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THE MARINER'S COMPASS.

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[IN the 47th Number of this Journal, when giving a drawing and a short description of the Fluid Compass supplied by this Institution to its life-boats, we stated that we hoped in a future Number to give an Article on the Mariner's Compass by a gentleman scientifically acquainted with it. By the aid of Commander Evans, R.N., Superintendent of the Compass Department of the Admiralty, who has kindly furnished an interesting Paper on the subject, we are now enabled to fulfil our intentions.]

Connected as the NATIONAL LIFE-BOAT INSTITUTION is with the interests of this country, in all that pertains to the security of life and property, the pages of its Journal have been deemed a fitting place for a popular Article on the Mariner's Compass.

All classes of the seafaring community, whether long voyage or coasting sailors, yachtsmen, fishermen, or the hardy boatmen of our coasts, have a direct interest in, and some acquaintance with, this familiar sea-instrument; yet it would appear as if this wide familiarity had engendered some indifference to its requirements and functions, and consequent ignorance of its remarkable properties and the laws which govern its action.

It would be beyond the scope of this Article to more than briefly touch on the governing laws to which we have alluded, but it may prove of interest, and perhaps be attended with good results, to place before our nautical readers some account of the essentials of a good working compass; to notice the worthy labours that for a long series of years have been bestowed on it theoretically and practically, as also some of the crude current ideas as to the fundamental principles on which its action depends; and to detail in general such points in its construction as may be useful in practice, prefacing the whole by a concise retrospect of what is known of its history by record or tradition.

Wrapt as the early history of the Mariner's Compass is in obscurity, there is sufficient evidence to prove that at a very remote period among the Eastern nations the directive power of magnetized iron was known, and that it was turned, by the Chinese, to purposes of distant travel, if not to extended navigation. The time of its introduction among the Western nations of Europe is comparatively recent; the merit of the invention of the compass in its present arrangement of box, bowl, and supporting pivot, being assigned to a Neapolitan citizen, about the year 1302; but recent literary research indicates that it must have been in use, under similar conditions, at least a century earlier, by the mariners of England and France.

Between the remote date recorded in the Chinese annals (said to be about 2600 years B.C.) of the application of the freely-suspended magnet to purposes of travel and that just given, little or nothing is known of its history. The successive powerful nations that existed near the shores of the Mediterranean sea have left no records of its em-

ployment, and we may certainly draw the inference that in the lengthened and circuitous voyage of St. Paul, which resulted in shipwreck on the Island of Malta, the "shipmen" had not the advantage or consolation to be derived from this guiding monitor.

By some it may be considered puerile to seek after records which add so little to our real knowledge, but considering the powerful aid the Mariner's Compass has rendered to civilization, and the material progress that has been made in the well-being of mankind from the days of Columbus and Vasco de Gama, by opening up the navigation of vast and distant oceans, and the consequent discovery of rich and fertile lands; the interest of the intelligent seaman cannot fail to be enlisted towards whatever relates to so priceless an auxiliary to his labours.

It is somewhat remarkable that the compass, valuable as it is to us, and honoured in song as it has been from the days of the Troubadours to those of Dibdin—the sailors' bard—has not at all periods received the same meed of honour from those most interested in its use. In the 17th century several treatises were written relating to the discovery of longitude to be attained by magnetic observations of the dip and variation of the compass-needle: from the interest created at the time by these views, we may infer that at that period the value of the compass to navigation was thoroughly appreciated, and we find that in immediate connection with the development of certain magnetic laws directly affecting it, a special voyage of research to the South Atlantic Ocean was undertaken by the illustrious HALLEY under the direction of the British Government in 1701.

In the middle and towards the close of the 18th century, much attention was paid to the fabrication of magnets, and the art of infusing high magnetic power into them had attained a great degree of excellence. Notwithstanding this progress, we find, in the beginning of the 19th century, the celebrated navigator Flinders describing the compasses of the Navy as "the worst-constructed instruments of any carried to sea;" and in 1820 that able philosopher, Peter Barlow, in an official report to the Board of Admiralty, on the compasses of the Royal Navy, stated that more than one-half of those he had examined (150) "should be considered as mere lumber, and ought to be destroyed."*

It would be an interesting subject of inquiry to trace the causes leading to the decline of the compass in the estimation of seamen which brought about such a falling off in its fabrication; we can alone now shadow forth one or two probable ones. In the time of our scientific navigators of the last century, Cook, Vancouver, Phipps, and others, great attention was devoted to the determination of purely magnetic observations, partly with the practical view of the results being ultimately useful (thus reviving the old idea) in obtaining the longitude; the dip of the needle, for example, was frequently observed at sea, and the variation of the compass was certainly determined in many distant parts of the world with considerable accuracy, as is verified by recent observation and investigation. Singularly enough, the discrepancies in the variation of the compass, as then observed at sea, under different circumstances of the position of the instrument, and the direction of the ship's head, and which we can now trace to the action of the iron in the ship magnetized by induction from the earth, were considered as due to inherent errors of manufacture, and its character for accuracy of course looked on with suspicion. The art of navigating by lunars and chronometers was now cultivated by the higher class of seamen, the check on the compass was consequently more perfect, and the navigator was again more independent of it. Among the general mass the golden rule of the "three L's," or strict attention to the lead, latitude, and look-out, was the common formula of navigation, without even an allusion to the poet's "unerring guide." The compass was now probably at its lowest ebb in the tide of professional opinion, for we actually find it

* It is scarcely necessary to say that this state of things no longer exists; from the time of BARLOW's Report there has been progressive improvement, and there is ample testimony from many disinterested and leading authorities that the chief compasses of the Royal Navy have attained a high degree of excellence; and, indeed, have been adopted as models by other first-rate navies of the world.

treated as a hardware article, specially manufactured in the Minories and its neighbourhood with other ships' stores, and stowed away indiscriminately with iron hooks and thimbles, deck scrapers, hook-blocks, and other choice miscellanea of the boatswain's storeroom: this is no fanciful picture, but what is well known to those conversant with the naval services little more than a quarter of a century past.

Let us turn to the present day, and take for example what we find recorded in this Journal, at the opening of the year, relating to a compass designed for the Life-boat Institution; it is described as very portable, compact in its details, serviceable in its arrangements, and exact as a philosophical instrument; in fine, "it is found to answer admirably in every respect." Now, although this excellent character cannot be applied to the compasses in general use in the mercantile navy, still much improvement has taken place in late years both in the manufacture and in their treatment on board ship.

The improvement as a sea instrument may in part be traced to the introduction of steam, a vessel being thus enabled to make as much progress on a direct course in a few hours as would formerly have taken days to accomplish; the improved sailing powers also of nearly all classes of ships, and the competition and emulation in making quick passages have further tended to place the compass as an indispensable auxiliary to the sextant and chronometer; greater issues depend on its correct action than in those days when time was of little importance to the seaman, and when, on the approach of apprehended danger, the ship's head was turned away from the obstacle, and a more propitious season quietly awaited. The seaman of to-day, without disregarding the good old "three L's," is obliged to give a more prominent position to his compass. The progress of our knowledge of terrestrial magnetism, one of the most important branches of physical science, has also been most marked in the last half century.

The extensive (and, so far as the compass is concerned, it is to be feared too often extravagant) introduction of iron into the construction and equipment of ships, which, by increasing the errors of the compass, diminishes materially in some directions of the ship's head its directive power, and thus renders a sluggish compass, or in other words an inferior compass, useless, or even worse than useless, has necessitated not only the employment of compasses of superior manufacture, but also some knowledge of the laws which affect them by the action of the ship's iron: this last is a subject on which we forbear to treat at present, but the resulting principle should not be lost sight of, namely, the absolute necessity of a compass of first-rate character forming a part of the equipment of every vessel in which iron enters largely into the fittings.

The question may now be asked—*What* are the essentials of a good compass? Before answering this question, it may be advisable to give some account of the features of a bad compass, and this we shall do by making a few extracts from the Report of the late Professor Barlow on the contract compasses of the Navy in 1820, to which allusion has already been made, and it will be seen how closely his description applies to those of the genuine old Minories' stamp, forming too frequently at the present time the miserable equipment of our coasting craft, and, indeed, of some of our noble foreign trading ships.

Mr. Barlow considered, after his extended examination, "that the causes of error may be reduced to the three following:—

"1. The errors which naturally appertain to the form of the needles usually employed in those instruments.

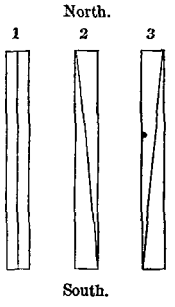
"2. To imperfect workmanship.

"3. To the manner in which the compasses are kept in store."

"With respect to the imperfections in workmanship, it is needless to enter into detail. The cards are many of them elliptical, rather than circular; true centering seems to be entirely disregarded, and the pivot capping which ought to be agate, seems in many instances only to be common glass. The balance also in various cards is only preserved by a very liberal distribution of sealing-wax, which increases the weight of the card, and prevents it traversing, par-

ticularly where the needle has but slight directive power.

"With respect to the first of the above sources of error, it is to be observed that the needles are commonly of a form approaching very nearly to a parallelogram as shown in the annexed figures, and conse-



quently the accuracy of the bearing of the card will depend upon the north and south point of the needle coinciding with the geometrical axis of the figure as in figure 1. In this case, if the card be placed with its north and south points corresponding with the axis of the needle, there will be no deviation; but if, in communicating the magnetic fluid to the needle, the greatest accumulation should be oblique with respect to the axis as in figure 2 and 3, then the card being placed as before, its north point will bear to the east or west of the true magnetic north by a quantity equal to that obliquity." This was proved by unscrewing the cap of one of the needles, and screwing it again on the other side, thereby turning the face of the card downwards, and then suspending it again; the error in deviation was now found to be 4° east instead of 4° west, as originally observed, a circumstance which the Professor "conceives can only be accounted for by supposing the needle to have received its magnetism in a diagonal direction, instead of its being communicated in a line coincident with its geometrical axis. This source of error may, it is obvious, be avoided by suspending the needle edgewise, instead of flatwise."

On the third source of error there are the following valuable remarks, which apply well to the conservation on ship-board. "It is a well-known fact, if two magnets be brought near and parallel to each other, with their poles inverted, or if they be laid across each other, or be in any other irregular manner brought into contact, or within each other's influence, the power of each will be impaired, and perhaps ultimately destroyed. Now, in the store, the boxes containing the cards, &c., are all placed and piled on each other indiscriminately, without any regard being paid to the directions of the needles within them; consequently there is a perpetual decomposition of the magnetic influence going on, which would ultimately derange and destroy the action of the most perfect instrument; and to this cause is doubtless to be attributed the very weak directive force of many of the needles which I examined, as I cannot imagine that any instrument-maker would deliver them in the state in which they now are."

The closing paragraph of this Report is so comprehensive, that, at the risk of repetition, we introduce it, adopting most fully the Professor's views:—"I am aware" (says the Professor) "that many nautical men set a very little value upon the compass; but this, I conceive, arises from the constant defects it is found to exhibit, and not that from its nature it is incapable of rendering them essential service. If, indeed, a lunar or other astronomical observation could be made at all times, this instrument might perhaps be nearly dispensed with; but as it frequently happens that several days pass without such an opportunity presenting itself, the perfection of the compass cannot be an object of indifference; and I cannot help thinking, if this perfection was attained, that a great degree of accuracy might be introduced into the dead reckoning, and many severe and afflicting losses prevented."

We now proceed to the consideration of the essential qualities of a good compass.

These we consider to be the combination of great sensibility and stability with simplicity of construction. By sensibility and stability it is to be understood that the needle is freely to submit to the earth's magnetic force, with power sufficent to steadily obey that force under the varying motions of a ship, without the aid of friction or other mechanical impediment; steadiness

(or rather sluggishness) produced by the latter causes being obtained, as is now well known, at the expense of accuracy.

