

Correspondence.

Wood-workers' Competition at the Pan-American.

To the Editor of the SCIENTIFIC AMERICAN:

The statement is often made that the number of "all-round" men in the mechanical trades is decreasing, and this statement is, generally, accompanied by an expression of regret for existing conditions in this respect, together with the plea—particularly in the case of those who claim to have the interests of the many at heart—for the maintenance of a broader knowledge of allied trades on the part of skilled workers.

That our present commercial organization is such as to lead to a differentiation of trades and do away with the all-round man is generally conceded, and, I believe, it will be generally admitted that the best interests of the workman, individually, demand of him all-round ability with a high degree of skill in several branches of work.

The question has often been asked, How may we promote "all-round skill" on the part of the mechanic? The answer to this question is to be found in part, in my opinion, in the following: Through competitive trials. I suggest, and I am prepared to enlarge upon, the desirability of competitive trials between all round skilled men.

Would it not be interesting and of value to have at the Pan-American Exposition a wood-workers' contest in all wood-working specialties such as: Manual training wood-work, pattern making, carpentry, joinery, cabinet work, stair building, turning, car wood-work, mill-wrighting, machinery wood-work, carving, etc.? Design to be included in all cases. Would have each man that enters put up a substantial entrance fee.

I would be very glad to enter in the all-round and possibly some of the specialties.

W. R. BRADFORD.

Agricultural College, Michigan,
February 18, 1901.

Are the New Armored Cruisers up to the Modern Standard of Efficiency?

To the Editor of the SCIENTIFIC AMERICAN:

The discussion in your columns of the designs of our three new armored cruisers of the "Milwaukee" class and the six of the "California" and "Maryland" classes has aroused considerable interest in a subject which is near the heart of every true American citizen. The letters published February 9 and 16 seem to hit the nail on the head. There can be no question at all that these ships are lamentably weak in offensive power; and the answer from the Department, easily recognized as such by its customary reference to "a compromise among several opposing interests," by no means explains the matter satisfactorily. "Trial displacement" may be an "indefinite term," but the weights required by the various governments, to be carried on ships of similar class and design, are not so widely different as to rule out such displacement as a basis for comparison. Furthermore, it is certainly "begging the question" to discuss this point, when the displacements mentioned for the foreign ships are 2,000, or even 4,000, tons below ours.

Our department friend mentions the fact that the machinery designed for the new vessels develops only 11 horse power per ton. This is but too true. The "Oregon," designed in 1891, has machinery weighing, all told, 1,009.2 tons. This developed, on trial, 11,111 horse power, or just 11 per ton. This was with Scotch boilers, and was ten years ago. Has steam engineering stood still during the decade? Not if its status in other lines is any index. The introduction of water-tube boilers into warships was loudly hailed as effecting a vast saving in weight. One evidence of this appears on page 253 of "General Information Series," No. XIII., published by the Navy Department in 1894, where the boilers of the "Hekla" and the "Geiser," two Danish cruisers of 1,280 tons, are compared. The official report says:

Another great advantage which the (water-tube) boiler possesses is its small weight as compared with ordinary boilers. This can best be seen by comparing the weight of the boilers in the "Geiser" with the weight of the boilers in the "Hekla." Its ("Hekla") six cylindrical boilers are proportioned to the same horse power (3,000 indicated horse power) as the "Geiser," both ships being of the same type and displacement.

	"Hekla" tons.	"Geiser" tons.
Boilers and all fittings.....	120.2	90.8
Water in boilers.....	48.0	17.4
Total.....	168.2	108.2
Type of boilers.....	Cylindrical	Water-tube.

Thus 60 tons, or over one-third of the total weight of the boilers in the "Hekla," are saved in the "Geiser." It is well to note that this comparison is between boilers of the same date.

Another comparison on the same page, between locomotive boilers of 3,500 horse power and Thorny-

croft water-tube boilers of 4,500 collective horse power (designed for the same class of work) shows weights of boilers and mountings to be 82 tons for the former and 71.52 for the latter; corresponding water weights were 30 and 12.78 tons; total weights, 112 and 84.3 tons. Reducing the water-tube figures to a basis of 3,500 horse power, we have 65.6 tons, a saving of more than 40 per cent over the older type.

