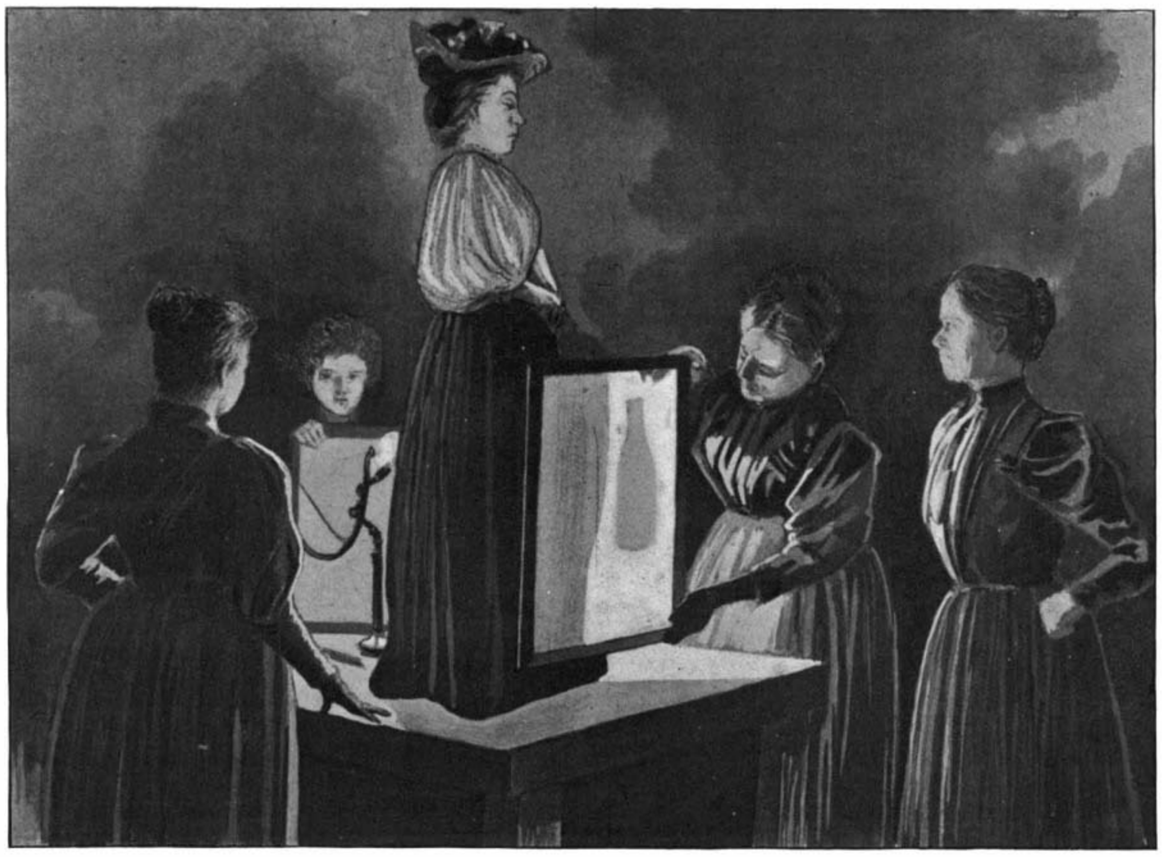
is placed as near the lorgnette as possible, that is to say, almost in contact with the screen, and at a distance of about eight inches from the tube. It suffices to look into the lorgnette in order to perceive at once the shadow of the densest objects contained in the package under observation. We therefore perceive only the densest objects, and, consequently, the use of radioscopy in customs examinations is limited. In fact, the aid afforded by the X rays to the officers whose business it is to inspect the entry of dutiable objects or materials at the frontier or at the gates of cities must not be exaggerated.

We reproduce a photograph of a scene that occurred recently in the large merchandise hall of the Saint Lazare station. We have seen a customs inspector examining a valise by means of the human lorgnette and in the presence of the members of the High Commission of Customs. It is certain that the inspector distinctly perceived in the interior of the valise the metallic objects that the latter contained. Amid the linen he plainly saw cigars and metallic boxes in which contraband objects could be concealed. But the fluoroscopic examination could not teach him any more. It would be impossible, for example, to distinguish by fluoroscopy such things as new fabrics and laces, which are dutiable, from those that have been worn and are admitted free.



