identical position which was allotted it on the original plans from which the boat was built. One could not ask for a more conclusive tribute to the accuracy of the scientific method of design than this.

While we are satisfied that the general belief that "Reliance" is certain to take every race is quite unwarranted by the facts, it must be remembered that the performance of "Shamrock" on this particular occasion can never be repeated in the stronger winds, that is, in any strength of wind that will drive the boat at a speed above that critical point at which wave-making due to big displacement becomes a more serious speed factor than reduced skin friction due to a limited area of wetted surface. Whether "Reliance" can beat "Shamrock III." in a wind of under 8 knots strength will only be known when the boats line up in a light sailing breeze off Sandy Hook; but her tuning-up trials would indicate that she will fail to do it. That she will leave her when the wind freshens to 12 knots and the bigger displacement of "Shamrock" begins to tell against the challenger is probable, but by no means certain; while in a wind of from 15 to 20 knots strength or over the more powerful and lighter-displacement "Reliance" should have the race in hand from the moment the two boats cross the line.

PRESENT STATUS OF AMERICAN SHIPBUILDING.

Very little of an encouraging nature concerning shipbuilding or the American merchant marine in the foreign trade of the United States is to be noted in this year's Blue Book of American Shipping, which is just from the press. Rather, indeed, is foreign shipping still dwindling, since no new vessels have been ordered for this service. The Blue Book is a statistical publication and also a directory well known in shipping and shipbuilding circles throughout the country. It contains as an introduction a careful review of prevailing conditions, the most surprising of which is that not a single contract has been let in the United States for a vessel for the foreign trade of the United States during the past two years. It is a curious anomaly that a country whose exports are unrivaled among the nations of the earth has not ordered the construction of a single ship in two years to carry away its freight. Could any one thing demonstrate more clearly than this the need of government aid for shipping? Why is this feature of our trade neglected? The ability to make things to export is aided by a tariff. Why not the carrier itself? Space in a ship is a commodity. It is something made to sell. The statistics of our export trade would be vastly enriched if there could be added to them the freight earned in transporting the manufactured products.

Except on the Great Lakes, where the industry is a special one protected by the coasting regulations, there is little encouraging to report regarding shipbuilding in the United States. During the fiscal year ended June 30 last, 1,536 vessels, of 456,076 gross tons, were built in the United States, compared with 1,657 vessels, of 473,981 gross tons, for the previous fiscal year. Vessels now under construction indicate a further lessened output for the coming fiscal year. The principal decrease for the past year has been in steel steamers built on the great lakes, which number 41, of 131,660 tons, compared with 52, of 161,797 tons, for the preceding year. The previous year was the one of greatest output in the lake district. On the seaboard only 18 ocean steel steamers, of 101,471 gross tons, were built—and this was the largest output of this type in our history. Nor were these all for oversea trade. Far from it. Only five of them can properly be credited to that service—the "Finland" for the Red Star Line, the "Massachusetts," "Mississippi" and "Maine" for the Atlantic Transport Line, and the "Siberia" for the Pacific Mail Steamship Company. The Red Star and Atlantic Transport lines are now controlled by the International Mercantile Marine Company. All these ships were ordered over two years ago, and there have been no new orders to fill the plans left vacant on the stocks. A few contracts have been received by the coast shipyards for some splendid vessels for the coastwise service. These include a side-wheel passenger steamer and a freight steamer for the Fall River Line, the former to cost $1,000,000 and the latter $400,000, and both to be built by the Fore River Ship and Engine Company, Quincy, Mass.; a 400-foot passenger and freight steamer for the Mallory Line, of New York, and a similar vessel for the Ocean Steamship Company, of Savannah, both to be built at the Roach Shipyard, Chester, Pa.; a 300-foot steamer for the Clyde Line, to be built by the Cramps, of Philadelphia; a steamer for the Eastern Steamship Company, to be about 350 feet long; two steamers for the Ericsson Line, each 203 feet long, all to be built by the Harlan & Hollingsworth Company, Wilmington, Del.; and four dredges for government service to be built by the Maryland Steel Company, Sparrow's Point, Md. These embrace all that are of any importance.

