

there to contradict them. When they will recognize that safety is the primary element among the general public, and utilize intellect for life saving as freely as they do for coal saving, ocean travel will be doubled.

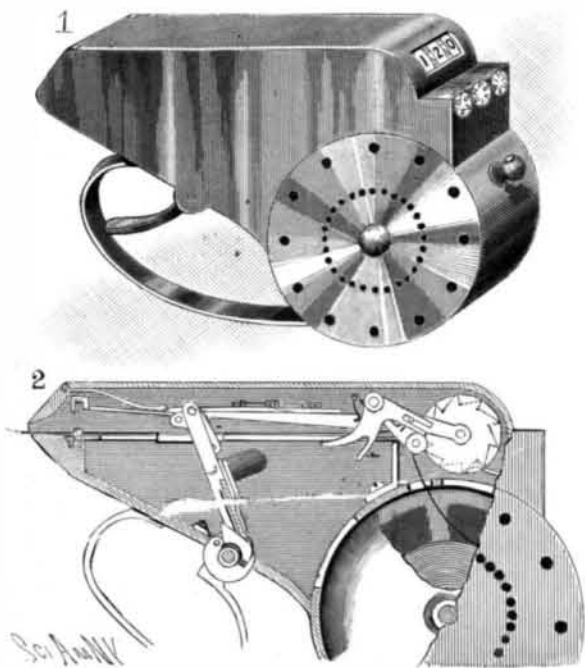
COMBINED TICKET HOLDER AND REGISTER.

We illustrate a ticket holder and ticket register recently patented which is designed to hold and deliver a large number of tickets, such as used on cars or in theaters or other places where a uniform fee is charged. The apparatus is designed to contain a continuous ticket strip and deliver a suitable length corresponding to the length of the ticket, the operative parts being improved in various particulars.

The prime moving part of the mechanism is a spring-controlled trigger which serves to feed the ticket strip by means of a positively acting lever mechanism and automatic clamping and releasing devices for the strip, the parts embodying features of much originality and of simple form, as will be obvious from Fig. 2. The strip is fed a predetermined distance, then held while a knife acts to perforate the strip and facilitate detachment of the ticket by the patron or the employé. It is purposed to intersperse at intervals tickets marked "Free," to induce the patrons to watch the apparatus. The feeding devices are adjustable, that the machine may be adapted to feed according to the length of the ticket used.

Coacting with the other mechanism is a series of registering wheels provided to register the sales. In connection with the cover of the apparatus, a novel combination lock is provided, the dial plates of which are seen in Fig. 1. The total number of tickets registered also appears through the case.

The apparatus is the invention of the late Manuel



FORTUÑO'S TICKET HOLDER AND REGISTER.

Fortuño, whose administrator is Señor Leonardo F. Fortuño, Hospiceo San Nicolas, 23, Mexico City, Mexico.

DR. ISSATSCHENKO, of the bacteriological laboratory attached to the agricultural department of the Russian government, has just made a preliminary communication on a new microbe pathogenic to rats which he has discovered, says Nature. A disease, which assumed epidemic proportions, broke out among the rats kept for experimental purposes in the laboratory, and from the liver and spleen of affected animals a bacillus was isolated, which proved on inoculation to be extremely fatal as regards both rats and mice. Receiving food infected with this organism, rats and mice in variably succumbed, the former after from eight to fourteen days, the latter after from four to eight days. Following Pasteur's example in the case of a bacillus similarly fatal to rabbits, attempts were made to turn this new microbe to practical account and utilize it as a living rat poison. The results so far have not been very encouraging, but further experiments are being made in this direction. It is apparently quite without effect upon pigeons and rabbits. As regards its artificial cultivation, this microbe is very accommodating, growing luxuriantly upon all the customary culture media with the exception of potatoes. In microscopic appearance it varies, as is so often the case, according to the nature of the medium in which it has been previously grown. It is mobile, and is endowed with lateral flagella.

FOR the purpose of cleaning bottles from fatty substances a very simple and practical process has been found. Pour warm water into the bottle, fill in ordinary hay and rub the inside of the bottle with this thoroughly, using a small stick. Now rinse the bottle out with clean water, and not a trace of the odor and the grease will remain. Large bottles which had contained petroleum were successfully cleaned in this way.—Oesterreichische Brauer- und Hopfen-Zeitung.