A SMUGGLER DETECTED BY THE X RAYS.

M. Remond, who presented M. Seguy's apparatus, afterward proceeded to make a series of very interesting experiments. He brought in a carelessly wrapped package tied without any precaution, and which was apparently valueless. Having placed this before the fluorescent tube, there were at once observed upon the screen a number of loose cigars scattered through the bundle. He showed a deal box, which, when opened, appeared to contain nothing but straw and rags. This box had a false bottom, and upon the fluorescent screen there were instantly seen the objects that were concealed beneath the partition.

The most curious scene was undoubtedly the examination of a female smuggler, as such examinations will hereafter be conducted by the searchers skilled in radioscopy. We reproduce this scene from a photograph taken upon the spot. A woman whose appearance was such as to avert any suspicion was placed before the telltale apparatus, and there was immediately observed upon the screen a bottle in front of her legs. This appearance had not all the success that it merited, since it had been predicted to us by a customs officer, whose practiced eye, skillful in detecting fraud, is no less piercing than the X rays. M. Remond, complaisantly making the smuggler walk, asked the spectators if they remarked anything abnormal about her. The inexperienced answered, No; but a customs officer present was not to be deceived. "This woman," said he, "has something under her frock." He had observed some embarrassment in her walk, and had guessed the presence of the bottle.

It would be wrong, then, to imagine that the X rays are going to suppress customs inspectors and to substitute therefor what has been called, by an amusing neologism, "radioscopers." The indications furnished by the X rays will, in many cases, be inadequate, and will not allow travelers to escape an inspection of their trunks.

On the contrary, the rays discovered by Prof. Roentgen will be very usefully employed for the rapid examination of small parcels, postal packages, and valises. The officers of the custom house will have a method, either with the human lorgnette or with an analogous apparatus consisting simply of an electric source, a focus, tube and a fluorescent screen, of immediately ascertaining at a glance the relative accuracy of the declarations made by shippers or travelers. They will thus be able quickly to detect fraud; and, if they desire, to avoid submitting honest people to the useless annoyance of inquisitorial inspection. What is most unpleasant and vexatious in such inspections is the contact of the officers' hands with the linen and other objects contained in the baggage.

If the new process does away with the necessity of such contact, or simply permits of diminishing the frequency thereof, the director of the custom house will gain the thanks of the public by adopting it.—L'Illustration.

MEETING OF THE AMERICAN ASSOCIATION.

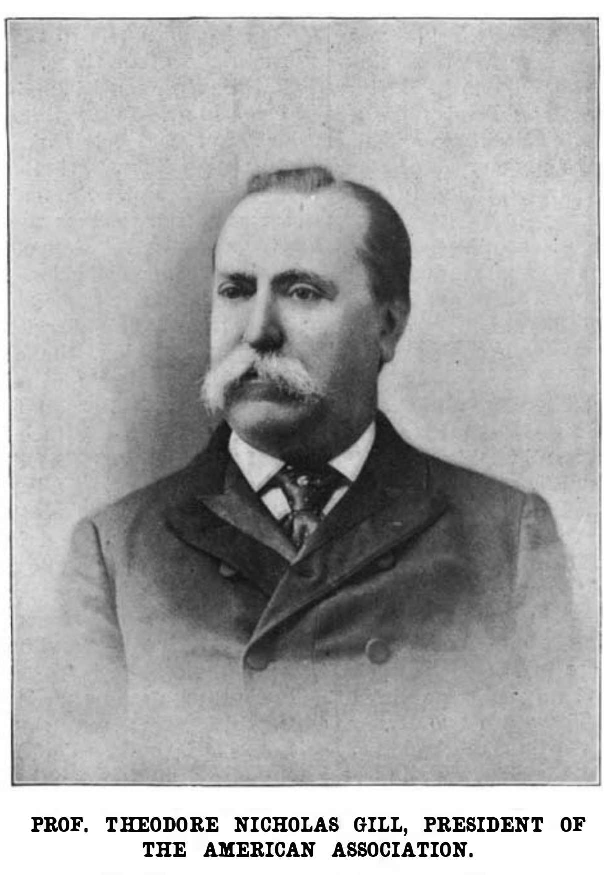
BY MARCUS BENJAMIN, PH.D.