It might be pertinent to state, since so many laymen appear to be ignorant of it, that the coastwise trade of the United States and the foreign trade are two different things. The coastwise trade, meaning trade between United States ports, is a protected trade. Vessels of other flags may not engage in it. The past four years have marked a distinct wave of prosperity in shipbuilding for the coastwise trade; but the crest appears to have been reached, since new orders are not forthcoming.

Since the Spanish-American war naval contracts have been well distributed among the coast shipbuilders. During the year contracts for four battleships, two armored cruisers, and two gunboats have been given to them. Contracts for two more battleships are about to be given, and in addition the New York navy yard is building one battleship. Forty-one warships are at present under construction, representing a displacement of 338,948 tons, a total horse power of 415,500, and a cost for hulls and machinery of $90,314,516.

During the year the United States Shipbuilding Company was formed to take over the plants of the Union Iron Works, San Francisco; the Bath Iron Works and Hyde Windlass Company, Bath, Me.; the Eastern Shipbuilding Company, New London, Conn.; the Harlan & Hollingsworth Company, Wilmington, Del.; the Crescent Shipyard, Elizabethport, N. J.; the Canda Manufacturing Company, Carteret, N. J., and Samuel L. Moore & Sons, Elizabethport, N. J. Later the plant of the Bethlehem Steel Company was added, Mr. Charles M. Schwab transferring it to the shipbuilding company, though retaining an issue of $10,000,000 in bonds as an exclusive lien upon the property. In addition he received $20,000,000 in stock, equally divided between preferred and common. It was soon found that the shipbuilding company was capitalized far beyond its tangible assets and earning power, though the subsidiary plants themselves were in a thoroughly healthy condition. The inevitable result was failure to meet the fixed charges upon its sheaves of securities, and the court was under the necessity of nominating a receiver for it. The unfortunate plight of this company is no reflection whatever upon shipbuilding as a thoroughly sound and excellent business; it is merely another evidence of the folly of supposing that values are created by artificial means. A plant is worth no more than it can earn.

A forecast of shipbuilding on the great lakes does not show many orders in abeyance. A year ago the shipyards were filled up with orders for a full year ahead. But that is not the case now. The lake shipyards, broadly speaking, are now well up with their work. If they had to do so they could probably turn out all orders on hand within six months. Those best informed, however, do not take a dubious view of things on the Great Lakes. The industry, as stated before, is special; the ships are not like other ships; the shipping is not like other shipping; the freight carried is not so miscellaneous as oversea freight, but is confined to a few items in bulk. These items are likely to continue to be moved for years in a constantly ascending scale and ships will continue to be built to carry them. Moreover, a fair part of the existing tonnage on the lakes is wooden; it is old and decaying and must eventually be replaced by new and more modern carriers. Thus the permanence of shipbuilding on the lakes is assured for many years to come, although the number of orders for the coming year will fall considerably short of the business of any of the past three years.

THE NINTH INTERNATIONAL GEOLOGICAL CONGRESS.

The Ninth International Geological Congress is to hold its sessions in Vienna from the 20th to the 27th of this month, and the convention promises to be one of the most interesting in the history of the organization. The number of excursions offered in connection with the congress is very large. There were eight given before the sessions in Vienna began: In the palæozoic region of central Bohemia; in the cretaceous areas of Bohemia; to the hot springs (Carlsbad, etc.) and the regions of eruptive rocks in the north of Bohemia, and to the district about Brünn in Moravia; to the coal region of Ostrau and the environs of Cracovie and Wieliczka in Moravia; to the oil district of Galicia; to the region of the Carpathian "Klippes" and of the Tatra; to the environs of Salzburg and Salzkammergut, and to the palæozoic and tertiary terranes of Styria. The duration of these excursions was from eight to fourteen days and all were conducted by Austrian geologists who had made special studies in the regions concerned.

