MARINE AIR CONDITIONING

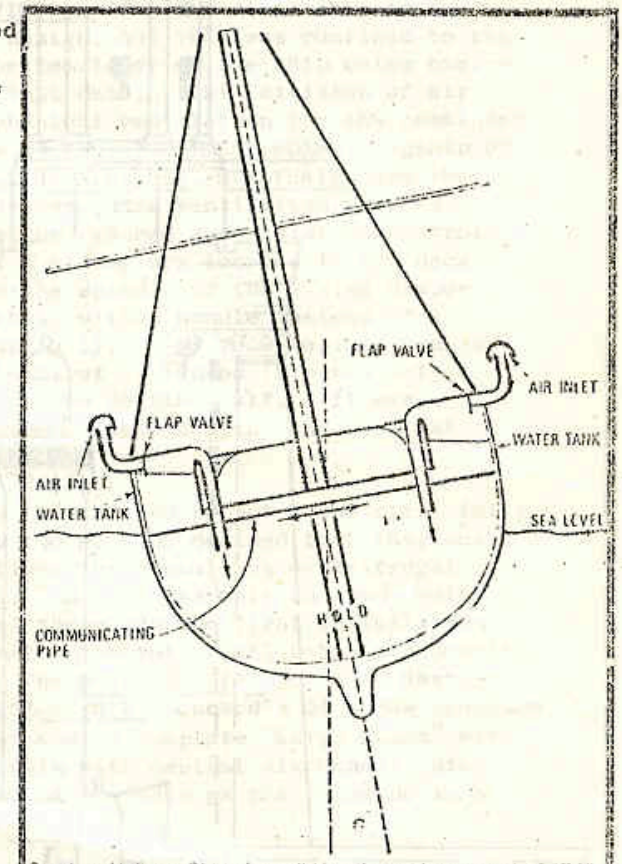
Ships' Lungs & Personal Notes by J A E Heard

S H I P ' S L U N G S

by J.A.E. Heard

Under sail, the deck was a place to breathe fresh air. Below deck, as a source of ventilation, gun ports in the lower decks could be opened. It was said that the capsizing of the MARY ROSE in 1545 at Portsmouth by a sudden gust of wind was due to the gun ports being opened.

Stephen Hales, a father figure to forced ventilation, in 1740 used natural air pressure through flap valves to produce a ventilation system in ships holds. Hales made a later improvement using manpower at the end of a twelve foot lever to operate a piston type fan; two, ten foot long by four foot six inches wide wooden boxes with a movable partition worked manually by the twelve foot lever with leather flap valves maintaining the air passing in one direction. According to Ernest Carter, this became known by sailors of the day as "Ships Lungs".



Stephen Hales "Ships Lung" Ventilator (Autoratic) of 1740

The canvas "Wind Sail" in Steele's "Elements and Practice of sail making 1794" is described as a VENTILATOR with dimensions and description of how it should be rigged on deck to catch the air and lead it below deck.

Although reference to the journals of the Institute of Naval Architects provides plenty of evidence of the increasing problems of ventilation in the 19th Century with ship construction progressing from wood to steel, it was 1857 before the man Schiele used a fan and engine with any form of ducts (actually wooden tubes of a 100 square inches). Natural ventilation was the general order of the day, the deck might be sprayed with water at night as a cooling method and wind scoops fitted to the side lights provided dubious forms of ventilation.

Travelling POSH to India meant Port-Side Out Starboard-Side Home for those who could afford it to benefit from such amelioration of natural sun effect as thus could be obtained.

The early part of the 20th Century saw little advance except that mechanical ventilation more and more supplanted natural ventilation, the systems were very simple duct with "Punkah" louvre terminals. Most systems were served

by centrifrugal fans supplying un-heated, un-filtered fresh air to the accommodation which would be heated by steam or electric radiators. The ST. PATRICK of the Great Western Railway had a twin duct system terminating in "Therm-Reg" louvres on the cabin bulkheads where the occupant could select a mixture of air to suit his or her needs. Accommodation generally was poor by today's standards, only the public rooms and de-luxe cabins had ship side lining and ceilings. All other rooms had bare steel sides and ceilings. Wind scoops were stowed in all cabins to give additional ventilation in the tropics by inserting in the side light. They were often the cause of flooding if the weather turned rough. Possibly the worst conditions were those in the hold between decks of the "BI" ships which were fitted to carry pilgrims to Mecca when not carrying cargo.

In 1930, the Lloyd Trestino motor vessel VICTORIA was the first ship to incorporate AIR CONDITIONING to "Carrier's" design, but this was confined to the public dining rooms, the ventilation to the remainder of the ship being basically the same as had been customary up to that date. This division of air conditioning for the Public Spaces and mechanical ventilation for the remainder persisted even with such magnificent ships as the NIEUW AMSTERDAM, flagship of the Holland America Line, The P. & O. ships STRATHALLEN, STRATHAIRD and the Cunard QUEEN MARY and QUEEN ELIZABETH. However, the ventilation systems, especially for the QUEEN ELIZABETH were better planned and easier to control. Mixture control in the cabins consisted of a mixing box located in the deck head with a bicycle gear wheel attached to the spindle of the mixing damper and a corresponding gear on the cabin bulkhead with a handle instead of a pedal. (The chains somehow kept disappearing !). By 1950 various Owners began to specify air conditioning. In the first instances this was only required for hospitals on tankers trading in the Persian Gulf. It was generally merely grafting cooling equipment onto their heating and ventilating systems, instead of developing new equipment.