The Sutro Baths.

The seacoast from San Francisco is reached by either one of two steam railways or the Sutro Electric Railway, all starting from the suburbs of the city and converging near the celebrated Cliff House, in front of the Seal Rocks, says Engineering News. The old Cliff House was burned on December 24, 1895, but a larger structure was at once built, and is a great resort for tourists and people from the city. North of the Cliff House are the new and extensive Sutro Baths. On the top of the hill and overlooking the ocean is Sutro Heights, the residence of Adolph Sutro, mayor of San Francisco, but who is most widely known from his connection with the famous Sutro tunnel on the Comstock lode in Nevada. The grounds of his establishment are open to the public.

On the shore, and close to the Cliff House, are the new Sutro Baths, established and built by Mr. Sutro, which were opened in March, 1896. The buildings are handsome and spacious, and form a pleasure resort for visitors as well as bathers, there being a museum and other attractions, and cheerful promenades lined with palms and growing plants. The entire building is 499.5 by 254.1 feet, and contains about 600 tons of iron-work in the columns and roof trusses, 270,000 cubic feet of concrete, 3,500,000 feet of lumber and 100,000 square feet of glass. Provision is made for spectators at aquatic sports and swimming matches, there being seating capacity for 3,500 persons in the amphitheater and 3,500 on the promenade, while the total capacity of the building, including the aisles, etc., is 25,000 persons. There are seven swimming tanks, as follows: One large tank, 1,409,062 gallons capacity; four small tanks, 70, 283, 400 and 875 gallons; one medium size tank, 112,500 gallons, and one fresh water tank for plunges. There are nine springboards, and seven toboggan slides lined with sheet brass and having a continuous stream of water running down them. There are 517 private dressing rooms and 9 club rooms, the total capacity being 1,110 persons; 29 dressing rooms and all the club rooms are fitted with shower baths, and there are 66 shower baths in all. The laundry equipment can handle 20,000 bathing suits and 40,000 towels per day. The restaurant is on three floors, with an area of 30 by 75 feet on each floor. The water for the baths is taken from the waves or rollers which break on the reef on which the baths are built.

A catchwater basin, 75 by 150 feet, was blasted out of the rock, and this receives the water from the waves, which then flows to the receiving pond, and through a tunnel to the settling tanks, whence it goes to the various bathing tanks. With a high sea rolling in, the tanks can all be filled in an hour. A centrifugal pump with a capacity of 6,000 gallons per minute keeps up a constant circulation, and can fill the baths in from five to six hours. The tanks can all be emptied in an hour, at high or low water, through an outlet of 24 inches diameter, the waste water being led away to a point where it is discharged into a tidal current, so that there is no chance of its being at once taken in again. The water is heated by a system devised by Mr. Sutro, using direct steam driven through small tunnels. The temperature is graduated in the different tanks, and in the smaller tanks it can be raised 10 or 20 degrees in a few minutes. The bath buildings are protected on the west by a breakwater lying north and south, 400 feet long, 20 feet deep, 25 feet wide at the top and 75 feet at the base, containing 450,000 cubic feet of rock; another breakwater runs east and west, this latter being 300 feet long and of the same cross section, containing 300,000 cubic feet of rock.

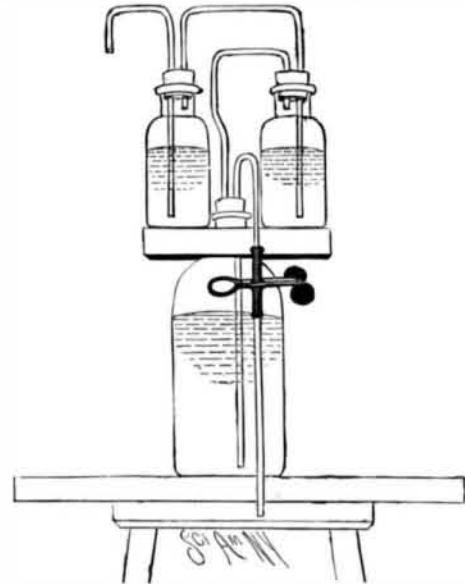
The Current Supplement.