The growing demand of late years for an efficient compass has produced—to meet the qualities described—an almost endless variety of forms and arrangements of details, of which the generality are more or less complicated, and, of course, more or less difficult of repair, and costly. Simplicity of construction, so that repairs could be effected by an ordinary skilled mechanic, must be deemed a qualification of merit. The principal modern improvements may, after all, probably be reduced to the introduction of compound needles, arranged on sound philosophical principles, and in the manufacture and fitting liquid compasses; —by the latter is meant those compasses in which the card and suspension is immersed in fluid, and whose use in any excessive motion of a ship or boat appears to be indispensable. We propose, however, to confine our attention chiefly to the simple form of compass, premising that the essential points of construction are equally applicable to the liquid compass.

The chief points to be attended to in the construction of the Mariner's Compass are: —(1) Great directive power of the needle, with little weight, and consequently little friction on the point of suspension. (2) Permanency of the magnetic power or force in the needle. (3) Accurate adjustment of the several parts of the compass. This comprises:—

(*a*) The magnetic axis of the needle coinciding with the north and south points of the card.

(*b*) The intersecting point of the axes of the gimbals of the bowl coinciding with the point of suspension of the card.

(*c*) The accurate centering of the point of suspension within the bowl.

(*d*) The perfect impression of the card, so that the centering and marginal divisions are not distorted by shrinking or other causes.

Some of the foregoing points may be usefully reviewed in detail; but as the essence or cardinal virtue of the compass is concentrated in the needle, our principal attention will be directed to the consideration of this wonderful agent.

There are numerous records within the last century of the labours of various philosophers in investigating the best form for compass-needles—their size, solidity, weight, kinds of steel best adapted, and methods of tempering and magnetizing. It would far exceed our limits to relate the various results; we must therefore restrict this part to an enunciation of certain principles, which, from being consistent with known magnetic laws, and further established by experiment and experience, may be received with due confidence.

The question, which is a very important one, as to what form should be given to the needle to produce the most advantageous effect, is thus answered in the language of science: "That form is to be recognized as the most advantageous in which are united the greatest possible magnetic moment, with the smallest possible mass, and the smallest possible moment of inertia." Experiments based on these conditions result in the following:—

1. That narrower magnets are more advantageous than broader.
2. That thinner magnets are more advantageous than thicker.
3. That consequently the most advantageous form is that in which breadth and thickness disappear, and the magnet (or needle) is transformed into a mathematical line—that is, into a so-called linear magnet.

We have thus authority for applying to the needle the simplest of forms; but there is another important result from the experiments which led to the foregoing conclusions, namely, that "there is only one means of obtaining great magnetic strength with trifling weight, viz., by firmly cementing several thin and flat magnets near or upon one another in one system, without their touching each other." There is a limit, however, to the effective combination of several magnets, similar to those just described, which may be thus summed up:—

(1) Any single magnet has more proportionate magnetic power than two such magnets combined. (2) A combination of such magnets has more actual magnetic power than any single magnet containing the same quantity of steel in mass. 3. The absolute gain of power by each additional magnet diminishes progressively, and hence a limit to the extent of combination.

We see here the advantage of reducing the weight of the needle by making it as thin as is consistent with strength; increasing its power by the addition of one or more laminæ; or again, multiplying the power by placing two or more such combined needles on the card. The arrangement of a compound system of needles has been received with disfavour by many acknowledged authorities, on the grounds that their similar poles, being so closely adjacent, would in effect mutually destroy their magnetic power. Experience has proved, however, that a remarkable amount of permanency will be found in properly-constructed needles so placed, after the lapse of many years. This objection, practically, therefore does not exist.

The advantage of a compound system of needles over a single needle, in addition to that of greater directive power being obtained with the same weight (and the interference of the pivot-cap with the centre of the needle), are manifold and somewhat remarkable. The needles can be placed on their edge, whereby there can be no alteration of their magnetic axes (see preceding figure). By placing two equal parallel needles with their ends 60° apart—*i. e.*, 30° on each side of the north and south line of the card—or, similarly, two pairs of equal parallel needles 30° apart—*i. e.*, 15° and 45° on each side of the north and south line*—the moments of motion about all horizontal axes are equal, and oscillations of the card about any axes—or, in other words, with the ship in motion with her head in any direction—are performed without the "wabbling" motion common to single bar needle-cards. The following remarkable property also exists, which points to the desirability of compass needles, combined as just described, being furnished to iron ships especially:—

When magnets or soft iron are placed as correctors of the larger deviations due to the iron of the ship, unless the needle (where a single bar is employed) be very short, compared to the distance of the disturbing magnet or iron, a deviation is introduced depending on the length of the needle; this deviation disappears with the compound arrangements.

The tendency of late years has been, in particular cases, to considerably increase the length of the compass-needle above that generally adopted of 6 to 7 inches; although we may consider that increase of length gives a proportionate increase of directive force, yet the weight, and consequently the friction, increases proportionally, so that nothing material is thereby gained. There is also this objection, that a perfect long needle is more difficult of manufacture than a perfect short needle, the former being more liable to have "consecutive poles"—that is, the whole of the polarity is not collected at either end, but distributed alternately along the length; this defect occasions great loss of directive power: on the whole, a length not exceeding 6 to 8 inches appears to embrace all the necessary conditions of a good needle.

Polishing the needle of a compass is of no advantage considered magnetically: for general use in all climates, a coat of paint or varnish is, on the whole, preferable.

Among the parts of a compass which in the course of time most affect its correct working are the pivot and cap on which the needle traverses; great care is therefore required both in the selection of the materials—subject as they mutually are to constant friction—and the accuracy of workmanship of those parts. Agates are commonly used for caps, but it has been remarked by a competent authority "that this is the worst of the hard materials that are fitted for pivots of any kind, as it consists of an immense number of thin strata of different degrees of hardness, and which can often be seen only with very powerful microscopes." Rubies and sapphires are now used in the fittings of superior instruments.

* As in the Admiralty Standard Compass card.

Steel pivots, hardened and duly tempered, have now taken the place generally of the old-fashioned iron-spike. To preserve the points from rust, they are, in some first-rate compasses, gilded by the electrical process, and also pointed with a peculiar metal, found with platinum, known as "native alloy," the properties of this metal being remarkable hardness, and freedom from rust under most trying conditions. Pivots for heavy or storm-card are frequently, instead of being pointed, tipped with a rounded ruby; in which case the hollow of the cap is made of gun or speculum metal, highly polished, and accurately adapted to the size and shape of the ruby. With powerful needles, this arrangement works remarkably well. With a pointed pivot, the perfect adaptation of the point to the cavity of the stone in which it works is essential; the stone should also have a high degree of polish. These minutiæ are neglected in inferior compasses.

An interesting fact in magnetic science, which bears directly on the efficiency of the compass, is the influence of non-magnetic substances generally in quieting the vibrations of the magnetic needle. Metallic substances have the greatest influence—silver and copper in a very high degree; we find accordingly that when a magnet is vibrated within a ring of copper, the amplitude of the arcs of vibration are sensibly reduced—although the times of vibration remain the same—and the bar, or needle, tends rapidly to a state of rest.* The comparative tranquillizing effect of copper over wood is very great (about 75 to 1); the bowl, therefore, of a compass with any pretensions to excellence should be constructed of pure copper, of substantial thickness, and the part adjacent to the needle increased in solidity by an extra ring, the ends of the needle being permitted to work as close to the ring as consistent with freedom of motion. These latter details are based on the assumed law of the restraining force of the copper with a given magnet, being inversely as the squares of the distance from the pole of the bar, and directly as the quantity of copper within its sphere of action.

We have thus sketched the chief details of the Mariner's Compass; and it is obvious that there is required in its most simple construction good and often costly material, combined with a high order of skilled labour, and a knowledge of many mechanical and philosophical principles. We cannot look for more in either of those aids to the seaman, the chronometer and sextant.

An Article on the Mariner's Compass would at the present time be incomplete without some reference to those wild, and often dangerous schemes to the unwary mariner, which are occasionally before the public; professing to render the compass indifferent to the magnetic influence of the iron of the ship by the interposition of some non-conducting or conducting substance, so that the needle shall point to the magnetic north under all circumstances, and in all places. One of the fundamental laws of magnetism is here overlooked; for the influence of this marvellous and mysterious force is, like that of gravity, exerted through all bodies without the slightest interruption;—as also the obvious consideration, that if any body could intercept the action of the ship's iron, it would also intercept the action of the earth's magnetic force on the needle.

* Physical research has shown that this is not the result of ordinary magnetic action, but is dependent on the generation of electrical current induced by the magnet whilst in motion in the metallic ring, and is termed Magneto-Electric Induction.

SHIPPING.—The entries of British tonnage at ports of the United Kingdom have risen from 7,621,035 tons inwards and 7,699,497 tons outwards in 1861, to 7,856,639 tons inwards and 8,090,221 tons outwards in 1862. The foreign tonnage fell from 5,458,554 tons inwards and 5,716,555 tons outwards in 1861, to 5,234,451 tons inwards and 5,354,128 tons outwards in 1862. On the registry of the whole British empire, including the plantations, there were at the close of the year 1862 39,407 vessels of 6,042,096 tons—an increase over the previous year of 539 vessels, and 146,727 tons. In 1862 there were 1,923 new ships of 451,534 tons built and registered in the United Kingdom and British plantations—a greater addition than in 1861 by 201 vessels and 132,706 tons. The number of vessels, British and foreign, which entered inwards and cleared outwards from different ports in the United Kingdom during the past year was 268,462. They were manned, probably, by 1,610,000 men.

THE GALE.

"The wind bloweth where it listeth, and thou hearest the sound thereof, but canst not tell whence it cometh, and whither it goeth."

WE are not about to write a sermon, although we have commenced with a text; but the sentiment conveyed by it is so beautiful and appropriate to our subject that we cannot resist its introduction. And surely it may be both advantageous and interesting to many of our seafaring readers to study reverentially, and somewhat more attentively than they may have already done, that mysterious phenomenon, the mighty gale, which, though they see it not, they both sensitively hear and keenly feel; whose effects, so far as evident to them, may have seemed to be only or chiefly evil; and on which, in moments of anxiety or self-reproach, some of them may even have looked with fear and trembling, as an agent of Divine wrath, strewing its pathway with devastation and woe.

Now, we hope to make it clear to such persons that the fiercest gale, however calamitous in some of its effects, is not an instrument of anger, or the result of a fortuitous chance; but that, on the contrary, it is a part of a well-considered and benevolent plan, chiefly an instrument of good, and that its partially destructive effects are only sufficient to place it in the category of imperfection, in which all things in this temporary world must be classified. And surely they may derive from such knowledge that calm and resolute acquiescence in God's providence as shall come to their aid when danger threatens, and impart to them the coolness of head and strength of nerve which shall best enable them to successfully battle with and avert its consequences.

If in any cases such should be the result, we shall have attained the practical end which we have in view. For how many valuable ships, and still more valuable human lives, annually perish from the want of that cool judgment and presence of mind in those in command, which, in moments of extreme peril, is beyond price!

It is, of course, known to every one that the wind is merely the air in motion; but the nature of the air, the reason why it is put in motion, and what occasions its being so, is known to comparatively few. We will briefly attempt to supply that rudimentary knowledge of the subject which should be possessed by every one, and which cannot but be both interesting and useful.

The air, which is the first essential to all animal and vegetable life, is what is termed an elastic fluid: although invisible to us, it is as much a fluid as water and the many other ordinary liquid bodies which are visible to the eye, and with which every person is familiar; but it is much lighter than liquids, or, technically speaking, it has less density. It also possesses the property of elasticity to an indefinite extent, which water and other liquid bodies do not. Thus water, even under enormous pressure, can only be slightly compressed into a smaller compass; but air can be compressed by force, or expanded by the withdrawal of pressure, to an amazing extent. For instance, a thousand cubic feet of air, by the aid of sufficiently powerful machinery, might be compressed into the space of one cubic inch, whilst, on the other hand, if from an air-tight vessel, of sufficient strength, holding a thousand cubic feet of air, the whole of it except one cubic inch could be artificially abstracted, the remaining cubic inch would, from its own elasticity or expansive power, completely fill the whole vessel.