Turning to our own navy, we find the "Chicago," completed in 1889, with engines and boilers of 5,000 horse power. In 1896-98 she was overhauled, fitted with new engines and boilers, and now develops 9,000 horse power. Part of this increase is attributable to the substitution of triple expansion engines for compound engines; but to the substitution of Babcock & Wilcox water-tube boilers for cylindrical boilers must be credited a large percentage of the saving in weight which enabled her to obtain an additional 4,000 horse power and a considerable increase to her coal supply, on the same weight as that before required for 5,000 horse power. This is the result of about ten years' progress. Where is any evidence of this saving in the new designs?

Admiral Dewey's famous flagship, "Olympia," designed in 1889 and completed six years ago, has machinery weighing 1,162.5 tons, which has developed 17,313 horse power, or 14.9 per ton, and this with cylindrical boilers. The new battleship "Maine" has machinery designed for 16,000 horse power, and weighing 1,130 tons, or 14.16 horse power per ton. This showing will undoubtedly be exceeded on trial. Examples might be multiplied indefinitely, but enough has been said to show that the machinery of the new cruisers does not by any means satisfy reasonable expectations.

Taking 14 horse power per ton as a conservative estimate, we find that for both classes of armored cruisers a saving of from 425 to 450 tons might be effected. This would enable the carrying by each of four additional 8-inch guns (as suggested by Mr. Hoole, in your issue of February 9), at a weight of 115 tons for guns and mounts, and 90 for ammunition; and would still leave some 225 tons for additional machinery power. At the above figures this would mean some 3,000 horse power, or enough to add a knot to the speed of each ship. In case further protection were required for these guns, this would eat up a large portion, if not all, of the 225 tons, but even then the ships would be a vast improvement on the present designs.

To those of us who recognize the fact that our astounding victories during the war of 1812 and in the late Spanish war were in very large measure due to the superb guns and gunnery on our ships, the importance of an overwhelming battery is at once apparent, without need of argument. The large amount of ammunition carried by our new ships has been mentioned. This includes 200 rounds for each 6-inch gun. With due regard to the necessity for an adequate supply of ammunition, yet when we consider the vital importance of striking a first crushing blow, it would seem preferable to have a broadside of (say) 10 such guns, with 120 rounds behind each, than to have 6 guns with the same total amount of ammunition. The chances are very strong that the former battery would disable the latter long before its ammunition was exhausted. In the engagement off Santiago de Cuba the "Brooklyn" fired 473 rounds of 5-inch ammunition, or less than 40 per cent of the amount above mentioned. The proposed addition of four 8-inch guns, however, was estimated at the full government rate of ammunition supply—125 rounds.

The department letter says: "The difficulties in the way of strictly true and impartial comparison are extremely great because of the inaccuracy of information as to details of the foreign vessels which is available to any one writing as your correspondents do." I beg to say that all of the data I have used in the above comparisons comes from official reports of the United States Navy Department; and that the data offered in both Mr. Brown's letter, published February 16, and Mr. Hoole's letter, agrees exactly with what I have obtained from foreign official and semi-official sources. The general features of size, speed, battery, and armor are very easily obtainable, with a high degree of accuracy, by private citizens.

These new ships of ours are important, and we can ill afford to have another "Denver" fiasco on our hands.

SIDNEY GRAVES KOON.

Cornell University, Ithaca, N. Y.,
February 18, 1901.

A Disingenuous Request.

We are in receipt of a communication from a correspondent in the city of Boone, Iowa, who sends \$5 and some sketches of a table he is building, evidently intended for some gambling establishment in that town. A plate of soft iron is located about the middle of the board under the cloth, and electric wires pass up the legs of the table and connect with the plate. By pressure of the foot, or by some similar means, the electric current may be established, and the plate becomes magnetized; the loaded dice can thereby be

manipulated at the will of the operator. The correspondent has had some difficulty in carrying out his plans successfully, and desires us to assist him in overcoming the defects by specifying "the amount and sizes of wire or ampere turns and size and shape of magnets necessary." We have returned the amount of the bribe offered, and take this opportunity of informing him that we do not care to become an accessory in his crime, and for any further enlightenment he may require in overcoming his troubles we would respectfully refer him to the Chief of Police of the city of Boone.