It has often been noted as an interesting fact that the American Association has commonly three presidents in attendance at one of its meetings. These are the retiring president, who yields the chair to the incoming president at the opening of the session and delivers his address on the same evening, and the president elect, who is chosen at the meeting held on the last day. This year, by the death of Edward D. Cope, whose demise in the spring deprived this country of one of its most brilliant scientists, a fourth name presents itself in that of the senior vice president, who succeeded to the presidency, and who will call the meeting to order in the place of President Cope and deliver the retiring address, which on this occasion, at the request of the council, will take the form of a critical description of Cope's contributions to science. No one is more competent to attempt this task than Prof. Gill, for he has been the friend and fellow worker of Prof. Cope in similar lines since the early sixties, when the two young men were fellow students in natural history under Prof. Baird in the Smithsonian Institution. That the address will be a splendid summary of the work in natural history for the last quarter of a century is confidently expected by those who are already familiar with Gill's admirable biographies of Huxley and Goode that were prepared on the deaths of these two men.

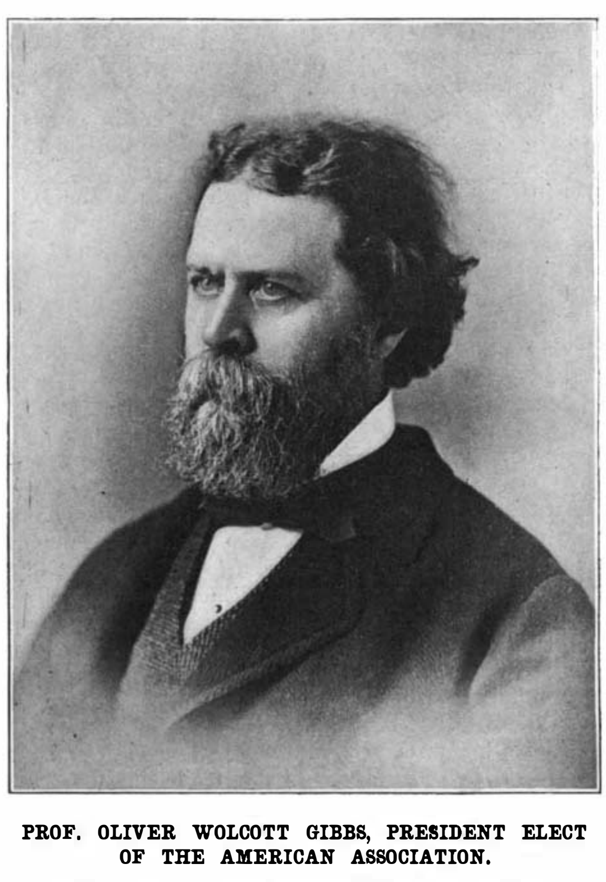
Theodore Nicholas Gill, who ranks among the very first of American zoologists, is a native of New York City, where he was born on March 21, 1837. His early education was received in private schools and from private tutors, and then he studied law, but never was admitted to the bar. As he grew to manhood he developed an interest in natural science, and during the winter of 1857–58 he visited Barbados, Trinidad and other West Indian islands for Mr. D. Jackson Stewart, for whom he collected shells and other specimens in natural history. The results of his explorations were worked up mainly in the library of Mr. J. Carson Brevoort, and published in the Annals of the New York Lyceum of Natural History and in the Proceedings of the Philadelphia Academy of Science. It was in the library (the best of its kind in the United States) of this patron of science that he laid the foundations for that great knowledge of books and authorities which, combined with a splendid memory, has stood him in such good stead in his latter years. In 1859 he visited Newfoundland and studied its fauna, and in 1860 prepared a report of the fishes of the northwest boundary for the State Department.

It was about this time that he came to Washington, which has since been his home, and in 1862 he became librarian of the Smithsonian Institution. This office he held until 1866, when the library was transferred to the Capitol, where he was continued in service until 1874, having become chief assistant. Subsequent to the last named date he has devoted his attention almost exclusively to studies in natural history, and is a daily worker in the Smithsonian Institution, having since 1894 held the honorary office of associate in zoology on the scientific staff of the National Museum.

Meanwhile he had become connected with the Columbian University, at first as associate professor of zoology and subsequently as full professor, which appointment he still holds, and gladly meets his classes



PROF. THEODORE NICHOLAS GILL, PRESIDENT OF THE AMERICAN ASSOCIATION.