The air which surrounds this globe is a compound body—that is to say, it is composed of different bodies, which can be separated one from the other. Its principal ingredients are two gases, called oxygen and nitrogen; these are mechanically combined in the proportion of four measures of nitrogen to one measure of oxygen. In the great laboratory of nature they are being constantly separated the one from the other, by the respiration or breathing of animals and of plants, and by combustion or burning, and also by the oxidation of metals, fermentation, &c.

This important body, the air, without which no animal or vegetable life could for a moment exist, and on the purity of which the healthy state of each so greatly depends, has been generally supposed to be of essentially a local character, being confined to a comparatively short distance above the earth's surface, and which distance has been variously computed by astronomers at about 40 or 45 miles. Such, however, is the elasticity of the air, that at the height of about $3\frac{1}{2}$ miles above the sea-level, the aëronaut, or mountain traveller, has ascended through one half of the atmosphere; the remaining half being less subject to pressure and the attraction of gravitation, occupying no less than 40 or more miles in vertical height. At the level of the sea the barometer stands at the mean height of 30 inches; but at the height of 3·4 miles it stands at only 15 inches, at 6·8 miles at 7·50 inches.

Some idea of the attenuation of the air at a short distance above the earth's surface has been lately exemplified by Messrs. Glaisher and Coxwell, in their perilous balloon ascents in this country, when, on one occasion, at a few thousand feet above the earth's surface, the pigeons they threw out, beating

the "thin air" with their powerful wings, obtained no support therefrom, but fell rapidly, as though lifeless, towards the earth; and when at the extreme height of 6½ miles, to which they ascended, the combined effects of the reduced pressure on their bodies and the more rarefied food to their lungs reduced Mr. GLAISHER to a state of insensibility, and almost overpowered Mr. COXWELL, thus proclaiming, as in so many words, to the race of man, "So far canst thou come, but no farther, and hither shall thy proud course be stayed."

We have stated that the air is a compound body, and that its component parts are readily separable the one from the other by various means. It is also capable of holding foreign bodies, such as aqueous and other vapours and exhalations, and minute particles of vegetable and mineral solids, in the shape of dust; and of retaining in connection with it other gases, the products of the decomposition of animal and vegetable matter, and of combustion. It follows, therefore, that its properties near the earth's surface, as a respiratory and alimentary medium, must be of a varying character, according as foreign bodies, by exhalation or otherwise, have mingled with it. It is, however, a remarkable proof of design that the two chief constituents of the atmosphere are always in the same proportion; for whether in a fever hospital or on the top of a mountain, the nitrogen and the oxygen are in the ratio of four to one.

But, even if experience did not prove such to be the case, we might reasonably expect, from the analogies of nature, that some one especial state and proportional combination of the ingredients of the air would be fitter for the respiration and health of animals and vegetation than any other, and that, therefore, some plan would have to be devised and arranged to maintain generally that happy equilibrium. We need not, however, theorize on this point; for the statistics of health and the returns of the registrars of deaths only too plainly record the often dreadful effects of poisoned air in our larger cities and towns, from want of ventilation in the dwellings of the poor, and from insufficient or imperfect sewerage in general; and in many of our rural districts, from the malaria arising from undrained marshes and swamps.

Before, however, seeking for that machinery in nature, devised to compensate for such local disturbances of the purity and life-supporting properties of the air we breathe and live on, it may be worth while to consider for a moment some of the known important properties of the air, although all those properties which Infinite Wisdom has planned may not, and perhaps never will, be discovered by man. In describing, or rather briefly relating, some of these wondrous properties, we shall not attempt to enter into an explanation of them, this not being a scientific treatise, and our only object being to convey some faint impression, in this one phase of nature, to the minds of the more unscientific of our readers, of the wisdom, and power, and contrivance that have been, and are being, exerted by the Great Creator of all things for the sustenance and welfare of his creatures.

1. SUPPORT OF ANIMAL AND VEGETABLE LIFE.—The first and highest function of the air, if we may reverently use the expression, is the support of the life of man, of intelligent beings; the support of the life of all the inferior races of animals and of the vegetable world being subservient to it. It will be sufficient to state that this wonderful power is effected through the medium of organs which, in the higher classes of animals, reside in the lungs and in the skin, and in plants in their leaves, which organs have the power of decomposing the air, and appropriating that portion of it which is necessary for the growth or support of animal or plant, and discarding that part which would be useless or injurious to it. It will be sufficient to further state generally that that part of the air which is exhaled by the animal as a product of respiration is necessary to the plant, and that that part which is changed by the animal and by combustion is vivified so to speak, by the expiratory organs of the vegetable world, and that thus the general equilibrium or purity of the atmosphere is maintained.

2. COMBUSTION.—Without the medium of the air there could be no combustion, as

the process is commonly understood, since fire cannot under ordinary circumstances exist unless fed by oxygen gas; and inflammable bodies, in giving out heat and light, decompose the air and consume its oxygen. Indeed, the process by which the air is decomposed and its oxygen appropriated by the breathing organs of animals, thereby producing animal heat, is a species of combustion. How great a necessity, therefore, is this property of the air must be felt by every one.

3. Evaporation. — Another important property of the air or atmosphere, caused by its density and weight, is the distribution of moisture. The minute aqueous particles which now float upwards through the air become partially condensed under change of temperature; they congregate in clouds, and are carried by the winds of heaven over the dry land, there to fall in refreshing rain, revivifying the face of nature, and replenishing the lakes and springs and rivers for the use of man. If there were no atmosphere, the ocean, to be sure, and the dry land would still exist; but the former would be calm, and still, and lifeless, a veritable "dead sea," and the latter one great waste. No life, no motion, no sound around the whole vast globe to disturb the eternal still and silent void, a void which it is painful even to contemplate.

4. Reflection of Light.—A fourth remarkable property of the air is the reflection and diffusion of light. If there were no air there would be perfect darkness on every spot on which the sun's rays did not fall; no object would be visible, even under the shadow of a house or a wall, and intense darkness would be in all our dwellings, for, as already stated, without the air there could be no combustion, and, therefore, no artificial light.

5. Transmission of Sound.—Without the air there would be no sound, all sound being occasioned by a motion or vibration of the particles of the air, so that without the air there could be no speech.

Our space, however, will not allow us even to enumerate all the known properties or functions of this wonderful and beautiful fluid. Without it, we could not navigate the ocean—we could work no metals; indeed, as we have already shown, without it we could not live.

Such being, then, the all-important character of this surrounding medium in which "we live, and move, and have our being," we might feel sure, as inferred under a previous heading, that some adequate machinery would be set in motion to preserve it in the purest and most fitting condition to fulfil the important functions required from it.

Such a machinery exists in the wind—that is, in the motion given to the air itself; through which motion as complete a circulation and intermingling of parts and purification of the whole is provided as exists in the animal body by the circulation of the blood, and in the waters of the globe by the system of ocean currents and tides, and rivers, and streams. The great "trade winds," as they are termed, near the ocean's surface, and the great counter or return currents, in the higher regions of the air, being, as it were, *the gigantic arteries and veins of the system*, and the lesser and more temporary winds being subsidiary to them.

It will be sufficient here to state that the chief cause of the wind is change of temperature in the air over large surfaces: the heated air, for instance, as in the tropics, becoming lighter by expansion, and ascending into the higher regions, and the colder and heavier air from the Poles rushing on, like an ocean tide, to supply its place. The winds are also affected by the motion of the earth on its axis, and probably, to some extent, like the waters of the sea, by the moon's attraction.

That, however, with which we have chiefly to do is the point from which we started, that the great object of the wind, even of the fiercest gale, is a benevolent one, affecting the whole human race; that any evil which accompanies it is minor and temporary, affecting comparatively but few persons; and that the loss of human life which is occasioned by it at sea arises, for the most part, from the unskilfulness or ignorance, and only too often from the culpable neglect, of the owners of shipping property, and of seamen themselves.

THE WRECK REGISTER AND CHART FOR 1862.

IN accordance with our annual custom for many years past, we again present our readers with a synopsis of the returns just made by the Board of Trade to Parliament, of the wrecks and casualties which have taken place on the coasts, and in the seas, of the British Isles during the past year.

It may here be observed that the materials from which these valuable documents are compiled are derived from reports furnished by the Officers of Coast-guard and Receivers of Wreck, resident on the shores of the United Kingdom.

When we remember that the number of vessels which entered inwards and cleared outwards from different British ports in the course of the past year was 268,462, and that these ships had on board, probably, 1,610,000 men, it becomes almost a matter of certainty that a large number of casualties should take place amongst them every year.

The coasts of the British isles extend upwards of 5,000 miles, and on looking at the Wreck Charts which accompany the Register, it is observed that there are few parts of that continuous shore which are not studded with the usual wreck marks; and thus it is that on nearly every page of the Register this startling fact constantly presents itself—that during the year no less than 1,827 wrecks and casualties took place on our coasts, with the loss of 690 lives!

Compared with previous years the Register informs us that the wreck experience of the past year is very unfavourable. But the number of lives lost is fortunately considerably under the average, owing chiefly to the valuable and prompt services of life-boats and other means employed on occasions of wrecks on our coasts.

The wrecks and casualties in the year show a large increase on the average of those during the preceding eleven years. The number of wrecks in the last eleven years was 13,657, while the total voyages made to and from British ports in that period was 2,745,910—so that 1 ship was wrecked out of every 201. During the past year, as previously stated, the number of voyages of vessels to and from ports in the United Kingdom was 268,462, and out of this large number 1,827 casualties occurred—or 1 in every 147.

In the past eleven years, from the above wrecks 8,775 persons were lost, or nearly 800 each year. Last year, it appears from the returns that the lives of 4,729 persons were imperilled on the coasts of the British isles, of which number 690, or 14·59 per cent. were lost. The wrecks and disasters for the year 1862 may be thus classed:—

	Vessels.
Totally wrecked	455
Seriously damaged	695
Totally lost in collision	66
Damaged seriously by collision	272
Injured by collision	339
Total	1827

This number of disasters for last year is at the rate of five per day. The number in each month of the year is thus given:—

	Vessels.
January	221
February	117
March	163
April	87
May	77
June	75
July	94
August	66
September	75
October	346
November	179
December	327
Total	1827

It will thus be seen that the months of January, February, March, October, November, and December, have been the most destructive to ships.

The startling facts which the Wreck Register discloses each successive year have succeeded in drawing general public attention to this important subject, and frequently it is referred to in Parliament. On a recent occasion, when Lord RAVENSWORTH alluded, in the House of Lords, to the necessity of constructing Harbours of Refuge on the north-east coast, he caused to be suspended in their Lordships' library a large wreck chart lent by the NATIONAL LIFE-BOAT INSTITUTION.

The fearful scenes represented on that chart naturally excited their Lordships' attention. Indeed the dreadful havoc

which storms commit every year in the seas and on the shores of the British Isles can only be fully realized by the aid of such a chart. It will be observed from the accompanying Wreck Chart that the position of each casualty is distinctly marked.

It is, however, satisfactory to find that the publication of the Annual Wreck Register of the Board of Trade, and other means of publicity, have materially contributed to the establishment on our coasts of a system of life-boats and life-preserving apparatus, which reflects the greatest credit on the philanthropy of the age in which we live, and on the energy with which these means have been placed on our shores, by the joint action of the National Life-boat Institution and the Board of Trade.

