

be had not alone for present needs, but for the future, by recognizing the tendencies in ship building, and that a ship canal should have ample width as well as ample depth. Experience proved that the Suez Canal did not possess enough width as originally constructed, and it had to be widened. Yet, in spite of these costly precedents, the Nicaragua Canal, as at present planned, is surprisingly narrow in places.

However much the Nicaragua Canal may be needed by commerce, it is only ordinary business requirement that such a guarantee as that of \$100,000,000 in securities should not be made until there is absolute surety of the successful consummation of the project. New York and San Francisco are now 15,600 miles apart by the water route around Cape Horn. By the Nicaragua route this mileage is reduced about 10,000 miles. From an economic standpoint the construction of the canal would be beneficial, as it would more nearly equalize prices of commodities. The Pacific coast needs the cheap coal of the South and the cheap manufactured products of the North, while the South and the North can take in exchange wheat, fruit, lumber, and other products. But rather than make a hasty effort to secure these benefits, the government can afford to wait a year or two if necessary until a competent commission has looked thoroughly into the weak spots of the canal scheme. It is safe to be thorough in all preliminaries, so that when the work is undertaken and completed it shall be an engineering, a commercial, and a financial success.

THE COMING NAVAL REVIEW.

As the time approaches for the assembling of the great fleet which, at Hampton Roads and in New York harbor, will take part in a magnificent pageant to mark the opening of the World's Columbian Exposition at Chicago, a strong public interest is being manifested in the affair. This will be the first occasion on which the ships of our new navy will come into comparison with those of the leading foreign powers.

The letter of invitation to foreign powers, inviting participation in the naval review, set forth that our government would "assemble a fleet at the prescribed rendezvous at Hampton Roads in the month of April next, with instructions to proceed thence to New York harbor, there to take part in a naval review in connection with the International Exposition at Chicago, commemorative of the 400th anniversary of the discovery of America by Columbus. It is the sincere and earnest wish of the President that this proposed celebration shall be commensurate with the importance of the historical event which it commemorates, and shall illustrate the extraordinary advance in the progress of naval architecture at the present time. To this end the fleet of vessels of the United States will be composed of vessels of the most modern types which shall have been completed at the date named, and the demonstration will further include reproductions of the caravels which composed the fleet of Columbus upon his voyage of discovery."

Twenty-one vessels have been selected by the Navy Department to take part in the review as follows: The New York (flagship), Baltimore, San Francisco, Charleston, Newark, Philadelphia, Chicago, Miantonomoh, Kearsarge, Detroit, Montgomery, Atlanta, Yorktown, Concord, Bennington, Castine, Essex, Dolphin, Bancroft, Vesuvius, and Cushing. Of the foreign powers invited, Austria, Turkey, and Greece have declined, having no vessels available. Germany will send two armored cruisers, the Kaiserin Augusta and the Seeadler. Russia will send a large fleet, and will probably have the largest representation of any nation in the ceremonies. The Russian fleet will include the first-class armored cruisers Dimitri Donskoi and General Admiral, and the corvette Rynda, with Vice Admiral Koznakoff commanding. Great Britain has accepted the invitation, but the fleet has not been definitely selected. The flagship Blake and several vessels of the North Atlantic squadron will be present, and it is probable that one or two belted cruisers will also be sent over. Italy will send the cruisers Etna, Bausan, and Dogali, and perhaps the transport Fridano, under Rear Admiral Magnaghi. Spain will be represented by the cruisers Reina Regente and Infanta Isabel and the gun boat España. The Duke of Veragua and his suite will sail for America on the American line steamer New York on April 8. France has virtually accepted the invitation to participate, but no vessels have yet been designated. Brazil will send the ironclad Aquidaban and the cruisers Republica and Tiradentes. From the Netherlands will come one frigate of the first class, the Van Speyk, and there will be still other participants not yet announced, but enough to constitute the largest naval demonstration ever seen on this side of the Atlantic.

It is the present intention to have the fleet assemble at Hampton Roads on April 26, and proceed thence to the review in New York harbor, but the full details have not yet been settled. Admiral Gherardi, who has been assigned to the chief command, expects that the battle ships in line will stretch from the Narrows up along the North River shore, and has suggested that "instead of having the vessels pass in review, it may

seem best that the vessel upon which will be the President, members of the Cabinet, and such other dignitaries as may be with him, should steam down along the whole line and receive the honors that will be due to him."