The Canadian Pacific Steamships Limited in 1956/57 had promoted the first fully air conditioned passenger ship and in 1959 the P. & O. decided that they must convert existing ships to fully air conditioned by installing centrifrugal compressors in the CHUSAN and the HIMALAYA. But it was only in 1960, with the launching of the EMPRESS OF CANADA that there was the first installation of the Marinair system with complete AUTOMATIC control of all cabin air conditioning as well as for the public spaces. The NORTHERN STAR for Shaw Savill followed in 1961 and in 1967, the QUEEN ELIZABETH 2 - Cunard's Q4 - was launched on the 20th September and included the most modern complete "Ships Lungs" with individual cabin control, making a closed ship with central air conditioning equipment at last functioning for all parts of the ship as the lungs do in a human body

PERSONAL NOTES BY JAEH

In 1930, C.L.S. was returning by ship from the States with the drawings for the first Air Conditioning Installation to be made in Lloyd-Triestino Liner, the N.V Victoria on the ship: JAEH met a rather lovely actress named Zelma O' Neill who he joined at dinner to the outrage of CLS who kept sending messages by the waiter that the soup was getting cold, the fish was drying up, the meat was loosing flavour. At coffee CLS pointed out in a disapproving tone that the hair was dyed to which JAEH joyfully replied "yes! I know! I've looked down at the roots.!" Zelma became a friendly companion during the voyage right up to the arrival at Southampton and the approach of her large handsome husband, but the relationship between CLS and JAEH remained on a suspect point CLS no doubt thought JAEH too frivolous whereas JAEH thought CLS stuffy but also there was respect on both sides. CLS was to be associated with CEC and Marine Air Conditioning until his resignation in 1946.

The installation made on the M V Victoria included full Air Conditioning for the dining saloons and six luxury cabins: The cabins were treated by means of local induction units, supplied by small high speed air ducts conveying conditioned ventilating air only, thereby forming the fore-runner of all high speed air systems such as the Weathermaster System.

After the Victoria there was a long sequence of ships in which the public rooms were all fully air conditioned and a few luxury cabins, such ships were the Orion (Orient), Strathmore, Stratheden, Strathalan, (P&O) Dominion Monarch, Normandie first ship in which centrifugal refrigerating machine was installed (FR) and Orcades. The first air conditioning installation for the Cunard Steam Ship Company was in the "Queen Mary" in 1935 when the desirability to increase passenger comforts was begining to be appreciated.

At that time the Air Conditioning Installations were limited to the public spaces, that is the Main Dining Saloon, First Class Lounge, Tourist Dining Saloon and First Class Haidresser's Shop. It was only after the war, when the "QUEEN MARY" was being reconverted for normal requirements, that additional Air Conditioning Plants were fitted to extend the Air Conditioning System to include the First Class Smoke Room, Long Gallery and Salon, Cinema, Cocktail Bar and Cinema Projection Room, Steam Vacuum Refrigerating Plant provided (184 ton) 5259.pm water at 47°F.

The Air Conditioning Installations for the "QUEEN MARY" were followed in 1939 by similar installations for the "MAURETANIA". In this case there were six Carrier Plants serving the Cabin Dining Saloon, Grand Hall, Tourist Dining Saloon, Tourist Lounge and Tourist Cinema.

In 1940 the biggest Air Conditioning Installation on board ship was made when the twelve plants to serve the "QUEEN ELIZABETH" were fitted. These plants served the Cabin Restaurant, Tourist Dining Saloon,

Tourist Lounge, Cabin Smoke Room, Theatre, Salon, Cabin Lounge, Writing Room, Studio and Hairdressing Saloon. Again steam vacuum refrigerating plant provided the chilled water-1410 9.p.m at 46°F (390 TR)
In 1938 Winsor Engineering Co Ltd raised the question of Ships ventilation and CLS pointed out that we might wish to quote but possibly in co-operation with the[redacted]-letter dated 31.10.1938. - attached.

The sequence of passenger ships was terminated by the Second World War during which much work was done for the more important rooms (central radar etc) for the Admiralty including K.G.V. Class, Light Fleet Cruisers; 43 Class - 30 units; Centaur - 40 units, Hermes - 25 units in addition the Carrier Factory was busy on air and sea rescue ships.

After the war the first installation of air conditioning continued the pre-war pattern of applying these comfort facilities only to public spaces. In 1947 sixteen Carrier Plants were installed in the "CARONIA", these plants serving Aft Dining Saloon and Officials' Dining Saloon, Theatre, Verandah Cafe, First Class Smoke Room, Library and Writing Room, Garden Lounge Bar, Cabin Lounge, Forward Restaurant and Private Dining Saloons, First Class Lounge, First Class Hairdressing Saloons, Cabin Smoke Room, Hospital General Wards, Operating Theatre, Infectious Wards, Cabin Hairdressing Saloon, Gymnasium and Medicinal Bath Cubicals.

This was followed in 1947 by the "MEDIA" 1948 by the "PARTHIA", in which case the installations comprised three plants serving the Dining Saloons, Lounge, Cinema, Cocktail Bar, Smoke Room, Long Gallery, Drawing Room and Writing Room.

Following the resignation of CLS, SLG decided to forego ship work and more or less handed CEC interests over to Winsor. But later the Admiralty desired to keep CEL in competition with Thermotanks and JAEH on SLG's instructions negotiated cost plus contracts for the new Hermes Class (Centaur, Bulwark, Albion and Hermes) which resuscitated the marine work leading to the C.P.S Empress of Canada shaw Savill's Northern Star the Marinair System and the QE2, followed by a fresh sequence of installations on Corvettes, Patrol Craft and Navy Frigates for many countries.

Code
C.L.S C.L Sainty
J.A.E.H. J.A.E. Heard
S.L.G S.L Groom

Orion 1935, 23,350 tons, 665 x 82 feet, Orient Line

Media 1947, 13,350 tons, 531 x 70 feet, Cunard White Star