Amidst the desolating scenes which the Wreck Register and Chart reveal, it is consolatory to know that by means of life-boats, the life-preserving apparatus, ships' own boats, and other means, 20,158 lives have been saved from a watery grave during the past seven years, as the annexed list shows:—

	Lives saved.
1856	2,243
1857	1,668
1858	1,555
1859	2,332
1860	3,697
1861	4,624
1862	4,039
Total	20,158

The following is a summary of the means used in saving the 4,039 lives from wrecks on the coasts of the United Kingdom during the past year:—

By life-boats	327*
By rocket and mortar apparatus	310
By ships' own boats, shore boats, steamers, &c.	3389
By individual exertion	13
Total	4039

As usual, ships, ships' boats, and smacks, have saved more lives in that period than the life-boats and the rocket and mortar apparatus. This apparent discrepancy is susceptible of easy explanation. When a disaster takes place in British waters, it frequently happens that either a ship or smack is fortunately at hand to render assistance to the crews of the distressed vessels. Such help is seldom attended with any very great danger (although sometimes it is so), and the men are often brought ashore before any tidings at all have reached a life-boat station. But the great value of the services rendered by life-boats can only be appreciated by considering that they are mostly performed on occasions when no other craft could be launched from the shore with safety.

Schooners and brigs were, as usual, the most numerous description of vessels that were lost during the past year on our shores. These are usually employed in our coasting and coal trade, and the destruction of hundreds of them, even in moderate gales, is now reduced to a matter of certainty.

In December last seven vessels foundered off the east coast of England—with the loss of all hands—while engaged in coasting voyages. One of them was a collier sloop 71 years of age! Another collier brig also foundered in October last, and 7 out of 9 of her crew were drowned. She was 99 years old!

The following is an analysis of the tonnage of the ships lost last year:—

	Vessels.
Vessels under 50 Tons	341
51 and under 100 „	441
101 „ 300 „	784
301 „ 600 „	186
601 „ 900 „	44
901 „ 1200 „	20
1201 and upwards „	11
Total	1827

The cargoes of these vessels are thus made up:—

Coals	593
Ballast, not colliers	165
Colliers, in ballast	128
Metallic ores	113
Grain, oatmeal, flour, and provisions	109
Stone, slate, &c.	100
General cargo	93
Timber or bark	89
Fishing smacks	84
Various, or unknown	353
Total	1827

The most destructive gales of wind were those that blew from S.W., S.S.W., W.S.W., and N.W.

We find that the ages of some of the

* This number does not include shipwrecked crews, who, with their vessels, were safely brought into port by life-boats.

vessels that were hurried out of existence were as follows:—

	Vessels.
Under 3 years	122
3 and not exceeding 7 years	271
8 „ „ 10 „	131
11 „ „ 14 „	155
15 „ „ 20 „	216
21 „ „ 30 „	266
31 „ „ 40 „	125
41 „ „ 50 „	59
51 „ „ 60 „	25
61 „ „ 90 „	14
91 „ „ 100 „	1
Unknown.	442
Total	1827

We also remark that, in perfectly calm weather, 23 vessels were wrecked; in light airs, 28; in light breezes, 56; in gentle breezes, 43; in moderate breezes, 110; in fresh breezes, 187; in strong breezes, 195; in moderate gales, 75; in fresh gales, 170; in strong gales, 199; in whole gales, 218; in storms, 63; in hurricanes, 69; and in unknown and variable weather, 52.

We moreover observe that 321 vessels were wrecked that were under the command of masters holding certificates of competency; while 720 were wrecked that were commanded by others who were not required by law to hold such certificates; and 266 that were commanded by foreigners not having British certificates.

We observe that of the total wrecks during the past year on our shores, irrespective of collisions, 60 vessels foundered; 41 vessels were driven or run on a lee shore; 66 parted their cables, or dragged their anchors and went on shore; 40 were wrecked from damage to hull, or the loss of masts, yard, or sails; 3 were actually capsized; 72 were wrecked from inattention, carelessness, or neglect; 25 from defects in ships or equipments; 7 from a combination of causes, while 18 arose from accident.

Of the total wrecks that took place from collisions, 18 were from bad look-out; 22 because the rule of road at sea was not observed; 1 from want of sea-room; 4 in thick and foggy weather; and 4 from neglecting to show lights; but it is worth observing that only one collision with total loss occurred from the error of the pilot who was on board; 4 occurred from negligence and want of caution.

It is also a lamentable fact, in regard to collisions, that 141 took place in fine and clear weather; the whole number of collisions during the year being 338—102 in the day time, and 236 in the night. Last year 11 collisions occurred between steamers, and 190 between sailing-vessels, while both were under way: 32 collisions also took place between sailing-vessels, one being at anchor and the other under way at the time; but no collisions occurred between steamers under these circumstances: 46 collisions likewise took place between steamers and sailing-vessels, both being under way; and 6 only when sailing-vessels at anchor were run into by steamers: 53 collisions also occurred by vessels breaking from their anchors or moorings. We earnestly trust that the admirable regulations which the Board of Trade have just published to prevent collisions at sea will materially tend to lessen the number of these fearful disasters.

The sandbanks which have proved most disastrous to vessels during 1862 are the

	Vessels wrecked.
Long Sand	17
Newcome Sand	11
Kentish Knock Sand	10
Gunfleet Sand	10
Scroby Sand	8
Hasbro' Sand	8
Goodwin Sand	6
Barrow Sand	6
Blakeney Sand	6
Corton Sand	6
Shipwash Sand	5
Sizewell Bank	5

The most disastrous wrecks, with the greatest loss of life, occur between that part of the coast extending from Skerries and Lambay to Fair Head and Mull of Kantyre. During the past thirteen years 1,641 lives were lost in that district. The next is from the North Foreland to St. Katharine's Point, which during the same period claims 1,136 lives.

The estimated loss of property involved in the destruction of a portion only of the vessels wrecked in the last six years amounted to four and a half millions of pounds sterling, although the total amount, being unreported, cannot be ascertained; but who can appreciate the value of the precious lives lost in those terrible disasters,

except those at our seaports and fishing-villages who are now widows and orphans or friendless, who have bewailed with unutterable anguish the loss of a husband, father, or near relation?

On the other hand it is most gratifying to find that in these six years 4,169 lives were rescued from the jaws of death by life-boats and the life-saving apparatus *alone*. It may be proper to observe that these means of saving life are rarely used except under the most perilous circumstances.

One can hardly conceive a more pitiable sight than a noble ship stranded on a sand-bank during a gale of wind, with her crew in the rigging, or firing minute-guns as signals of distress, so that they may obtain help from the shore. On observing these signals the crew of the life-boat immediately put off. Indeed we know of no spectacle more sublime, or more calculated to send the blood thrilling through the veins with admiration and awe, than the cool, determined courage and the lively charity that sends these poor and often half-starved fisher-fellows out in the dark night, in the midst of bitter frost and snow, into a tumultuous sea and surf, hungry for their bodies, in the very teeth of a furious wind, with death threatening them on all sides, and nothing but their coolness and skill to rely upon to preserve their own lives, to say nothing of the lives of others—leaving wives and families of little ones at home who may never see them in life again. What stout hearts those must be as, yard by yard, they struggle away from the dim shore, lost in an obscurity of scud and surf, and snow, thinking of nothing but their duty—the errand of mercy and charity before them—through the raging tempest—winning their way, though seas that to the landsman are fearful to gaze on, even from the safe standing on the beach, momentarily threaten to overwhelm them! Out further and further yet into the dark void a speck on the waters. Another flash of the minute-gun points out where the vessel is lying aground upon a shoal, the sea making a clean breach over her, and the scud and spray flying sheer over her mastheads, which threaten to go every moment. Stand to it, stout hearts! a few more minutes of the heavy toil and the boat will be well into leeward of the wreck, when the most dangerous part of the whole operations will commence; for there is danger of her being stove in momentarily, either by contact with the wreck itself, or with the floating spars which may be hanging loosely around her. The relief of a wreck is no mere child's play—it often occupies hours of hard, dangerous, and unremitting toil. It is no mere sudden flash of generosity that is required—no enthusiasm burnt out as soon as kindled; but that steady, undaunted "pluck" which distinguishes frequently the highest as well as the lowest class of Englishmen in times of danger. How important then is the work of the National Life-boat Institution in providing these messengers of mercy on our coasts, and in encouraging noble deeds of daring in the rescue of our fellow-creatures from an awful death!

It may be interesting here to recapitulate briefly the operations of the National Life-boat Institution, which has now 125 life-boats under its management. During the past year, in addition to saving twenty-one vessels from destruction, 358 lives were rescued by the life-boats of the Society. For these services rewards amounting to 915*l.* 18*s.* 1*d.* were voted. The number of lives saved by the life-boats of the Society, or by special exertions, for which it has granted rewards since its formation, is 13,220. For these services 82 gold medals, 733 silver medals, and 17,200*l.* in cash have been granted as rewards. The Institution has also expended 75,380*l.* on life-boats, life-boat transporting-carriages, and boat-houses. Surely a Society which has thus been productive of the greatest services in the cause of humanity will not have to appeal in vain to the public for help to enable it to continue its merciful work on our dangerous sea-board!

SUMMARY.

In 1862 the Number of Vessels wrecked on the coasts and in the seas of the United Kingdom was 1827.
Of these 455 were total wrecks, 66 sunk by collision, making the number totally lost 521.
Vessels stranded and damaged so as to require to discharge Cargo 695, by Collision 611, total 1306, making the whole number of Casualties 1827 and the Loss of Life as far as can be ascertained 690.

	Life Boats	Mortar and Rocket Stations	
There are	138	170	in England
	20	26	" Scotland
	21	42	" Ireland
	179	238	

Published by Charles Knight, 90, Flee[t St.]
& by the National Life Boat Institution, 14, John [St.]

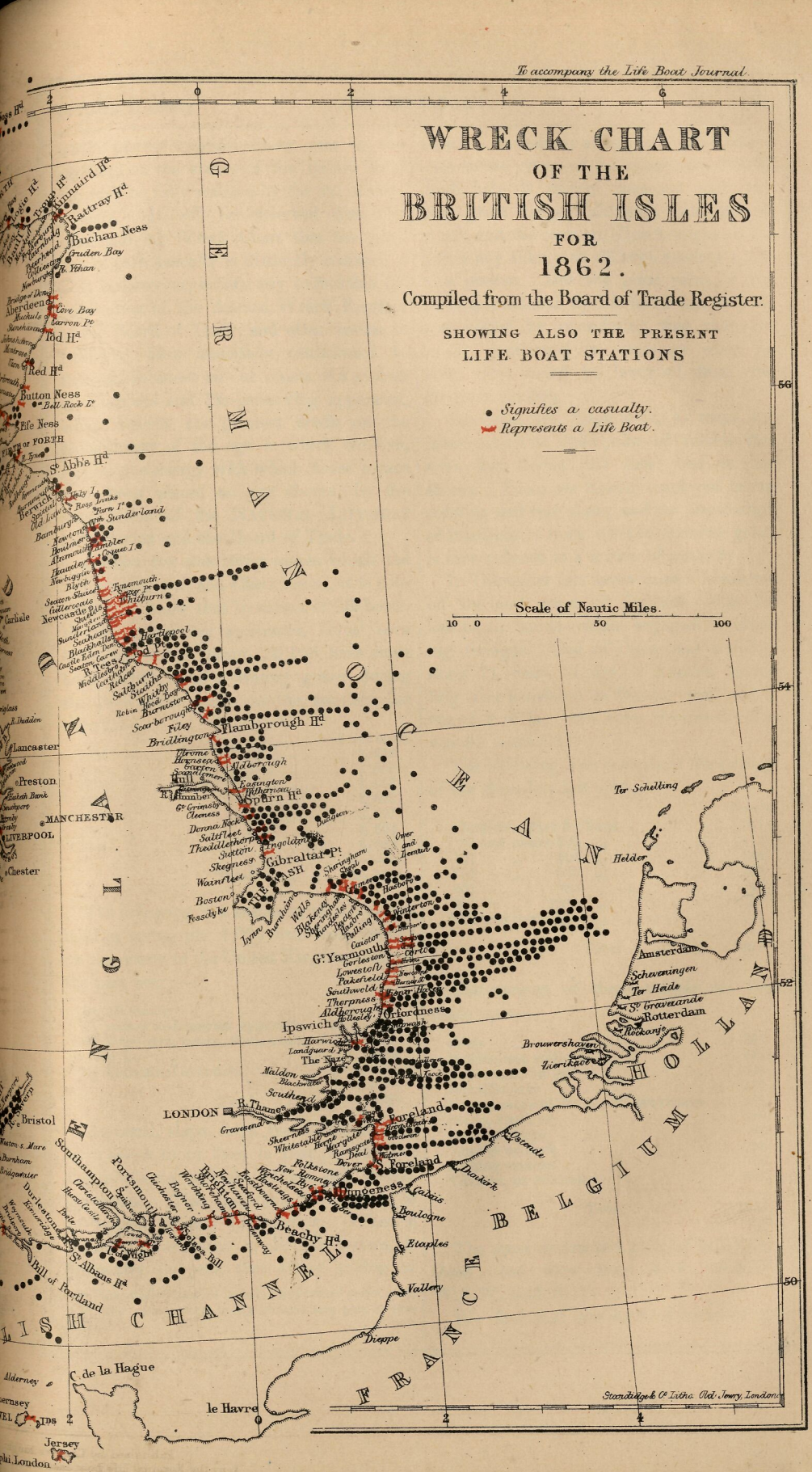
WRECK CHART
OF THE
BRITISH ISLES
FOR
1862.

