred to London, serving there until the emergency ended.

Horace has attended many Association Conferences and has served on the Tees Pilotage Authority with distinction for the last 18 years. He is presently Captain of his local Golf Club. Our congratulations accompany the award.

Holiday Interchange of Pilots' Children

We have been asked by the President of Bundeslotsenkammer to assist one of their pilots from the Elbe Association, Captain

(*continued on page 14*)

Local Secretaries

Aberdeen	H. McKilligan	Aberdeen Harbour, North Pier, Aberdeen
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