On the day of the review New York harbor will be under Federal jurisdiction, and there can be no room for doubt but that the great pageant here will be in every way worthy of the great exposition whose inauguration it will mark.

The American Silk Industry.

According to Census Bulletin No. 348, the advance in the state of this art for the past decade has been wonderful, not only in the quantity and character of production, but in the invention and development of improved machinery, through the operation of which silk fabrics of all descriptions have been brought within the reach of the masses and, to considerable extent, translated from the category of luxuries to that of necessities. The success attending the industry of silk manufacture in the United States has naturally given birth to healthy home competition, with the result that production has been stimulated and American-made silk goods now find abundant demand within our own markets.

The classification of silk goods of American manufacture is now practically without limit, embracing every article made in the older silk-manufacturing countries, and fully equal to the foreign product in quality of weave, beauty of design, and excellence of finish.

The value of the net or finished production of silk goods manufactured during the census year 1890 was \$69,154,599, against \$34,519,723 for the census year 1880, an increase of \$34,634,876, or 100.33 per cent.

The following is a comparative statement:

	1890.	1880.
Number of establishments.....	472	382
Capital invested.....	\$51,007,537	\$19,125,300
Number of hands employed.....	50,913	31,337
Amount of wages paid.....	\$19,680,318	\$9,146,705
Miscellaneous expenses.....	\$4,345,032
Cost of materials used.....	\$50,919,016	\$22,467,701
Value of product.....	\$87,338,454	\$41,033,045
Number of spindles.....	1,254,798	508,137
Number of looms.....	22,569	8,474

These figures do not include the operations of fifty-two establishments engaged in dyeing and finishing silk goods, with an invested capital of \$2,368,157, employing 1,745 hands and paying \$1,013,325 in wages.

This report was prepared under the general directions of the division of manufactures of the Census Office by Mr. Byron Rose, special agent, assisted by Mr. Peter T. Wood.

LOCATION OF SILK MILLS.

The following list, substantially complete, indicates the location of silk mills, with the year of their establishment, at points where none existed prior to 1880. At a number of the locations named additional mills have also been erected within the last census decade, but only the first one established is referred to in this list.

1880. Poughkeepsie, N. Y. Boonton, N. J. Hawley, Pa.	1887. Hopedale, Mass. Mapleville, R. I. Glenn, N. Y. Middletown, N. Y. Norwich, N. Y. Whitehall, N. Y. Hackettstown, N. J. Honesdale, Pa. Hagerstown, Md. Pittston, Pa. Reading, Pa. Belding, Mich.
1881. Dover, N. J. Linden, N. J. Allentown, Pa. Darby, Pa.	1888. Jamestown, N. Y. Bayonne, N. J. Midland Park, N. J. Port Oram, N. J. Altoona, Pa. Bloomsburg, Pa. Pottsville, Pa. Tobyhanna, Pa. Weatherly, Pa. Petersburg, Va. Wadesboro, N. C.
1882. Bridgeport, Conn. Preston, Conn. Tarrifville, Conn. Oswego, N. Y.	1889. Argusville, N. Y. Hillburn, N. Y. Hornellsville, N. Y. Kinderhook, N. Y. Matteawan, N. Y. Spring Valley, N. Y. Steinway, Long Island, N. Y. Oakland, N. J. Pompton, N. J.
1883. Athol, Mass. Auburn, N. Y. Easton, Pa.	1890. Sandwich, Mass. Monroe, N. Y.
1884. Woonsocket, R. I. Mariboro, Conn.	
1885. Stirling, N. J. South Bethlehem, Pa.	
1886. Becket, Mass. Newton Upper Falls, Mass. Guilford, Conn. Fultonville, N. Y. Phillipsburg, N. J. Bethlehem, Pa. Catasauqua, Pa. East Mauch Chunk, Pa. Harrisburg, Pa. Stroudsburg, Pa. Wilkesbarre, Pa.	

Preserve for Binding.