Compiled from the Board of Trade Register.

SHOWING ALSO THE PRESENT
LIFE BOAT STATIONS

● *Signifies a casualty.*
Represents a Life Boat.

Scale of Nautic Miles.
10 0 50 100



SERVICES OF THE LIFE-BOATS OF THE ROYAL NATIONAL LIFE-BOAT INSTITUTION.

SEATON CAREW, DURHAM.—On the night of April 12th, signals of distress were observed on the North Gare Sand, at the entrance to the River Tees, the wind from the S.E. with a high sea on. The Seaton Carew life-boat was at once launched and taken to the spot; when they found the signals to have proceeded from the brig *Regalia*, of Whitby, which had driven over the bank and stranded on the shore. The life-boat took off her crew, 7 in number, and landed them in safety. The coxswain of this life-boat, ROBERT HOOD, having been no less than forty-three times engaged in this and the former Seaton Carew life-boat in assisting the crews of wrecked vessels, and many of those occasions being since his appointment to the coxswainship of the present boat, the Institution awarded him its Silver Medal for his long and valuable services, in addition to the usual pecuniary payment on this occasion.

HASTINGS.—On the 19th May, the fishing-smack *Britannia*, standing too near the shore at Hastings, struck on the rocks off the east end of the town, and sunk; the wind blowing a strong gale from the east at the time. The Hastings life-boat was immediately launched, and took off her crew of 4 men, landing them in safety.

THORPE, SUFFOLK.—On the night of the 11th June, in a heavy gale from S.S.W., the brig *Florence Nightingale*, of London, coal laden, stranded on the Sizewell Bank, near Thorpeness. A tar-barrel being burned, was seen from the shore, and the Thorpe life-boat was quickly launched, through a tremendous surf, and proceeded to her. On nearing the wreck, her masts went by the board, making the operation of taking off the crew a very difficult one. The anchor, however, being let go to windward, the boat was veered down, and the wrecked crew, 6 in number, hauled on board by lines. One of the life-boat's crew was washed overboard by a heavy sea which struck the boat; but being supported by his life-belt, and a line being thrown to him, he was enabled safely to regain her.

This excellent life-boat was presented to the NATIONAL LIFE-BOAT INSTITUTION by residents in the town and neighbourhood of Ipswich, in 1862, and this was the second shipwrecked crew she had saved from a watery grave during the few months she had been on the station.

In acknowledgment of his services on these occasions and previously in the former Thorpe life-boat, the coxswain, WILLIAM ALEXANDER, was voted the Silver Medal of the NATIONAL LIFE-BOAT INSTITUTION, which was publicly presented to him at Ipswich, by the Mayor, G. C. E. BACON, Esq., on the 16th July last.

ST. IVES, CORNWALL.—On the 12th June, during a heavy gale of wind from N.N.W., with rain, the schooner *Azores Packet*, of Falmouth, stranded in making for the harbour at St. Ives. The life-boat of the Institution was quickly launched, and rescued her crew of 4 persons, landing them in safety. The cost of this life-boat and of those at Newquay, Cornwall; Tyrella, Dundrum Bay; and Buckie, Banffshire, was presented to the Institution by a benevolent lady who has withheld her name.

NEW BRIGHTON, LANCASHIRE.—On the 27th June, the schooner *Vigilant*, of Kirkcaldy, stranded on Taylor's Bank, at the entrance of the Mersey. Being seen from New Brighton, the tubular life-boat stationed there by the Institution quickly proceeded under sail to her aid, and succeeded in taking off her crew, the vessel shortly after capsizing and becoming a total wreck.

ABERDOVEY.—On the 11th August last, the barque *William Bromham*, of Gloucester, when running for the harbour of Aberdovey, in tow of a steam-tug, ran aground on the bar at the entrance of the river, the wind being from W.S.W., and the sea rough at the time. The surf beating over her, with the probability of her breaking up, her crew had to leave her, which seven of them contrived to do in the ship's life-boat. The remainder, six in number, were then taken off by the Aberdovey life-boat, which

had been launched and proceeded to the assistance of the barque's crew on the accident being observed from the shore.

The life-boat afterwards assisted in bringing another barque and her crew safely into port.

NEWHAVEN, SUSSEX.—On the 31st of August, the schooner *Cestrian*, of Chester, in running for Newhaven harbour, grounded on the bar, when the Institution's life-boat stationed there was launched, and proceeded to her aid. An attempt was at first made to save the vessel, the life-boat taking a hawser from her to the pier, but the tide rising, swept her round the pier-head into heavy breakers, and the attempt had to be given up. The life-boat then took off her crew, five in number, landing them within the harbour in safety. This was the first service performed by this boat, which had recently replaced a smaller one at the station. She was reported to have behaved remarkably well on the occasion. This life-boat was named by the Committee the *Thomas Chapman*, after the Deputy-Chairman of the Institution.

ADDITIONAL STATIONS AND NEW LIFE-BOATS.

BIDEFORD.—A new life-boat 34 feet long, and fitted to row either with six oars single-banked, or twelve short oars double-banked, has been placed at Appledore, near Bideford, in lieu of a smaller one previously there. The cost of the boat was presented to the Institution by Mrs. HOPE, as executrix of the late Rev. F. W. HOPE. The boat has been named the *Hope*, and was conveyed by railway from London to Bideford, with its transporting-carriage, by the London and South-Western Railway Company, with their usual liberality, free of charge, and the old boat and carriage returned to London in the same manner.

KIRKCUDBRIGHT.—A new life-boat station has been formed at Kirkcudbright, on the north shore of the Solway Firth, and a 30-feet six-oared life-boat, with transporting-carriage, has been placed there, a substantial boathouse being built for its reception. This boat was presented to the NATIONAL LIFE-BOAT INSTITUTION by a Manchester gentleman under the initials of N. L. She was kindly conveyed to Castle-Douglas from London, by the London and North-Western and the Glasgow and South-Western Railway Companies, free of charge, and thence drawn to Kirkcudbright on her own carriage.

FLEETWOOD.—The life-boat of the Institution at Fleetwood having been seriously damaged, and being considered too small for the station, a new 33-feet ten-oared boat has been sent there in her stead. The cost of this life-boat was presented to the Society by Miss M. WASEY. The boat was taken to Fleetwood from London, with its transporting-carriage, by the London and North-Western Railway Company, without charge, and the old boat and carriage brought back in the same liberal manner. This boat has been named the *Edward Wasey*, after Captain EDWARD WASEY, R.N., who, when Inspecting Commander of Coast-guard at Fleetwood, rendered important service by proceeding to wrecks in the former boat, and was thereby instrumental in saving several lives under very hazardous circumstances.

TENBY.—A new 33-ft. ten-oared life-boat, with a transporting-carriage, has been placed at Tenby, on the north shore of the Bristol Channel, to replace an old boat of inferior character. The cost of this boat was presented to the Institution by F. R. MAGENIS, Esq. A new boathouse has also been built to receive the boat, so that this important life-boat station is now fully equipped in the most complete and efficient manner.

The new boat was conveyed from London to near Tenby, and the old one brought to London by the Great Western and South Wales Railway Companies, with their usual liberality, free of cost.

LYTHAM, LANCASHIRE.—A new 33-ft. ten-oared life-boat has been sent to Lytham, in lieu of a smaller boat previously there. Her cost was presented to the Institution by THOMAS CLAYTON, Esq., at whose request she has been named the *Wakefield*, after his native town. She was liberally conveyed, with her transporting-carriage, from London free of cost, by the London and North-Western Railway Company, and the old boat and carriage returned in the same handsome manner.

Lytham, which stands on the north bank of the River Ribble, and within a few miles of some of the dangerous banks that lie outside the entrance of the Mersey, is a very important station; and the old boat has been the means of saving the lives of numerous wrecked crews.

HASTINGS.—A new life-boat, 36 ft. long, and rowing twelve oars, has been placed at Hastings by the NATIONAL LIFE-BOAT INSTITUTION, in lieu of a smaller boat previously there. She was conveyed to her station, from London, with her transporting-carriage, in August last, free of cost, by the London, Brighton, and South Coast Railway Company, and the old boat and carriage returned to London in the same liberal manner.

BLAKENEY, NORFOLK.—A new life-boat, 37 feet long, and rowing twelve oars, has been placed at Blakeney, in lieu of one previously sent there, which had been found too small for the locality. This boat was liberally conveyed from London to Wells, near Blakeney, by the Great Eastern Railway Company, free of cost, and the old boat returned to London on the same terms.

TEIGNMOUTH, DEVON.—A new 33-feet life-boat, rowing ten oars, has been stationed at Teignmouth, in lieu of an old and inferior boat previously there. This boat is an experimental one, being built of iron, and being the first life-boat on the self-righting principle which has been made of that material. She was built by Mr. HEPWORTH, the iron ship-builder, at Millwall, London, and under the immediate superintendence of Mr. JOSEPH PROWSE, of H.M. Dockyard, Woolwich, Surveyor to the Institution. She has been remarkably well built, and in the strongest manner possible, being made of the best charcoal iron. Her cost was raised at the British settlements at Hong Kong and Shanghai, in 1862, by W. H. HARTON, Esq., member of the General Committee of the Institution, in conjunction with Messrs. GILMAN and Co., of Hong Kong, for the express purpose of presenting a life-boat to the Institution, to be stationed on the English coast. In compliment to the subscribers, who thus remembered an important work in their own country when far away from it, she has been named the *China*. A new boat-house has been built for her, and she has been supplied with a new transporting-carriage. She was kindly conveyed to her station, without charge, by the Great Western, Bristol and Exeter, and South-Devon Railway Companies, and the old boat and carriage brought to London in the same manner.

SUMMARY OF THE

MEETINGS OF THE COMMITTEE.

Thursday, 2nd April, 1863. THOMAS CHAPMAN, Esq., F.R.S., *V.P.*, in the Chair.

Read and approved the Minutes of the previous Meetings, and those of the Finance, Correspondence, and Wreck and Reward Sub-Committees.

Elected the Members of the Sub-Committees for the ensuing year.

It was moved, seconded, and carried unanimously, that the life-boat about to be sent to Fishguard be named *The Sir Edward Perrott*, in acknowledgment of the long and valuable services to the NATIONAL LIFE-BOAT INSTITUTION of Sir EDWARD PERROTT, Bart., as Chairman of its preparatory Committees.

Reported that F. R. MAGENIS, Esq., had forwarded to the Institution a cheque for 262*l.* 10*s.*, to pay the cost of the new life-boat to be stationed at Tenby. He wished the boat to be called the *Florence.—To be thanked, and ordered the boat to be named accordingly.*

Read letter from W. WORSHIP, Esq., of Great Yarmouth, of the 21st March, transmitting a sum of 204*l.* 16*s.*, being one-third of the residuary estate of the late Miss ALICE GEDGE, of that town. She had left that share of her property to the Society, in addition to a legacy of 100*l.*—*To be thanked.*

Also from the Secretary of the East and West India Dock Company, of the 21st March, forwarding from the Company an additional donation of 52*l.* 10*s.*, *in aid of the funds of the Institution.—To be thanked.*

Also from the Right Hon. the Earl MANVERS, of the 15th March, expressing his high appreciation of the important character of the operations of the NATIONAL LIFE-BOAT INSTITUTION, and forwarding a donation of 20*l.*—*To be thanked.*

[His Lordship's father was a Vice-President of the Society from its first establishment, and afterwards a liberal annual contributor to its funds.]