Seven minor excursions to places of geological interest in the vicinity of Vienna were on the programme for days during intervals in the meetings, while twelve extended excursions, likewise under the leadership of experts, are offered to the members of the congress for the weeks immediately succeeding the closing of the business sessions. The latter are to Buda-Pesth and to the Danube region in Hungary below the capital, to the Dolomites of the Tyrol, to the basin of the Adige in the Tyrol, to the western portion of the Hohe Tauern, to the central portion of the Hohe Tauern region, to Predazzo and Monzoni, to the Carnic and the Julian Alps, to the glacial beds of the Austrian Alps, to the glaciers of the Adige, to Dalmatia, and to Bosnia and Herziegovinia. All of the extended excursions are intended primarily for the benefit of the members who are making special studies of similar regions in their own countries, hence the number of those who can participate in a stated excursion is limited to enable the conductor to give personal attention to all.

The themes set for general discussion in the meetings of the congress are those which are of world-wide interest to geologists. Saturday, August 22, will be devoted to the consideration of the crystalline schists; Monday, to the cliffs and faults produced by the action of mountain-making forces, while on Wednesday there will be given a series of lectures on the geology of the Balkan peninsula, which presents many interesting problems in the science. The other sessions of the congress will be given up to lectures and discussions of various topics of general interest.

PROF. BARNARD'S OBSERVATIONS OF THE WHITE SPOT ON SATURN.

BY MARY PROCTOR.

In the SCIENTIFIC AMERICAN for August 1, 1903, a clipping taken from an article by W. F. Denning, in Nature, concerning the white spot on Saturn, refers briefly to Prof. E. E. Barnard's observations, which were as follows:

Prof. Barnard had observed Saturn frequently for some twenty-five years, but had never seen any marking by which the rotation period of the planet could be determined; that is, he had never seen any definite spot whose motion could be detected. On June 15 a large white spot was visible, following the central meridian of the planet, but daylight did not permit an observation of its transit across the central meridian of Saturn.

On the morning of June 24, it was again observed with the 40-inch telescope (at the Yerkes Observatory), and its transit carefully determined to be at 3h. 42m. central standard time. The spot was strikingly distinct, and lay some three seconds of arc north of the Saturnian equator. Its motion was very noticeable during the time it was under observation.

It has been subsequently observed, and seems not to be so noticeable as at the first observation. Prof. Barnard hopes to obtain a good set of observations of it, for a redetermination of the rotation period of Saturn. These spots on the planet are rare, the last conspicuous one of the kind having been observed by Prof. Hall at Washington, in 1876, from which he determined the period of Saturn, which had not been determined since the time of the elder Herschel.

Since 1876, faint spots have been reported by several observers, for which periods approximating to that determined by Hall were obtained, but they were too elusive for general observation. In Astronomische Nachrichten, No. 388, we are informed that upon receiving the announcement of Prof. Barnard's observations of the white spot, Hartwig at Bamberg, Germany, made observations of it on June 26, when it transited at 14h. 20m., Bamberg mean time.

Later observations by Prof. Barnard prove that the period of the planet Saturn is 10h. and 39m., which is 25m. longer than the period derived by Hall from the white spot of 1876.

A NEW GOLD DISTRICT.

In the Lake Arkell district, 120 miles from White Horse, and 20 miles from the Yukon River, new placer mines are being worked, which promise to be fully as rich as the Klondike region. Prospectors were rushing to the country before the original discoverers had succeeded in staking out two or three claims. It is said that surface dirt yields 15 cents to the pan. Every man who can leave is joining the rush from Dawson, White Horse, and Skagway.

THE CURRENT SUPPLEMENT.

The process invented by the late Dr. Ludwig Mond for manufacturing illuminating and power gas from coal slack is described in the opening article of the current SUPPLEMENT No. 1441. Another technological article of interest bears the title "Manufactured Marble." In the last number of the SUPPLEMENT the contact process of manufacturing sulphuric acid was historically considered. In the present number the actual manufacturing process is described. George C. Husman tells how unfermented grape juice can be made at home, and how it should be used. Inventors will doubtless read with interest the article bearing the title "The 'State of the Art' in Patent Cases." Charles Richards Dodge tells something of the volcano of Colima. The manufacture and employment of gas from heavy oil in Germany is fully described. Dr. Emmell reviews the present methods of producing bronze colors.