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OUR FIFTIETH ANNIVERSARY PRIZE ESSAY COMPETITION.

Though it is doubtless well known to the majority its appearance, week by week, without interruption for a period of half a century.

We feel that it is due at once to our readers and to this shall take the form of a profusely illustrated special done to avert disasters. number, which will be issued on July 25 of this year.

ber to a review of this progress during the past half century.

will be the publication of a prize essay on the subject with the sea. of "The Progress of Invention during the Past Fifty Years," for which we are offering a premium of two hundred and fifty dollars.

of all of our large body of readers and subscribers will express their opinion.

MODERN STEAMSHIPS AND NAVIGATION.

The modern steamship is a favorite subject for exemplifying modern progress. In early days man dreaded the ocean, and the cruise of Ulysses along the shores of the Mediterranean and Æneas' voyage with its constant landings are records of the old time coasting the more open seas, until at the present time the ocean vice is employed.

perfections of the service go to prove how well founded ling her to live up to her compasses. was man's dread of the sea. Ship after ship collides with another vessel, sinks after striking a rock, misses its port in a fog and runs on the beach, or by pure days of fog put her miles south of her proper position luck avoides a similar catastrophe and tries hard to and far ahead of her reckoning. Groping along with mere fact that the shores of our coast are patrolled by reasonable regularity of pitch, and narrowly escaped members of the life saving service, part of whose duty serious damage or total wreck. is to burn a warning light if a vessel is seen dangerous-

ing recently been adopted in the patroling of hard beaches. The almost romantic history of the inventor Francis and his metallic lifeboat and the accounts of our readers that the SCIENTIFIC AMERICAN ranks of the many rockets and mortars devised for carrying as one of the oldest journals in the United States, lines to wrecked ships go to show what the inventor they may not be aware that it has now been making has done to save life and property from wrecked ships.

In lighthouses proper, the advance from the old reflecting light with candles as illuminants to the modern lantern with Fresnel lenses, with a four-wick oil ourselves to make some special commemoration of so lantern, Wigham gas burner, or electric arc light, givinteresting an event as the fiftieth anniversary of the ing an illuminating power of hundreds of thousands formation of the present firm, and we have decided that of candle power, tells what science and invention have

This work, all of which may be termed shore work, It has been the aim of the SCIENTIFIC AMERICAN is really a concession to the imperfections of navigato keep the public faithfully informed, week by week, tion. The problem of safety at sea should be atof the world's current progress in the arts and sciences; tacked on the ship itself. The unsinkable ship, whose and it is our intention to devote the anniversary num. engines cannot be totally disabled, has not yet been invented. She is approximated to only. In the best of the ocean steamers the unavoidable imperfections One of the most interesting features of the issue bear eloquent testimony to man's inability to cope

The first thing that impresses a novice who takes the tiller in a boat for the first time is the extreme difficulty of keeping a moving vessel upon a fixed The conditions governing this competition will be course. He finds that unceasing attention and confound on another page, from which it will be seen stant changes of the rudder are required. The tiller that all manuscript should be received at this office on cannot be held in one position for more than a few or before June 20, 1896. The papers will be passed on seconds at a time. On the modern liner the same thing by a select jury of three, whose names will be an holds. The power the helmsman can exert by the nounced in a later issue. We are desirous that all the steam steering gear is instant in effect and ample in essays submitted should receive careful attention, and amount, but is not sufficient in either factor to enable to this end we request that intending competitors will him to hold the ship upon a constant course. As the forward their manuscript at their earliest convenience. ship rolls and lists, one or the other propeller, if she We also draw attention to the arrangements which is a twin screw ship, has the greater effect, and her we have made to secure a vote upon the question as head constantly tends to go to starboard or to port, to what invention introduced within the past fifty and the tendency has to be counteracted by the helm. years has conferred the greatest benefit upon man- Every wave parted by the bow exerts some degree of kind. The result in any case will be of special in- deflecting power, also to be met by the helm. Lookterest, and particularly so if, as we hope, the majority ing at a six or eight inch compass card, these deflections may seem of little account, but when referred to a radius measured by a day's or hour's run, or even by the ship's length, they appear in their true magnitude.