Also from Mr. J. NEWBY, of the 6th March, stating that he had delivered lectures on the operations of the Institution at Knottingley and Barnsley.—*To be thanked.*

Also from F. PENBERTHY, Esq., the Honorary Secretary of the Porthleven Branch, of the 20th March, giving an account of the inauguration, in the presence of a large number of spectators, of the new life-boat placed there, through the Institution, by T. J. AGAR ROBARTES, Esq., M.P. Every-

thing had passed off in the most satisfactory manner, and the life-boat was much admired by the assembly.—*To be acknowledged.*

Reported that a Public Meeting had been held at Liverpool—at which the Mayor, R. C. Gardner, Esq., had presided—to present the Rewards of the Institution to a boat's crew who had rescued the crew of the ship *John H. Elliott*, of New York, on the 20th Jan.

Also that Admiral Sir George Sartorius, a Member of the Committee of Management of the Institution, had collected, from his friends and others, 69*l.* 6*s.*, in aid of its funds.—*To be thanked.*

Decided that the thanks of the Institution, inscribed on vellum, be presented to Mr. Owen Williams, the late Coxswain of the Cemlyn life-boat, in testimony of his long and valuable services in that capacity.

Paid 514*l.* 16*s.* for sundry charges on various life-boat establishments.

Voted 14*l.* 11*s.* to pay the expenses of the Padstow life-boat—the *Albert Edward*—in putting off twice on the 18th March, and rescuing, during a strong gale and in a heavy sea, the crews, consisting of 13 men, of the brigantine *Pandema*, of Plymouth, and schooner *Betsy*, of Brixham, which had stranded on the Doom Bar Sand, off Padstow. The thanks of the Institution were also voted to Mr. Daniel Shea, Chief Officer of the Coast-guard, for putting off in the life-boat on both the above occasions. This life-boat is called the *Albert Edward*, after the Prince of Wales. By a happy coincidence she was also instrumental in rescuing a shipwrecked crew on the very day (the 9th Nov. last) that His Royal Highness arrived at his majority.

Also 7*l.* 17*s.* 2*d.* to pay the expenses of the St. Andrew's life-boat, in going off and rendering assistance to the schooner *De Goede Moder*, of Grimstadt, which was in an unmanageable state in St. Andrew's Bay, on the 11th March, during stormy weather.

Also 53*l.* 7*s.* to pay the expenses of the Berwick, Tynemouth, Middlesborough, Rye, Winchelsea, St. Ives, Fraserburgh, and Dundalk life-boats, in putting off in heavy weather with the view of rendering assistance to vessels which did not, however, ultimately require their services.

Also 6*l.* to six fishermen, for putting off, at some risk of life, and rescuing 3 out of 7 coast-guardmen, who had been capsized from their boat while proceeding to board a vessel during squally weather, off Greencastle, on the coast of Donegal, on the 27th Feb. Four men unfortunately perished on the occasion, notwithstanding the gallant and prompt endeavours that were made by the fishermen to save their lives.

Also 2*l.* to two fishermen, for saving 6 persons whose boat had been capsized in a heavy sea off Faha, on the coast of Cork, on the 27th Dec.

Thursday, 7th May. His Grace the Duke of Northumberland, K.G., President of the Society, in the Chair.

Read and approved the Minutes of the previous Meeting, and those of the Finance, Correspondence, and Wreck and Reward Sub-Committees.

Read and approved the Report of Capt. David Robertson, R.N., the Assistant Inspector of Life-Boats of the Institution, of the 28th April, on his visit to its life-boats on the coast of Wales. He found them generally in a very efficient state, and reflecting much credit on the Local Committees and the Coxswains.

Reported the transmission of the Fishguard new life-boat and transporting-carriage to their station. The Great Western and South Wales Railway Companies had taken them free of charge. The boat and carriage were taken to Bath on their way to Fishguard, and were drawn in procession through the principal streets, manned by a crew of Naval Reserve men, who had come specially from Bristol for that purpose, with the sanction of Capt. W. H. Fenwick, R.N., of H.M.S. *Dædalus*. Messrs. Pinchin and Co., Brewers, had kindly furnished a fine team of horses to draw the life-boat through the city.—*To be thanked.*

Also that the inhabitants of Bath had raised the cost of a life-boat, to be called the *City of Bath*; and to be stationed at Pembrey, on the North shore of the Bristol Channel.

Read letter from Mr. Wm. Vaughan, Honorary Secretary of the Fishguard Branch of the 2nd May, stating that the new life-boat had been tried in a heavy sea, and that she had given great satisfaction to her crew.—*To be acknowledged.* [She was subsequently tried under sail, and was again spoken of very highly.]

Also from Thomas Clayton, Esq., of Wakefield, of the 1st May, stating that he had paid 250*l.* to the bankers of the Institution, to defray the cost of the new life-boat for Lytham, on the Lancashire coast. He wished the boat to be named *The Wakefield.*—*To be thanked, and ordered the boat to be named accordingly.*

Reported that the Kingsgate new life-boat had been placed on its station, the South Eastern Railway Company kindly passing it free over their line.—*To be thanked.*

Read letter from Capt. Isacke, Honorary Secretary of the Kingsgate Branch, of the 4th April, stating that the new life-boat had been exercised, and that the crew were well pleased with her.—*To be acknowledged.*

Also from Dr. White, of Finchley, of the 29th April, submitting, for the consideration of the Institution, a plan, description, and estimate of the cost of a water-tight lantern for a life-boat.—*To be acknowledged.*

Decided that the Blakeney life-boat be replaced by a larger boat as early as practicable.

Also that Messrs. Peacock and Buchan be instructed to supply their composition (No 3) paint for all the life-boats of the Institution.

Paid 805*l.* 5*s.* 1*d.* for sundry charges on various life-boat establishments.

Voted 13*l.* 10*s.* to pay the expenses of the Seaton Carew life-boat in going off in reply to signals of distress on the night of the 12th of April, and rescuing the crew of seven men from the brig *Regalia*, of Whitby, which had sunk during stormy weather and in a heavy sea off Seaton Carew. This valuable life-boat had already been the means of rescuing the crews of the following

wrecked vessels:—Brig *Eliza*, of Middlesborough, 7; brig *Mayflower*, of Newcastle, 8; brig *Providence*, of Shields, 8; and barque *Robert Watson*, of Sunderland, 5; making a total of 35 lives saved by that life-boat alone. Its cost was the gift to the Institution of WILLIAM MCKERRELL, Esq., in the year 1857. On being informed of the last service of the boat on the 12th April, Mr. MCKERRELL transmitted to the Society a contribution of 10*l.*, and at the same time stated how very much gratified he was to learn that his life-boat had providentially been the means of saving so many lives from shipwreck, and that those services had been performed without a single accident occurring to her brave crew.

Voted the Silver Medal of the Institution to Mr. ROBERT HOOD, coxswain of the Seaton Carew life-boat, in testimony of his long services in that and a previous life-boat in saving life from wrecks.

Also 13*l.* 17*s.* to pay the expenses of the Fraserburgh life-boat in putting off with the view of rescuing the crew of the ship *Genoa*, of Liverpool, which, during a heavy sea and dense fog, had stranded on the Rattray Brigg Rocks, near Peterhead, on the night of the 12th April. Before the arrival of the life-boat, the vessel's crew had been rescued by other means. The life-boat had to proceed a distance of fifteen miles to the site of the wreck against a heavy sea and head wind. The cost of this life-boat, which is called *The Havelock*, was also presented to the Society by Mr. MCKERRELL, the gentleman above alluded to.

Also 3*l.* 15*s.* to the crew of the Appledore life-boat for assembling, with the view of assisting the crews of the smacks *Ebenezer* and *Gem*, of Bideford, which were in danger off Appledore in squally weather on the night of the 15th March.

Also the Silver Medal of the Institution, and a copy of its vote on parchment, to Mr. THOMAS ROWLANDS and Mr. GEORGE LEWIS, and 3*l.* to some other men, in admiration of their brave services in wading into the surf and rescuing the crew of 3 men from the sloop *Frances*, of Cardigan, which, during a heavy gale of wind and high sea, had sunk on Newport Sands, near Fishguard, on the 17th March. Messrs. ROWLANDS and LEWIS had incurred much risk of life in wading into the surf. Mr. JOHN HARRIES, Receiver of Wreck at Newport, had also rendered valuable assistance on the occasion, and the thanks of the Institution were given to that gentleman.

Also the thanks of the Institution, inscribed on vellum, to Mr. WM. NICOL, Officer of Customs at Appledore, and 2*l.* to his boat's crew, for putting off with the view of rescuing the crews of two smacks which had stranded on Bideford Bar during squally weather on the 15th March. A heavy sea had struck the salvors' boat, and washed overboard one of the crew. While endeavouring to recover him, a second sea struck the boat, and carried away three of the oars. She was thus completely disabled, and her crew had a very narrow escape of their lives. The crews belonging to the smacks fortunately afterwards succeeded in reaching the shore in safety.

Also 2*l.* 10*s.* to five men for wading into the surf, and rescuing, at some risk of life, a man who had been capsized from his boat, and had got entangled under it in a heavy surf off Great Yarmouth, on the 19th March. It was stated that, had it not been for the prompt and valuable services of the salvors, the poor man must have perished.

Also 5*l.* to ten men for putting off and rendering assistance to the crew and passengers of the steam ship *Telegraph*, of Chester, which had struck on a rock near the South Stack, on the Anglesea Coast, on the 17th April.

Also 2*l.* 10*s.* to a boat's crew for rescuing, in a fresh breeze, the crew of 5 men from the brig *Phœnix*, of Teignmouth, which was totally wrecked on the Whiting Sand, off the Coast of Suffolk on the 22nd December last.

Also 1*l.* 10*s.* to 3 men for putting off in a small canoe on the 18th March, and rescuing, at some risk of life, 2 of the crew of a boat which had been capsized by a heavy sea in Tralee Bay.

Thursday, 4th June. THOMAS CHAPMAN, Esq., F.R.S., *V.P.*, in the Chair.

Read and approved the Minutes of the previous Meeting, and those of the Finance, Correspondence, and Wreck, and Reward Sub-Committees.

Read letter from the STOREKEEPER-GENERAL OF H.M. NAVY of the 19th May, requesting that certain life-boat stores might be forwarded immediately to Portsmouth for the use of the life-boat of H.M.S. *Curaçoa*. Reported that the same had been accordingly transmitted to Portsmouth on the day of the receipt of the letter.—*Approved.*

Reported the receipt of the following legacies to the Institution:—The late Mrs. ANN CUTTO, of the Old Kent Road, 1,000*l.*; and the late JAMES MILLER, Esq., of the Devon Ironworks, Glasgow, 100*l.*

Also that Captain His Serene Highness The PRINCE OF LEININGEN, R.N., of H.M. Yacht *Victoria and Albert*, had forwarded a donation to the Society, and had promised to contribute annually to its funds.—*To be thanked.*

Also that a contribution of 105*l.* had been received by the Institution from the FISHMONGERS' COMPANY.—*To be thanked.*

Also that J. B. PARKER, Esq., of Exeter, had, on behalf of "a Lady in Exeter," forwarded a donation of 100*l.* to the Institution.—*To be thanked.*

Decided that a new life-boat house be erected at Thorpeness, Suffolk, for the "Ipswich" life-boat.

Also that a new life-boat house be built at Eastbourne.

Read letter from Mr. J. FRANCE, of Glossop, of the 30th May, stating that he had obtained the consent of the Order of Odd Fellows to an annual voluntary subscription being made by the members in aid of the funds of the NATIONAL LIFE-BOAT INSTITUTION.—*To be thanked.*

Paid 404*l.* 0*s.* 11*d.* for sundry charges on various life-boat establishments.