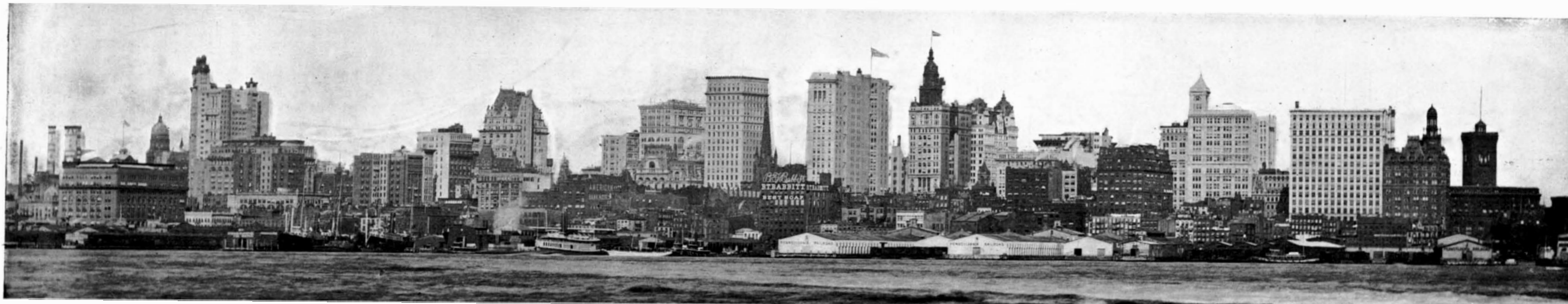
Automobile News.

Tunis is shortly to have an automobile service for the transportation of passengers over the roads between some of the important localities. Among the projects is a line from Tunis to Bizerte and Medjez el Bab, and from Sousse to Sfax. A syndicate of Parisian capitalists is at the head of the enterprise, and they have lately sent M. Fernand Dubois, a prominent engineer, to Tunis in order to study the routes. If the lines which are already projected prove a success they will be followed by others. The speed of the vehicles which are to be used for this service will be about 12 miles an hour.

One of the great races of the season will be the Paris-Bordeaux, which is now being organized by the Automobile Club of France and the Bordeaux Club; the date of the race was announced for the latter half of May, but the day has not as yet been definitely fixed. It is known, however, that the race will include four classes of vehicles: 1. Machines above 1,450 pounds. 2. Light vehicles from 880 to 1,450 pounds. 3. Voiturettes up to 880 pounds. 4. Moto-cycles. The price of engagement has also been decided upon; these are as follows: Heavy machines, \$40; light machines, \$30; voiturettes, \$20; moto-cycles, \$10. The engagements will be received by the Automobile Club of France and Bordeaux Automobile Club. After the arrival at Bordeaux is to be held an aeronautic fête organized by the Aero Club of Paris.

It is stated that the Belgian army is to be provided with a series of heavy automobiles for traction and the transportation of heavy material; the Minister of War is at present actively occupied with the question. The tractors are to be used in times of war as well as of peace; in the latter case they will be used for the various services of the army, in the grand maneuvers and for the rear train of wagons. The horses will not all be sold, however, as the Minister has decided to keep a certain number as a reserve in case of conflagration. In times of peace, the automobile will economize 3 or 4 horses, and in time of war 6 horses per ammunition wagon. For each horse the expense of maintenance is estimated at \$100 per year, and a considerable economy will result from the use of the tractors. Each machine is sufficiently powerful to draw a load of 3,000 pounds; its cost per hour is estimated at \$0.15, and as the machines are to be in regular use, it is expected that the cost of purchase will be covered in the first year. If the tractors are well constructed they should make about 10 years of service.

The electric cab system which was organized at Paris by the Compagnie Générale des Voitures has been discontinued. From this it must not be argued that electric cab systems in general are a failure; there is no doubt that in the present case the result would have been successful from a financial point of view if the subject had been more carefully considered beforehand. In the first place, the company, instead of choosing one of the types of electric vehicle which had already made its record at Paris, decided upon an English type which was very heavy and ungraceful in appearance; its chief advantage was that the accumulators were contained in a box swung underneath the cab and could thus be removed and replaced easily, but this advantage was offset by its many disadvantages, and it was undoubtedly inferior to many of the French types. The company erected a plant at Auber-villiers, in the neighborhood of Paris, at a much greater expense than was warranted by a system which was only in the experimental stage. The plant was at least three miles from the city, and the cabs were obliged to make thus an extra trip of six miles a day, and over a very bad pavement, taking a consequent amount of energy from the batteries, not to speak of their increased deterioration. The different causes of the failure of the present system may be summed up: Heavy vehicles, of moderate efficiency, accumulators badly hauled, the capacity reduced by extra trips, waste of energy, and great first cost of plant. From this it will be seen it would have been difficult to obtain a success. It is to be hoped that this will not discourage electric cab systems in Paris, and that fresh experiments will be made with one of the well-known types of electric vehicles, whose construction has been steadily improving. A number of other cities of Europe are installing automobile cab systems, and the results of the trials will be interesting.