PROF. OLIVER WOLCOTT GIBBS, PRESIDENT ELECT OF THE AMERICAN ASSOCIATION.

PRESIDENTS OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

regularly, considering it a privilege to contribute his services without compensation to the university. It was from the medical department of Columbian University that in 1866 he received the degree of M.D.; that of Ph.D. came to him from Columbian University in 1870, and that of LL.D. in 1894, from the same source.

His activity as a zoologist has been unceasing, and his contributions to that science have included over five hundred separate papers, most of which have been on ichthyology. Of these, many appeared in the Proceedings of the Philadelphia Academy of Natural Sciences, but since 1878 the Proceedings of the United States National Museum has been his favorite place of publication. His work has been chiefly on systematic ichthyology, especially with the arrangement of fishes in their classes, orders, and families, yielding a more natural and restricted distribution of genera, which has been almost universally accepted in the United States, and recognized in Europe. Among the most important of his contributions are "The Arrangement of the Families of Mollusks" (1871), "The Arrangement of the Families of Mammals" (1873), "The Arrangement of the Families of Fishes" (1873); the zoological portion of "Johnson's Universal Cyclopedia," the greater part of the volume on fishes and a portion of the volume on mammals of the "Standard Natural History," and the zoological text of the "Century" and "Standard" dictionaries.

Prof. Gill is a member of over seventy-five scientific societies, including the National Academy of Sciences, to which he was elected in 1873. His connection with the American Association began in 1868, and in 1874 he was made a fellow. Last year he was chosen vice president of the section on zoology, and as the senior vice president succeeded to the presidency on the death of Prof. Cope.

Oliver Wolcott Gibbs, the president upon whom the duties of presiding over this year's meeting will devolve, is also a native of New York City, where he was born on February 21, 1822. His education was likewise received in his native city. After passing through Columbia Grammar School he was graduated at Columbia College in the year 1841. Turning his attention to chemistry he studied for a few months under Dr. Robert Hare in Philadelphia, and then took a course in the College of Physicians and Surgeons in New York City, after which he spent several years in Europe studying under such famous masters as Rammelsberg, Heinrich Rose, Liebig, and Regnault. In 1848 he returned to the United States, and for a year lectured on chemistry in Delaware College, Newark, Del., whence he was called to the chair of physics and chemistry in the College of the City of New York, where he remained until 1863, and then was elected to the Rumford professorship in Harvard University, with charge of the laboratory of the Lawrence Scientific School, which place he held for a quarter of a century, and then was made emeritus. Prof. Gibbs fitted up a private research laboratory in Newport, R. I., in 1887, where he had long had his summer home, and there he still continues his chemical studies. His personality attracted a large number of students to him at the Lawrence Scientific School, including such men as Frank W. Clarke, Charles E. Munroe, Samuel P. Sadtler, Thomas M. Chatard, and others of the foremost chemists of the United States. His research work has included elaborate memoirs on the platinum metals, on the ammonia-cobalt bases, on new analytical methods, and on complex inorganic acids. It is this last research, which has extended over many years, that led to his discovery of the platino-tungstates, the vanadio-tungstates, and the molybdates. He has also contributed valuable papers to the literature of physics.

During the civil war he was in New York City, and at that time became actively associated in the workings of the United States Sanitary Commission and was chosen a member of its executive committee. In this connection he frequently met the other members of that body, and out of their daily contact grew the idea that, for the successful carrying on of their work, their meetings should "take the form of a club which should be devoted to the social organization of sentiments of loyalty to the Union." This was the inception out of which quickly matured the Union League Club, of New York City, whose original meeting was held at his residence on January 30, 1863, and of which he is to-day the senior honorary member. Prof. Gibbs has been honored at home and abroad as no other American chemist has. He has received the degree of LL.D. from Columbia and from Harvard. He has been elected an honorary member of the Chemical Society of London, and is also the only American who has ever received an election to honorary membership in the German Chemical Society. He is one of the four surviving original members of the National Academy of Sciences, and in which he has held the office of foreign secretary, becoming in 1896 the president of that body. Prof. Gibbs has long been a member of the American Association for the Advancement of Science, and as far back as 1866 was a vice president of that organization.