In the SCIENTIFIC AMERICAN SUPPLEMENT of July 23, 1898, will be found many articles of unusual interest to our readers. On the front page is a fine engraving of England's newest battleship, the "Albion," accompanied by a full description of her engines, armament, and general construction. "The Naval War Game—A Strategical Campaign," is a highly interesting article describing by means of Mr. Fred T. Jane's apparatus an imaginary sea-fight off Falmouth, in which the "Indiana" and "Massachusetts" play an important part. The Armstrong discharge tube for torpedoes is exhaustively treated in an article illustrated by nine diagrams. Admiral Cámara's fleet forms the subject of a full page engraving. The new Maxim-Schupphaus smokeless powder is treated at considerable length in a fully illustrated article. Mons. H. Poincaré in a very scholarly essay tells of "The Stability of the Solar System," and Mr. Willis H. Moore, Chief of the Weather Bureau, writes on the "United States Atmospheric Survey." The subject of wireless telegraphy is treated in a descriptive article illustrated by details of the apparatus employed. "New Cycle Details" is an article which is illustrated by numerous drawings and which will prove of no little interest to many bicycle riders. The mineral resources of the Philippine Islands are discussed by Frank Karuth, F.R.G.S. Taken as a whole, the current SUPPLEMENT has covered a very wide field and covered it well.

APPARATUS FOR PRESERVING PYROGALLIC ACID SOLUTIONS.

BY RANDOLPH BOLLING.

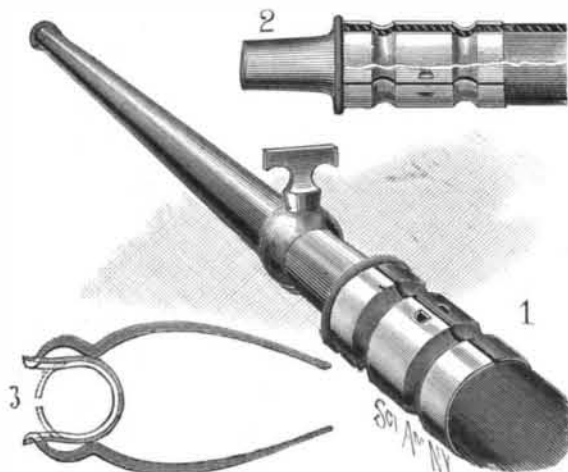
I have devised this piece of apparatus especially for the use of photographers who use a solution of pyrogalllic acid and other chemicals to act as a reducing agent on the silver salts of the photographic plate. The use of the so-called "developing solutions" has



almost ceased, due to the solutions becoming brownish from absorption of the oxygen of the air, and so rendering them useless for developing purposes, and requiring a fresh solution to be made up. The explanation of the solution spoiling was simply that repeated opening of the bottle allowed oxygen to come in contact with the pyrogalllic acid, which, having a strong affinity for it, combined with it, forming a brown or black compound, and the mixture had to be thrown away. To avoid this I have constructed a simple piece of apparatus which any one can make with a few bottles and a yard of glass tubing. Take a quart bottle, which is to serve as a stock bottle, and, having bored two holes in the cork, pass a bent glass tube through it to the bottom; now connect a short tube by means of a gum tube to this and you have a siphon; slip a pinch cock on the gum tubing so as to regulate the flow of the liquid. Above the large bottle is a yoke of wood having a slot sawed in it. This fits the neck firmly and serves as a support for the two absorption bottles, which are connected with each other and the central bottle with glass tubes; so that when the pinch cock is opened the liquid flows out of the stock bottle by way of the siphon and the air to replace it bubbles through both the absorption bottles. The two small bottles are filled with a strong solution of potassium hydroxide and pyrogallol dissolved in water, so that the air in coming into the apparatus has to bubble through a solution which completely removes all of the oxygen, leaving only the nitrogen, which has no action on pyrogalllic acid. You can keep a developing solution for years without the slightest alteration, as nitrogen gas does not combine with pyrogalllic acid.

THE "SIMPLEX" HOSE CLIP.

The purpose of this device is to provide a means for conveniently and efficiently securing hose to couplings or to the shank of the nozzle. It consists simply of a split, tubular, metallic spring band, the ends of which



AN IMPROVED HOSE COUPLING.

can be readily forced apart either for applying to hose or removing from the same. It is possessed of sufficient resiliency, and upon its inner surface are beads or projections so spaced as to effectually press the hose into the indentations of the coupling.