Voted 14*l.* 10*s.* to pay the expenses of the New Brighton tubular life-boat in putting off, in tow of the steam-tug *Universe*, of Liverpool, and rescuing, during a strong wind and in a very heavy sea, the crew of 10 men from the brig *Levant*, of Bristol,

which had stranded on the inside of the North bank, in Liverpool Bay, on the 11th May. There was no doubt that, in the absence of the life-boat, the crew of the *Levant* would have perished.

Also 8*l.* 13*s.* to pay the expenses of the Hastings life-boat in going off and saving the crew of four men from the smack *Britannia*, of Ramsgate, which was totally wrecked on the East Groyne Rocks, off Hastings, during a gale of wind, on the 19th May. Mr. Roe, Chief Officer of the Coast-guard, was thanked by the Institution for going off in the life-boat on the occasion.

Also 12*l.* to pay the expenses of the crews of the Arklow and Blakeney life-boats in assembling and putting off with the view of succouring the crews of vessels in distress.

Also the Silver Medal of the Institution and a copy of its Vote on parchment to Mr. G. M. Beatson, Inspecting Chief Officer of Coast-guard at Fraserburgh, and to Mr. Alexander Forbes, shipbuilder, of Peterhead; and the thanks of the Institution inscribed on vellum to W. J. Parsons, A. Gray, and J. Simmons, and 5*l.* to them and to two other coast-guardmen, in testimony of their gallant conduct in rescuing, at considerable risk of life, 11 out of 14 of the crew of the ship *Genoa*, of Liverpool, which, during a very heavy gale of wind and high surf, was wrecked on the 12th April, on Rattray Brigg Rocks, near Peterhead.

Also 12*l.* to the crews of two boats for putting off and rescuing, at much risk of life, the crew of 10 men from the brig *Faith*, of Colchester, which, during a gale of wind and very heavy sea, was wrecked on Blakeney Bar, on the 19th May.

Also 4*l.* to the crew of a fishing smack for putting off and rescuing the crew of 13 men and a pilot from the brig *Alli*, of Helsingfors, which during squally weather was wrecked on the Hasboro' Sands, on the Norfolk coast on the 31st Jan.

Also 5*l.* to the crew of the smack *John Hooper*, of Plymouth, for rescuing the crew of 4 men from the ketch *Helena*, of Newport, Monmouth, which had sunk during a strong gale of wind near the Eddystone Lighthouse, on the 18th March.

Also a reward to 2 fishermen for saving 2 other men who had been capsized from their boat during squally weather near North Harbour, on the coast of Cork, on the 2nd May.

Reported the services of the Lyme Regis life-boat, in rescuing from destruction the schooner *Vulcan*, of that place, which was observed, during a heavy gale of wind, to be rapidly driving on the rocks off Lyme Regis, on the 19th May. This valuable life-boat has, on previous occasions, rescued shipwrecked crews, under the most perilous circumstances, during very stormy weather.

Thursday, 2nd July. Thomas Chapman, Esq., F.R.S., *V.P.*, in the Chair.

Read and approved the Minutes of the previous Meeting, and those of the Finance, Correspondence, and Wreck and Reward Sub-Committees.

Read and approved the Report of Capt. Ward, R.N., Inspector of Life-Boats to the Institution, of the 29th June, on his tour of inspection of its life-boats on the Irish coast. He found them generally in excellent order.

All the life-boats on the Irish coast are now under the management of the National Life-boat Institution, which has placed a new boat on every station. Altogether the Irish life-boat stations have cost the Society nearly 8,500*l.*

Read letter from the Secretary of the Admiralty of the 1st July, calling attention to a model of a life-boat by Francis M'Kay, Cooper in the Victualling Department of the Admiralty, at Halifax, Nova Scotia.— *To be acknowledged.*

Reported that the new life-boat, presented by the surviving children of the late Robert Theophilus Garden, Esq., of River Lyons, King's County, Ireland, had, along with its transporting-carriage and stores, been forwarded to Bude Haven on the 15th June, the South Western Railway Company giving a free conveyance to the boat and carriage over their line to Bideford.— *To be thanked.*

Capt. David Robertson, R.N., the Assistant Inspector of Life-boats to the Institution, had accompanied the boat, and on the 19th June she was publicly launched at Bude before a large assemblage. William Rowe, Esq., the Hon. Secretary, had been indefatigable in his exertions on the occasion, and in preparing for the demonstration. The late Mr. Garden's eldest son had since paid the Institution 600*l.* to defray the whole cost of the establishment.— *To be thanked.*

Also reported that A. B., a gentleman residing at Cheltenham, had paid the Society 300*l.* to defray the cost of a new life-boat, which he wished to be named after his late wife.— *To be thanked, and decided that the boat be stationed at Eastbourne.*

Reported that Colonel Bunbury, of Bury St. Edmunds, had handed to the Society 100*l.*, in accordance with the request of the late Dowager Lady Bunbury.— *To be thanked.*

Read letter from Dr. Partridge Mills, of Ipswich, of the 14th June, forwarding 5*l.* in aid of the Society, being part of the proceeds of a *fête* given jointly by the Odd Fellows and Foresters in that town.— *To be thanked.*

Also from Capt. Brown, of the Royal Naval Reserve, of the 18th June, forwarding 14*s.*, being the amount of a penny subscription raised amongst the commander, officers, and crew of the ship *Adamant*, and the military officers on board that vessel, on a voyage from Calcutta to Portsmouth with troops.— *To be thanked.*

Decided that the thanks of the Institution be presented to the Rev. William Williams, late Hon. Secretary of the Ferryside Branch, South Wales, in testimony of his valuable services in that capacity, and in aiding in the formation of that establishment.

Paid 1,606*l.* 18*s.* 5*d.* for sundry charges on various life-boat establishments.

Voted 15*l.* to pay the expenses of the *Ipswich* life-boat, stationed at Thorpe, Suffolk, in putting off at midnight on the 11th June, and rescuing with great difficulty the crew of 6 men from the brig *Florence Nightingale*, of London, which during a heavy gale of wind was totally wrecked on Sizewell Bank, on the Suffolk coast. While engaged in the rescue of the shipwrecked men, a heavy

sea struck the life-boat, and carried away one of her crew; but he fortunately regained the boat by means of his life-belt and a line. WILLIAM ALEXANDER, the gallant coxswain, had on several occasions, in this and another life-boat, been off to save life under very perilous circumstances. The Society voted to him its Silver Medal, in testimony of his valuable services as coxswain of the Thorpe life-boat. The cost of this life-boat was presented about twelve months ago to the NATIONAL LIFE-BOAT INSTITUTION by the residents of Ipswich. She has since then been the means of rescuing two shipwrecked crews, besides rendering important services on one occasion to a vessel in distress during stormy weather.

Voted also 4*l.* 10*s.* to pay the expenses of the St. Ives (Cornwall), life-boat, in going off and saving the crew of 4 men from the schooner *Azores Packet*, of Falmouth, which during a heavy gale of wind had stranded, and afterwards sunk at the entrance of the harbour of St. Ives on the 12th June. The cost of this and of three other life-boats was presented to the Institution by a benevolent lady who has withheld her name.

Also 3*l.* to pay the expenses of the New Brighton life-boat, in putting off and rescuing the crew of 6 men from the schooner *Vigilant*, of Kirkcaldy, which was totally wrecked during a strong wind on Taylor's Bank, near Liverpool, on the 27th June. The life-boat was towed to windward of the wreck by the steam-tug *Blazer*, of Liverpool, and remained by the vessel some hours to see if she would float off or not, before the crew were taken off. Before the life-boat had proceeded far on her return, the vessel was seen to capsize and become a total wreck.

Also 4*l.* to pay the expenses of the Rhoscolyn life-boat in going off and rendering important services to the barque *Diadem*, of St. John's, New Brunswick, which, during foggy weather, was observed in a disabled condition off that place on the night of the 27th June. The life-boat landed four passengers from the vessel.

The thanks of the Institution, inscribed on vellum, were also voted to Mr. JOHN LONG, agent for Lloyd's, at Yarmouth, Isle of Wight; and to Mr. WILLIAM WEBB, and Mr. JAMES WEBB, pilots, and 10*l.* to be divided between the two pilots, and three other men, in acknowledgment of their gallant and persevering conduct in their pilot-boat in rescuing, at considerable risk of life, the crew of 6 men from the brig *Alabama*, of Gloucester, which, during a very heavy gale of wind, was totally wrecked on the middle of the Shingles while running through the Needles, on her way to Southampton on the 5th June. Upon nearing the distressed vessel, the salvors found it impossible to rescue the crew, owing to the fearful sea, which ran so high as to break over the vessel's maintop, completely obscuring the poor men in the rigging, who were shouting for help, and seemed frantic with despair. The crew of the pilot-boat, however, determined not to leave them, and stood off and on all night until the weather had somewhat moderated, when they succeeded with great difficulty in snatching the six men from an inevitable death.

Thursday, 30th July. THOMAS CHAPMAN, Esq., F.R.S., *V.P.*, in the Chair.

Read and approved the Minutes of the previous Meeting, and those of the Finance, and Correspondence, and Wreck, and Reward Sub-Committees.

Decided to replace, at the invitation of the Local Committee, the life-boat at Filey, on the Yorkshire coast, by a new boat, the one at present on that station being forty years old.

R. W. HOLLON, Esq., and Mrs. HOLLON, of Spellow Park, had decided on presenting to the Institution the cost (250*l.*) of the Filey new life-boat.—*To be thanked.*

Decided also to station a new life-boat, 36 feet long, at Arklow, on the coast of Ireland.

Reported the receipt of the following legacies to the Institution, less duty:—The late WILLIAM CURRIE, Esq., of Cornhill, London, 200*l.*; and the late Mr. JOHN JOLLY, farmer, of Enstone, Oxfordshire, 210*l.*

Also that E. SHEPPARD, Esq., of the Custom House, London, had collected an additional sum of 27*l.* 16*s.* 10*d.* in aid of the funds of the NATIONAL LIFE-BOAT INSTITUTION.—*To be thanked.*

Also that R. CULLUM, Esq., Collector of Customs at Newport (Monmouth), had forwarded 18*l.* to the Society, being the amount of additional contributions he had collected from master mariners alone visiting the Newport Custom House, in aid of the funds of the Institution. He had previously collected for it 44*l.* 7*s.* 3*d.*—*To be thanked.*

Also that the trustees of the late MRS. ADAMS, widow of the late Mr. ADAMS, army and navy outfitter, of Plymouth, had transmitted 100*l.* to the Society, through Mrs. HARTLEY, and THOMAS STEVENS, Esq., Honorary Secretary of its Plymouth Branch.—*To be thanked.*

Also that the Silver Medal voted by the Society to WILLIAM ALEXANDER, coxswain of its Ipswich life-boat stationed at Thorpeness, on the Suffolk coast, had been presented to him at a Public Meeting, held at the Town Hall, Ipswich, by G. BACON, Esq., Mayor of Ipswich.

Also that the Tenby new life-boat had been forwarded to its station, and that the old boat had been sent to London. A free conveyance was, as usual, readily given to the boats between London and the Ferryside, by the Great Western and South Wales Railway Companies.—*To be thanked.*

Also the transmission to Lytham of the new life-boat and transporting-carriage, sent to replace the present boat and carriage. They were conveyed free of charge by the London and North-Western Railway Company.—*To be thanked.*

Also that Messrs. FORRESTT, the life-boat builders, had received instructions to build a life-boat on the plan of the Institution for the Mecklenburgh Government.

Ordered a new life-boat house to be built at Pembrey, near Llanelly.

Paid 1,270*l.* 2*s.* 8*d.* for sundry charges on various life-boat establishments.