The publishers of the SCIENTIFIC AMERICAN would advise all subscribers to preserve their numbers for binding. One year's issue (52 numbers) contains over 800 pages of illustrations and reading matter. The practical receipts and information contained in the Notes and Queries columns alone make the numbers worth preserving. Persons whose subscriptions have commenced since the beginning of this year can have the back numbers sent them on signifying such wish. Their subscriptions will then expire with the year.

Eight Young Naturalists.

The daily Sun, relating how eight New Jersey boys, with a taste for natural history and some training in that line, made a very profitable and enjoyable use of a part of their vacation last summer, adds:

These boys, who were high school students, took a walking and collecting trip. In twelve days they traveled 160 miles, and came home with a new stock of health and a big load of collections. It was a very cheap trip, too, the total expenses being \$9 for each member of the party.

The expedition left Monclair one morning about the middle of June. One of the boys supplied a strong horse, which was attached to a grocer's delivery wagon. A vehicle was needed for their camp equipment and their collections. They had a complete camping outfit except a tent, which they had not been able to borrow: so they made up their minds that they would give the farmers a chance to offer them the hospitality of their barns. The idea worked well, and every night they slept on the hay in one or another of the capacious barns of New Jersey. Their wagon carried food supplies for two weeks.

Each boy had a valise and a roll of blankets. Then there were botany cans, a collecting press and driers, geological hammers, a camera, and all the other apparatus the boys needed for such a tour. Before they left home they agreed upon their daily routine. They were to have cooked meals morning and night and a cold snack at noon. Four boys each day attended to the culinary department, two serving as cooks and the other two serving the meals. The next day the other half of the party took their turn at the cooking pot. Usually the commissary detail rode in the wagon while the others were busy with beetles, bugs, plants, and minerals.

The boys studied every geological formation from Newark to the Delaware Water Gap. Some of the most interesting places visited were the slate quarries at Newton, the mines at Sterling Hill and Franklin, which are so rich in the beautiful crimson and green ores of zinc, and the Delaware Water Gap, where the young students were greatly interested in the finely exposed rock formations. Many specimens of everything that interested them were obtained, and when they came home they enriched the cabinet of the high school and had many things left to label and store away in their private collections as souvenirs of a very sensible and pleasant vacation jaunt.

The example of the eight Montclair boys may well be emulated by students in many places who have a fondness for nature and a taste for collecting specimens.

How Fires Affect People.

In a fire you get very close down to human nature, observes the New York Sun. The other night an apartment house took fire. There was no time to be lost by the inmates. A mother, scantily clad and crying, took out her two little children. A wife buttoned herself in her long newmarket and ran, leading her brown-eared setter. A devoted son and daughter on the top floor dressed warmly their helpless old mother of 80 and waited to carry her, if need be, across the fire escape. One woman put on a fur-lined cape over her night dress and came forth with a traveling bag filled with silver. A young widow ran for her new Sunday frock and took down the departed one's portrait. Another came forth fully equipped as for church, in jacket, tipped hat, and crimps. Another young woman left all her belongings and fled in her night dress, blistering her bare feet on the cinders, and ran down the street calling for a carriage. Another got her valuables in her sealskin coat, and finding the smoke not too threatening, fished out her long-tailed gown and the black silk silhouettes of her grandfather and grandmother, which she knew she couldn't replace. One man contented himself with a bath robe, another dressed himself in his four-in-hand tie and scarf pin.

Hygiene and Sanitation at the Exposition.

The Bureau of Hygiene and Sanitation at the World's Columbian Exposition has been organized for the purpose of giving as complete a view of the present state of the science as possible. More and more attention is being given to sanitary science, and the truth of the expression "the common health is the common wealth" is being abundantly proved by the decreasing death rate in many of our leading cities. The exhibit bids fair to be of interest not only to the specialist, but to the general public also. Athletic training both at home and at the gymnasium will be well represented. Food, its preparation and sophistication, will occupy a large amount of floor space. Another class (827) will include dwellings, their sanitary defects and the best means of remedying them. This will be followed by hotels, public baths, lavatories, models relating to the disposal of the dead, the supply of water, the disposal of sewage, etc. Such subjects as dust nuisances, the removal of noxious vapors, the danger from infectious diseases in certain trades, will be given great attention and will, doubtless be productive of much good.