A single degree of deflection on a radius of five hundred feet, taken as the ship's length, represents a deviation of nearly eight feet from the course. An error of one degree for an hour's run would give a deviation of nearly 2,000 feet, and for the day of over four miles. navigation. Little by little man forced his way upon But a degree on the compass card is very little. A point, the regular unit of the compass card, is eleven is crossed with almost the regularity of a ferry, and and a quarter degrees, and many a ship yaws from probably with greater relative regularity. The five side to side over an arc of two points, giving a length hundred foot hull is driven remorselessly through deviation of eighty or ninety feet. In all accurate ation, 200 fifty years ago. The twenty to thirty thousand horse little as possible; not only on account of its variaseas at a speed that would have swamped the ship of work the surveyor or geodosist uses the compass as power expended in driving the engines of a liner repre- tions, but because it is impossible to read it to a small sent the consumption of a ton of coal every two or enough fraction of the circle. With a vernier a cirthree minutes. So regular is the operation of engine cle can be read down to seconds; with the compass and boilers that under similar conditions of sea the a degree can barely be fractioned. The compass with screws act as a log and measure the ground covered as this imperfection is accurate enough for the steamship accurately as the regular log and log line. Every ad_1 navigator because it is too good for his steering junct available for increasing the efficiency of the ser- capacity; the ship cannot be held down to a compass course. Compass errors are constantly corrected by In all its appliances arranged to be operated on the observation, and the instrument is only used in rununstable platform supplied by a steamship in a gale of ning from one observation to another. But perfect wind, the seagoing steamship embodies some of the navigation would imply perfect dead reckoning. It is greatest triumphs of modern engineering and science doubtfulif man's powers will ever mount to the height Yet in spite of this the unavoidable weaknesses and im- of perfectly controlling a ship at sea, or even of enab-

The futility of dead reckoning received a startling illustration in the stranding of the St. Paul. A few attain the tribute of silence for its narrow escape. The constant soundings she ran ashore upon a beach of

The most prominent improvement in modern steam. ly near the shore, proves the crudity of our most ad- ships develops a new imperfection. Twin screws are vanced methods of navigation. The fact that the cap- now almost universal in the more modern types of firsttain of the St. Paul, which went ashore on the beach class ships. In the old single screw system trouble at Long Branch, was exonerated from all blame shows was experienced from the screw lifting out of water as that man has not yet achieved his mastery over the the ship pitched. Every approach of a screw to the carried below the line of the keel to give them "solid The ingenuity of the inventor has done much to water" to work in. In the twin screw ship the lifting ameliorate these conditions. Gas buoys float upon trouble is intensified. Not only does pitching raise her the waves, and, charged with compressed gas, give a screws toward the surface, but rolling and listing do brilliant light for three months or more without any the same. The screws carried well to the sides apattendance. Along dangerous channels or near shoals, proach alternately the surface as the ship rolls in a electric buoys are established supplied with current moderate sea, so that standing by the taffrail the from the shore, so that light is turned on at sunset blades can be seen showing their tips out of water. from the shore station miles distant. Wave action is, The pitching trouble is diminished by the increased utilized most ingeniously in the whistling buoy and length of modern ships, but the rolling of the screws out of water takes its place. The rolling interferes with the direction of motion less hulk, whose only safety is in her anchors. She is of the ship, as it changes the relative propelling power a well built ship, with steam or power signaling plant, of the two screws. The ship is pushed first to one and perhaps with steam propelling engine to bring side and then to the other, the total of the propelling her to port if her cables give away. Along the coasts force is reduced and the constant shiftings of the rudthe most elaborate system of patroling and of life sav- der also go to impair her speed. If she takes a list and s ing stations finds development, the bicycle even hav- holds it she may need a port or starboard helm to be

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sea with its concomitants of fogs, gales and ocean cur- surface weakens its propelling power. This is so well rents. Recent strandings and collisions in the harbor recognized that in many small vessels the screws are of New York go to prove the same thing.

bell buoy to give audible warnings to navigators.

The modern lightship is no longer an almost help-