To remove or apply the band, a pair of levers are employed, each being inserted in the special openings provided at either end of the band, and then approximated at their distal extremities, Fig. 3. Figs. 1 and 2 exhibit the clip as applied to hose at the nozzle and to an ordinary hose coupling. It is the invention of Mr. John T. Duncan, of 69 Talbot Road, Bayswater, London, England.

The Famine in Russia.

So rapid has been the succession of startling events on this side of the Atlantic, especially since midwinter, that little thought or attention has been given to affairs in the more remote districts of Europe that have not had a political or warlike significance. Hence, it will doubtless be a matter of surprise to many to learn that a widespread famine has existed in the agricultural regions of Russia since last autumn, affecting 40,000,000 of people. Had such condition of affairs been ascribed to Siberia, it would doubtless excite little comment, for the majority have been taught to believe the North-Asian portion of the Muscovite empire is a bleak, dreary, inhospitable region—a desert of rocks and sand in summer, a waste of ice and snow in winter, peopled by convicts, political exiles and fierce and savage Cossack cavalry. But Siberia experiences no famines; its population for the most part are happy, prosperous and well contented; its soil rich and variable, yielding an abundance to ordinary agricultural toil. Siberia is to Russia, in fact, what the "Far West" was to the Eastern States of our own country, or what the Great Northwest now is to Canada—the goal and ambition of the poor.

According to the Continental press, the existing famine is constantly increasing and enlarging its boundaries; worse, many of the famine districts are now ravaged by typhus in its most virulent form, "hunger typhus," the inevitable concomitant of unhygienic surroundings and lack of proper nourishment. Space will not permit of enumeration of a tithe of the horrors declared to exist; it can only be said the pictures drawn of the suffering millions of peasantry are distressing and heartrending in the extreme. The services of man and horse have been offered for a daily wage of eight cents. The thatches of dwellings have been pulled down to feed the cattle of the sufferers, and later the creatures themselves bartered away at forced sale to meet the necessities of their owners. Cows and horses "go begging" at four rubles (approximately \$2) per head. Thousands upon thousands are seeking to eke out life by means of bread made from the barks of trees, leaves, chaff, etc., with a modicum of black rye flour added; and every available hedge, the byres and other out-houses have been utilized as fuel; while a few, more fortunate, have fallen under the ban of the forestry laws by reason of gathering fagots, and are assured of sufficient food, such as it may be, to keep soul and body together while serving out their sentences, though wives and children perhaps are dying. In some regions the hereditary owners of the soil have attempted to mitigate the suffering existent upon or in the vicinity of their estates, and distributed fuel and food; have even made the forests free to the needy for the gathering of dead wood; but in the majority of instances, the proprietor is represented by a steward who regards the tortures of the peasant with complaisance and insists upon the "pound of flesh" in the way of dues accruing to his master.

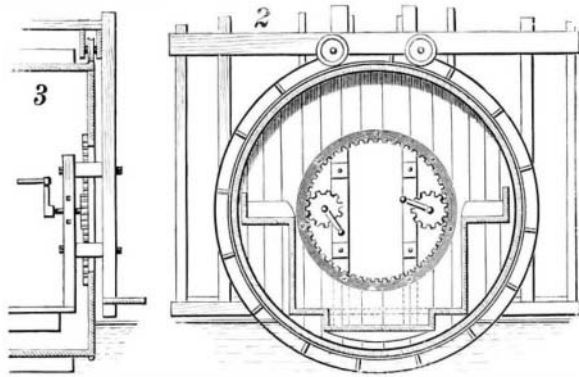
The Muscovite authorities, long persistently silent, have at last been forced, by the insistence and positive attitude of the European press generally, to enter upon an "explanation"—an explanation that seems to have for its chief purpose the quieting of alarm rather than any utterance of facts. The "official document," which is very like all documents emanating from the same sources, proves, however, to be in a measure stultifying. It admits that last year the crops wholly or practically failed in nineteen provinces, with a population of forty millions, but adds the private accounts of general starvation, of typhus, and other effects of lack of nourishment, are all "exaggerated," and that the items published are "only the ordinary appearances of poverty and want to be met with in the existing conditions of life among agricultural as well as other classes of population."