Photo, copyrighted 1900, by G. P. Hall & Sons.

Park Row Building, 390 ft.

St. Paul Building, 308 ft.

Singer Building, Washington Life Building.

National Bank of Commerce Building.

American Surety Building, 312 ft.

Empire Building, 300 ft.

Manhattan Life Building, 345 ft.

Commercial Cable Building.

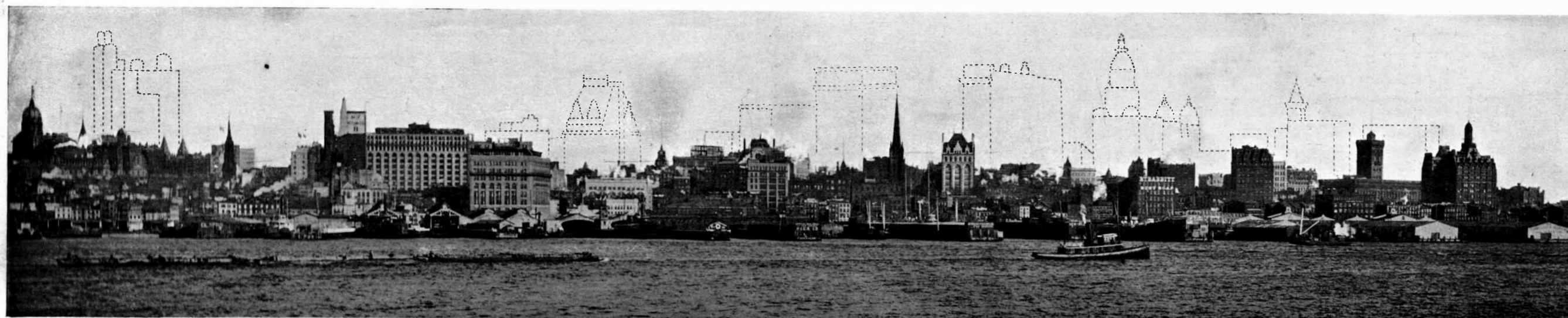
Johnson Building.

Standard Oil Building, 302 ft.

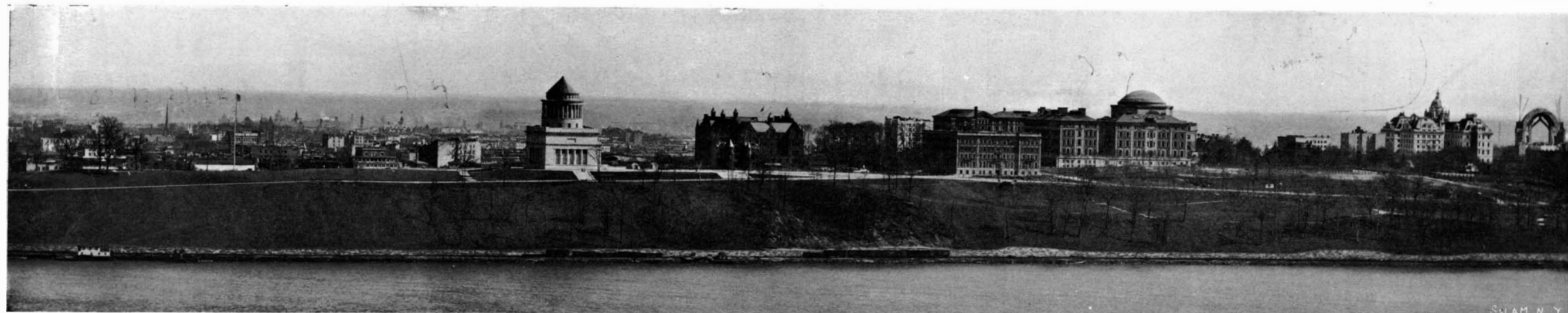
Bowling Green Building.

Washington Building.

NEW YORK FROM THE JERSEY SHORE IN 1901.



NEW YORK IN 1891, WITH TALL BUILDINGS ERECTED IN THE DECADE 1891-1901 INDICATED IN DOTTED LINES.



Photographs by G. P. Hall & Sons.

Grant Monument.

Teachers College.

Barnard College.

Columbia University.

St. Luke's Hospital.

Arch of St. John's Cathedral.

THE FUTURE ACROPOLIS OF NEW YORK FROM GRANTWOOD ON THE HUDSON.

Scientific American.

MARCH 2, 1901.