Voted 5*l.* 4*s.*, to pay the expenses of the Carmarthen Bay life-boat, in putting off on the 22nd July to the assistance of the French lugger *Jean*

P. Baptist, which was in a dangerous position on the Cefn Sidan Sands in Carmarthen Bay, in a fresh gale. Before the arrival of the life-boat, however, the wind changed, and the vessel fortunately floated off the sands.

Also a reward to the crew of a fishing-boat for rendering assistance to the brig *Pelican*, of Drogheda, which was in distress off Lamlash, on the coast of Ayrshire, during squally weather, on the 26th June.

Also a reward to two men for putting off in a boat and rescuing two out of four persons who were capsized from their boat about 3 miles from Kenmare, on the coast of Kerry, on the 10th June. A man and woman unfortunately perished before the salvors could possibly reach them.

FLUID COMPASSES.

IN our last January Number we gave a short account and illustration of the Boat's Fluid Compass, adopted by this Institution, and in this Number we insert an interesting paper on the "Mariner's Compass," with which we have been favoured by Captain EVANS, Superintendent of the Compass Department of the Admiralty. We now add the following diagram and explanation which will make sufficiently clear to the general reader the character of a fluid compass as manufactured by Mr. F. DENT, of the Strand, London:—

Fig. 1.

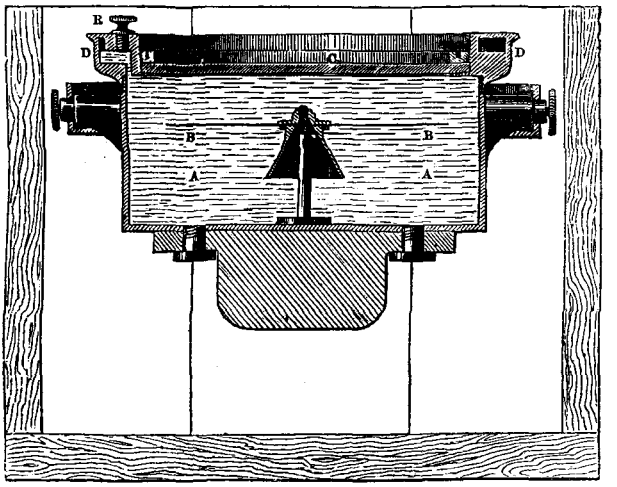


Fig. 2.

Figures 1 and 2 are vertical sections; Fig. 1 of the Fountain Reservoir, and Fig. 2 of the Bowl when filled. The same letters refer to similar parts in each figure. A is the bowl filled with dilute alcohol, or other suitable liquid; B is the card with the magnetic needle attached to it, and turning on a central point or pivot; C is the glass top of the bowl; D is the annular fountain reservoir. This reservoir has a nozzle or filling hole, closed by a screw R, below which at E is a hole, forming a communication with the bowl A.

To fill the bowl, the screw R is taken out, and a small funnel inserted, through which the liquid is poured in (the air passing out at the same time by the side of the funnel), until the bowl A is full. The liquid is still poured in until it nearly fills the reservoir D; the screw R is then screwed in, and the whole is thus tightly closed up. The elasticity of the air remaining in the reservoir allows for the contraction and expansion of the liquid; and if any liquid escapes by evaporation from the screws not being absolutely air-tight, its place is supplied by liquid from the fountain reservoir D.

If by any chance a bubble of air should find admission to the bowl A, it passes up into the reservoir D, either spontaneously or by slightly inclining the bowl to allow of its escape, which it does instantly. The fluid is composed of one-third spirits of wine and two-thirds pure water. In high latitudes more spirits may be used if there is danger of its freezing.

Royal National Life-Boat Institution,

For the Preservation of Life from Shipwreck.

(Incorporated by Royal Charter.)

Patroness—Her Most Gracious Majesty the Queen.
President—Admiral His Grace the Duke of Northumberland, K.G., F.R.S.
Chairman—Thomas Baring, Esq., M.P., F.R.S., *V.P.* *Deputy Chairman*—Thomas Chapman, Esq., F.R.S., *V.P.*

APPEAL.

The Committee of Management have to state that, since the beginning of the year 1861, the Royal National Life-boat Institution has expended 28,550*l.* on various Life-boat Establishments on the Coasts of England, Scotland, and Ireland. During the same period the Life-boats of the Institution have been instrumental in rescuing the Crews of the following Wrecked Vessels:—

1861.

Flat *Cymraes*, of Beaumaris..... 2
Schooner *William*, of Morecambe.. 5
Smack *Gipsy*, of Newry 4
Schooner *Margaret Anne*, of Preston 4
Brig *New Draper*, of Whitehaven.. 8
Schooner *William*, of Liverpool ... 5
Lugger *Nimrod*, of Castletown 3
Brig *Providence*, of Shields 8
Brig *Mayflower*, of Newcastle 8
Schooner *Village Maid*, of Fleetwood 4
Brig *Lovely Nelly*, of Seaham..... 6
Brigantine *Nugget*, of Bideford 5
Schooner *Prospect*, of Berwick..... 6
Sloop *Thomas and Jane*, of St. Ives 3
Fishing-boat of Whitburn 4
Brig *Arethusa*, of Blyth 8
Schooner *Dewi Wyn*, of Portmadoc 8
Barque *Guyana*, of Glasgow 19
Brig *Roman Empress*, of Shields .. 10
Brig *San Spiridione*, of Galaxide .. 2
Schooner *Voador du Vouga*, of Viana 8
French Brig *La Jeune Marie Thérese* 6
Barque *Perseverance*, of Scarborough 5
Schooner *Elizabeth*, of Bridgewater 4
Ship *Danube*, of Belfast 17
Schooner *Hortensia*, of Hanover ... 4
Schooner *Oregon*, of Stonehaven ... 4
Brig *St. Michael*, of Marans..... 8
Spanish Barque *Primera de Torreviega*—Saved vessel and crew ... 1
Schooner *Hurrell*, of Penzance—Saved vessel and crew 4
Barque *Frederick*, of London..... 1
Brig *Anne*, of Plymouth—Saved vessel and crew 8
Schooner *Betsey*, of Peterhead—Saved vessel and crew..... 6
Barge *Peace*, of London..... 2
Lugger *Saucy Lass*, of Lowestoft.. 11
Smack *Adventure*, of Harwich..... 10
Pilot cutter *Whim*, of Lowestoft... 7
Barque *Undaunted*, of Aberdeen .. 11
Wrecked boat on Blackwater Bank, on the Irish Coast 1
Schooner *Skylark*, of Folkestone... 6
Brig *Lively*, of Clay, Norfolk..... 5
Barque *Robert Watson*, of Sunderland 5
Sch. *Auchincruive*, of Grangemouth 6
Schooner *Friends*, of Lynn..... 4
Schooner *Eliza Anne*, of Dublin ... 5
Brig *Content*, of Sunderland..... 5
Smack *Ellen Owens*, of Cardigan... 3
Schooner *Fly*, of Whitby—Saved vessel and crew..... 4
Schooner *Epimachus*, of Amsterdam 5
288

Number of lives saved by shore-boats and other means, for which the Institution has granted rewards in 1861 .. 136

Total 424

1862 and 1863—to 20th Sept.

Brig *Sisters*, of Whitby..... 9
Brigantine *Matilda*, of Stockholm.. 4
Brig *Jane*, of North Shields..... 10
Schooner *Liberty*, of Dublin..... 3
Schooner *Sylphiden*, of Nakskov—Saved vessel and crew..... 7
Schooner *Belloma*, of Red Bay..... 1
Brig *Pioneer*, of Carnarvon 1
Schooner *Princess Alice*, of Ipswich 5
Brig *Minerva*, of Workington 4
Schooner *Elizabeth and Hannah*, of Newburgh 6
Brig *Trial*, of Poole 7
Barque *Cedarine*, of Bermuda.... 134
Smack *Frodsham*, of Liverpool.... 2
Sloop *William*, of Liverpool 5
Sloop *Elizabeth*, of Teignmouth ... 3
Barque *Cruz V.*, of Oporto..... 14
Barque *Druid*, of Sunderland 9
Smack *Merrion Lass*, of Aberystwyth—Saved vessel and crew ... 3
Schooner *Rook*, of Liverpool 3
Fishing-boats of Whitburn..... 12
Barge *Henry Everest*, of Rochester. 4
Ship *Annie E. Hooper*, of Baltimore 18
Schooner, *Ceres*, of Arbroath..... 5
Sloop *Loftus*, of Padstow 4
Schooner *Ellen*, of Liverpool—Saved vessel and crew 3
Smack *Mary Elizabeth*, of Padstow 3
Smack *John*, of Teignmouth 2
Schooner *Osprey*, of Fraserburgh .. 6
Schooner *James Davell*, of Newcastle—Saved vessel and crew .. 2
Schooner *Champion*, of Liverpool.. *10*
Galliot *Aremana*, of Jaffa—Assisted to save vessel and crew 6
Ship *James Browne*, of Philadelphia —Assisted to save vessel and crew 18
Smack *Countess of Lisburne*, of Aberystwyth..... 3
Barque *Royal Rose*, of Whitby.... 12
Barque *Brazil*, of Liverpool 13
Schooner *Little Aggie*, of Berwick.. 4
Schooner *Sisters*, of Wick 3
Ship *Louisa*, of Bristol 20
Barque *Rubin*, of Liverpool..... 12
Smack *St. Patrick*, of Bangor 3
Schooner *Emily*, of London—Saved vessel and crew..... 3
Schooner *Betsey*, of Brixham..... 5
Brig *Regalia*, of Whitby 7
Brig *Levant*, of Bristol 10
Smack *Britannia*, of Ramsgate.... 4
Ketch *Neuha*, of Berwick..... 3
Barque *Bonnie Dundee*, of Dundee. 13
Smack *Elizabeth*, of North Berwick 4
Schooner *Kezia*, of Sunderland 5
Schooner *Mary Anne*, of New Quay 5
Schooner *Pandema*, of Plymouth .. 8
Brig *Florence Nightingale*, of London 6
Schooner *Azores Packet*, of Falmouth 4
Schooner *Vulcan*, of Lyme Regis —Saved vessel.
Schooner *Vigilant*, of Kirkcaldy... 6
Barque *Diadem*, of St. John's 4
Ship *Conflict*, of Plymouth..... 1
Barque *Wm. Bromham*, of Glo'ster. 6
Schooner *Cestrian*, of Chester..... 5
Barque *St. Lawrence*, of Liverpool. 14
506

Number of lives saved by shore-boats and other means, for which the Institution has granted rewards during 1862 and first eight months of 1863 449

Total 955

Summary of Lives Saved:—

1861 . . . . . 424 | 1862 and 1863, to 20th Sept. . . . . 955 | Total 1,379

For these joint numerous services in saving 1,379 lives from shipwreck, the Institution has granted rewards amounting to 3,014*l.* 17*s.* 5*d.* in addition to 67 Silver Medals.

The number of lives saved by the Life-boats of the Society, and other means, since its formation, is 13,220; for which services, 82 Gold Medals, 733 Silver Medals, and 17,200*l.* in cash, have been paid in rewards. The Institution has also expended 75,380*l.* on Life-boats, Life-boat Transporting-carriages, and Boat-houses.

The Committee desire to express their grateful sense of the generous support which they have received from the British public during the past few years, a support which has enabled them to establish their present magnificent fleet of 125 life-boats on the shores of the United Kingdom. Deeply sensible, however, of the great responsibility that rests on them to maintain their fleet in a thoroughly efficient state, and its crews practised in the management of their boats, which can only be effected by a large and permanent annual income, they earnestly appeal to all classes of their countrymen to aid them in upholding and perpetuating so great and truly national a work.

Donations and *Annual Subscriptions* will be thankfully received by the Bankers of the Institution, Messrs. Willis, Percival, and Co., 76 Lombard Street; Messrs. Coutts and Co., 59 Strand; Messrs. Herries, Farquhar, and Co., 16 St. James's Street, London; by all the Bankers in the United Kingdom; and by the Secretary, Richard Lewis, Esq., at the Office of the Institution, 14 John Street, Adelphi, London.—W.C.

1st October, 1863.