Commenting on the famine, Public Opinion (London) calls attention to the fact no such dire and tar-

reaching disaster has ever overtaken Poland, Finland, or the Baltic Provinces, probably for the reason the bulk of population in these districts is made up of those non-Russian by origin, non-orthodox—that is, do not affiliate with the Greek Church—and who stand generally on a higher level of civilization; that they still enjoy remnants of their old social institutions, which help them in an organized manner to combat the elements of nature, to mitigate the effects of droughts, and generally to be prepared to meet any possible calamity.

THE ROLLER BOAT THAT ACTUALLY WENT TO SEA.

In view of the more ambitious designs for a successful roller boat which have been laid down and actually



DETAILS OF THE BECKMAN ROLLER BOAT.

built, the accompanying views of a home-made craft of this type, which was built and launched on the coast of Maine, have considerable interest. This curious craft actually started on an Atlantic voyage, manned by a crew of two men, or rather a man and a boy, the owner demonstrating his own faith in his seagoing barrel by taking his young son with him. Our readers will not be surprised to learn that the maiden voyage was disastrous, and that after rolling or rather being blown out to sea for fifteen miles, the crew were glad to exchange their swinging platform for the solid deck of a seagoing freighter. The vessel consisted of a cylindrical barrel about 10 feet in diameter and 12 feet in length, which was built of staves and hooped in the usual barrel fashion, and carried on its surface a series of parallel floats or paddles. Around each end of the barrel was laid a circular track of iron, on which, by means of two pairs of wheels, a working platform was

frame and inner platform were so adjusted that they would always swing in a horizontal position.

The rolling motion was imparted to the boat by means of hand cranks and gears which meshed in a large circular gear, bolted to the ends of the barrel, as shown in the engraving. The forward movement of the boat was due to the paddles or floats arranged on the periphery of the barrel. The only contact between the frame and the barrel was at the four points where the carrying wheels rested on the circular track. The interior of the boat was furnished with a couple of bunks and storage room for food, baggage, and a cooking galley. On his first and only trip, Peter Beckman started from Bar Harbor, Me., on September 23, and passed out by the breakwater to the open sea. Under the joint action of the hand cranks and the wind, the strange craft traveled for fifteen miles at the rate of six miles per hour. As was to be expected, however, the intrepid mariner found that the wind was his master, and after drifting for some fifteen miles before the breeze he was hailed by the freight steamship "Pentagoet," bound for New York, and taken on board. At Mr. Beckman's earnest solicitation an attempt was made to tow the rolling boat; but after the hawser had parted, the craft was left to continue its voyage alone across the Atlantic.