At the meeting held last year, when it was proposed to hold a joint meeting with the British Association, the nominating committee, in casting about for the most distinguished American scientist to represent the American Association, were prompt to recognize the fact that the president of the National Academy of Sciences was indeed the most eminent living American scientist. The wisdom of this choice was universally conceded, and the American Association quickly ratified the action of their committee.

The Precious Metals.

The product of gold and silver in the several States and Territories of the United States for the calendar year 1896 is estimated by the Director of the Mint to have been as follows:

State or Territory.	Gold		Silver	
	Fine oz.	Value.	Fine oz.	Coining val.
Alabama	275	$5,700	....	....
Alaska	99,414	2,055,700	145,300	$187,863
Arizona	125,978	2,604,200	1,913,000	2,473,373
California	737,036	15,235,900	600,000	776,533
Colorado	721,320	14,911,000	22,573,000	29,185,293
Georgia	7,305	151,000	600	776
Idaho	104,263	2,155,300	5,149,900	6,658,457
Iowa	48	1,000	....	....
Maryland	15	300	..	....
Michigan	1,800	37,200	59,000	76,283
Minnesota	39	800	...	...
Montana	209,207	4,324,700	16,737,500	21,640,404
Nevada	119,404	2,468,300	1,048,700	1,355,895
New Mexico	23,017	475,800	687,800	889,277
North Carolina	2,143	44,300	500	646
Oregon	60,517	1,251,000	61,100	78,998
South Carolina	3,062	63,300	300	388
South Dakota	240,414	4,969,800	229,500	296,727
Tennessee	15	300	....	....
Texas	387	8,000	525,400	679,305
Utah	91,908	1,899,900	8,827,600	11,413,463
Vermont	48	1,000	....	...
Virginia	169	3,500	...	....
Washington	19,626	405,700	274,900	355,426
Wyoming	692	14,300	100	129
Total	2,568,132	$53,088,000	58,834,800	$76,069,236

The increase in the production of gold over 1895 was $6,478,000, while the production of silver shows an increase over that of 1895 of $4,018,000.

Foreign Papers Published.

There are 2,200 daily and 15,000 weekly papers published in the United States, and twenty-three different languages other than English are represented in the newspaper press of this country, says the New York Sun.

There is only one newspaper published in the Russian language in the United States. There are five newspapers, all weekly, in the Portuguese language. Of these three are in California and two are in Massachusetts, at New Bedford and at Boston. There are four daily newspapers in the Polish language, published at Chicago, Buffalo, Milwaukee, and Baltimore. Besides these there are seven weekly Polish papers at Chicago, six in Pennsylvania, one at Cleveland, one at Toledo, and three at Detroit. Most of the periodicals in the Spanish language are trade papers, but there is a daily paper in New York, and at Key West is another. There are four Spanish papers in Arizona and twelve in New Mexico.

One Armenian paper is published in the city of New York, and there are two Chinese weekly papers in San Francisco. Five newspapers are published in the Finnish language, two in the mine regions of Michigan and one each in Illinois, Minnesota, and New York. There are two daily Bohemian papers in New York, two at Chicago, and one at Cleveland. There are three Danish papers in Chicago, one in Omaha, one in Racine, Wis., and one in Portland, Ore. The Danish papers are, almost exclusively, designed for circulation among the farmers, and few of them have any city circulation, though there is one Danish paper published in New York.

The indisposition of the French to acquire any other language must account for the large number of French papers published throughout the Union, even where the French population is inconsiderable. There are French daily papers (read chiefly by French Canadians) at Fall River, Lowell, and New Bedford, and one published at Woonsocket, R. I. There are also French papers in New York and San Francisco and New Orleans. Eight other French papers, all weekly, are published in the smaller towns of Louisiana.

Seven newspapers are published in the Slavonic language, and of the four in Welsh three are in Utica and its neighborhood. Thirty Swedish newspapers are published, but no daily papers among the number; eleven Norwegian, seven of them in Minnesota; five Hungarian, one Greek, one Gaelic, one Arabic, and eighteen Dutch, nine of which are in Michigan, where the Hollanders are numerous, one only being published at the East, in Paterson, N. J. There are two Italian daily papers in New York and two in San Francisco, but outside of these two cities the Italian press in the United States amounts to very little. There are four papers published in the Lithuanian language, and twelve, three of them dailies, in the Jewish jargon. German newspapers are published in nearly every State, and German dailies in nearly every large city.