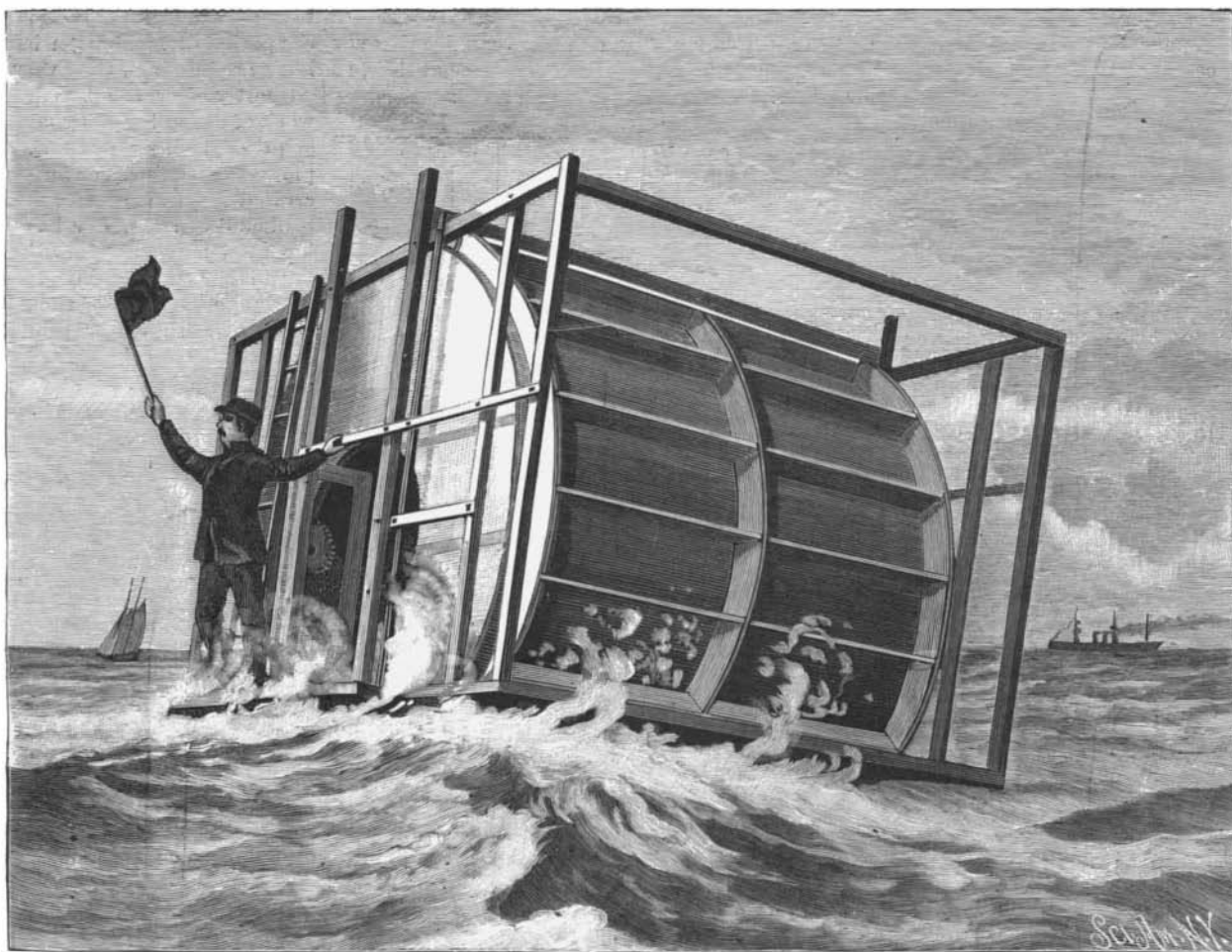
Disturbing Nature's Balance.

The great and growing cost of the attempts in Massachusetts to exterminate the gypsy moth shows how serious may be the consequences to "the balance of nature" by the introduction of foreign insects or animals. A few of these moths were imported some years ago by an entomologist residing near Boston, says The New York Times. Several of the captives escaped from custody, and the State has spent \$450,000 in the last four years in a vain attempt to exterminate their descendants. It is now estimated that at least \$1,575,000 will be required, and that the appropriation for five years to come should be \$200,000 per annum. On the other hand, a perpetual appropriation of \$100,000 per annum would serve to confine the moths to the district in which they are now found. The problem resembles that which has taxed the resources of the Australian colonies since the progeny of half a dozen rabbits, imported from England, became so numerous that the maintenance of agricultural industries was menaced by their depredations.

Australia has expended millions in rabbit-proof fences and in devices for killing off the rabbits. But, although bacteriologists have endeavored to remove them by disseminating the germs of fatal disease, the colonists have thus far been able to do no more than

hold the animals in check. In Florida several rivers have recently become choked by the rapid growth of a kind of hyacinth imported a few years ago, and considerable expenditures will be required to keep the streams open for navigation. An imported insect called the black scale menaced the fruit industry in California until the State procured from Australia and introduced in the orchards a little beetle which ate the obnoxious insects, and thus brought relief.

These and other instances which might be cited show that the utmost caution should be observed with respect to the introduction into any country of insects or plants for which nature has made no preparation there, and the growth of which may not be restrained by natural



PETER BECKMAN LEAVING BAR HARBOR, MAINE, IN HIS ROLLER BOAT.

carried and maintained in a horizontal position during the rotation of the barrel. The outer frame was made slightly larger than the barrel, and carried at each end of it a couple of stout vertical standards, as shown in Figs. 2 and 3. From these standards four horizontal transoms projected into the interior of the barrel through openings in its ends. Here they were bolted to a couple of vertical posts which formed part of an interior platform or cabin. The platform served as the living quarters of the crew. The weights of the outer

enemies and checks with which they must contend in the countries from which they are brought.

DURING the first three months of the present year the North Sea-Baltic Canal has been used by 3,437 vessels, with an aggregate net tonnage of 432,503 tons, against respectively 2,233 vessels and 308,557 tons for the same period last year. The receipts were 232,599 marks (£11,600), against 161,441 marks for the same period last year.