THE FOUNDATIONS OF THE EAST RIVER BRIDGE, NEW YORK.

Work upon the new East River suspension bridge, which is to connect New York and Brooklyn at a point about a mile and a half to the north of the present bridge is now well under way, and by the courtesy of the engineers we are enabled to present our readers with illustrations and particulars which show the progress that has been made at the present writing.

In our issue of September 12, 1896, will be found a bird's eye view showing the bridge as it will appear when finally completed and its relation to the surrounding districts. The terminus of the Brooklyn approach will lie on the block between South Fourth and South Fifth, Driggs and Roebling Streets, and the New York terminus will be located on the northern half of the block lying between Delancey and Broome, Clinton and Attorney Streets. The foundations of the bridge will be four in number, two under each tower, and they will rest upon timber and concrete caissons, sunk by the pneumatic process, upon which piers of solid masonry will rise to a height of 23 feet above high water. Above these will be built up the massive plate steel towers, each consisting of four corner posts, or legs, strongly tied together, the two groups of four on each pier being also connected by massive transverse lattice trusses and intermediate ties and struts. The top of the towers will be 335 feet above the river. The center span, 1,600 feet in length, will be carried upon four 18 inch steel wire cables, and the latter will be carried inshore 590 feet, where they will be anchored to massive masonry anchorages, each of which will be 150 feet square and 100 feet high. The shore spans will consist of independent trusses carried by the main towers, the anchorages and a pier intermediate between the former. The bridge will be stiffened against deformation under moving loads by a pair of continuous lattice trusses 40 feet deep. Between the trusses will be six elevated railroad and trolley tracks, and on the outside of each truss will be a roadway for vehicle traffic. Two walks for pedestrians will also be provided. These will be placed inside the trusses and above the trolley tracks. The total width of the floor will be 118 feet. There will be no terminal stations to this structure, as there are to the Brooklyn Bridge, the aim of the city authorities being to provide a broad, continuous thoroughfare, over which trains, vehicles, and pedestrians may pass without any interruption.

It can be well understood that in building a structure of these vast dimensions, whose term of life should be reckoned by the thousand years, the most important consideration is the foundations, inasmuch as upon these the stability of the whole structure depends, and when they have once been put in, they are forever beyond the reach of alteration or repair. It is conceivable that faulty design or poor material in the superstructure might be remedied, even after the bridge was completed—so great is the skill and resourcefulness of the modern engineer; but blunders in the design or construction of the piers of a 1,600 foot suspension bridge would probably wreck it beyond all hope of recovery.

The foundations of the new bridge will consist of timber caissons filled in with concrete. Owing to the varying depth of the rock below the surface of the river, no two of the caissons will be of the same dimensions, although they will all be similar in construction. The structure which is shown in the accompanying illustrations is the north caisson of the New York tower, and the description of the plant and methods employed in sinking it to place will apply also to the work on the other three. The borings show that the bed of the river consists mainly of sand, with some clay and bowlders. Below this, at a depth which varies from 45 to 71 feet below high water, is a very irregular surface of gneiss rock, similar to that which is found on Manhattan Island. The caisson will be sunk through the sand until it touches the rock, which will then be blasted away and "stepped" until the edge has come to a fair bearing on all sides. When this has been done, the space between the rock and the roof of the caisson will be carefully filled in with concrete.

Roughly speaking, the caisson, with its attached coffer dam, may be described as a huge boxlike structure, 60 feet by 76 feet on the sides and 19 feet deep, fitted with a bottom, which is placed, not at the lower edge of the sides, but 7½ feet above it. The space below the bottom or "roof," as it is called, constitutes a working chamber in which the blasting and excavation of the river bottom is carried out. Its walls are two feet nine inches thick and consist of two courses of 12× 12 inch timbers, the outer course being horizontal and the inner vertical, on the outside of which are two layers of 3 inch plank and one layer of the same thickness is laid on the inside.

The bottom of the walls is furnished with a cutting edge, which extends continuously around the whole caisson. It is built up of ½ inch steel plates, and it extends two feet below the bottom of the lower timbers, being stiffened at every two and a half feet of its length by knee braces. The lower twelve inches of the edge is also stiffened with reinforcing plates, which brings its total thickness up to two inches. It should be mentioned that the cutting edge is not intended for