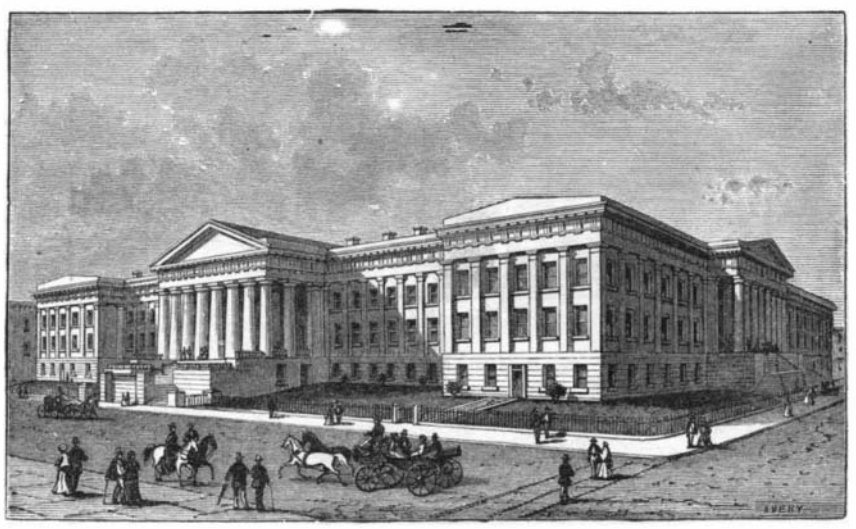
nection with a more complete record of qualitative and quantitative conditions. For example, the exact chemical composition of the metals tested has been noted, to determine the effect of cinder, sulphur, phosphorus, silicon, carbon, and other chemical and mechanical admixtures, under varying conditions of temperature and stress.

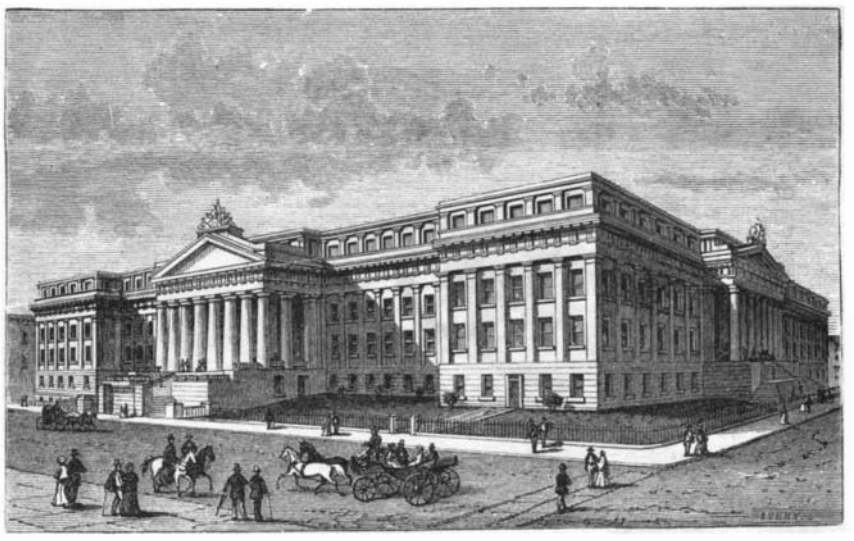
A special object was to determine the behavior of various irons and steels when subjected to concussive force, such as may be produced by the explosion of gun cotton, gunpowder, and other explosive materials, with a view to determine among other points the effect which an exploding boiler would have on another boiler working under pressure at its side, or the effect of a collision of one ship with another; and whether wrought iron or steel possesses the greater power to resist such accidentally produced strains. He also made and records many experiments on various irons and steels to discover the influence of composition, temperature, and so on, in varying the power of the metals to resist tensile tests; and the same with regard to chemical tests, as by corrosion. Altogether the paper must prove not only a standard work on the character and properties of iron and mild steel, but also have a marked effect in shaping the practices of mechanical and civil engineers in the manipulation and use of these metals.

THE PROPOSED ADDITION TO THE PATENT OFFICE.

The Patent Office building, at Washington, was originally one of the finest specimens of the Doric order of architecture in the country. Somewhat more than a year ago a fire destroyed a part of the upper portions of the west and north wings of the building. In view of the circumstance that the office has for some years been seriously cramped for room, it is now proposed to secure the additional space needed by adding an attic story to the entire building, instead of simply restoring the burnt portion to its original state, and providing for the enlarged needs of the office in some other way. The proposed attic story, in the plan adopted,



THE PATENT OFFICE AS IT IS.



THE PATENT OFFICE AS IT IS TO BE.

is raised on top of the old block course, and is about thirteen feet in height, without any variation all around the building.

The effect of the added story will be seen on comparing the two engravings herewith. However skillfully treated the addition must destroy the purity of the architectural type, and materially injure the general architectural effect of the building. This great sacrifice of art to utility would be justifiable on one condition only—that of absolute necessity. If there were no other way to provide the Patent Office with the room it needs, as many stories might be added as the original walls would support, the problem then being to make the alteration as little offensive to good taste as might be possible. But, as we believe, that exigency has not yet arisen, and is not likely soon to arise—provided the Patent Office is given its due in its own house. This handsome edifice was built for the Patent Office, its almost prophetic projectors having in view the vast requirements which the Office would ultimately have need of. Temporarily other governmental offices were sheltered under the same roof, the Patent Office having room to spare. By its natural growth, however, the Patent Office now needs the space thus surrendered, and ought to have it, the temporary tenants finding accommodation elsewhere.

This, then, is the true solution of the whole problem; give the Patent Office its own, or so much of it as it may require, only restored to its original state, and find lodgment for the dispossessed offices in a building of their own. The United States might better spend in this way a hundred times the money voted for the spoiling of the Patent Office edifice, rather than ruin the effect of such a fine piece of architecture by what, after all, must prove but a temporary makeshift.

TABLE FORKS.

We are often disposed to sneer at the Chinese mode of eating their food with chopsticks, and fancy they must make very dirty work at their meals, yet they are cleanly compared with the habits of our ancestors of two or three centuries since. At that time, even in the best society, forks were unknown, except among the Italians, who appear to have had them in general use considerably earlier than any other European nation, and are believed to be the inventors, or rather the originators, of the custom of using forks at the table. Forks, however, had long been used for raising meats out of pots or cooking vessels by the Greeks and Romans, and the use of forks for lifting the meat from the seething pots is recorded in the Bible. The Egyptian priests, also, in presenting offerings to the gods, used forks made of bronze, two of which, dug up at Sakkarah, are in the Abbott collection. None of these people, however, although familiar with the use of the fork in this manner, had any idea of using the fork at table. The mode of serving meat varies somewhat in different nations. In some countries the head of the house took the joint in one hand, and, with a knife held in the other, severed the meat into suitable pieces for each person. In other cases the joint was passed from hand to hand, each person cutting off sufficient for himself with his own knife, and then passing it to his neighbor, each cutting off such part as suited him. The portion thus cut off was afterward divided into smaller pieces suitable for eating, and conveyed to the mouth by the fingers of the hand unoccupied by the knife.

In many parts of Spain, to this day, table forks are unknown articles. In many taverns in other parts of Europe, knives are not placed on the table, because it is expected that each traveler is provided with his own, but as few persons will now eat without forks, landlords are obliged to furnish these, together with plates and spoons. It is curious that although the use of forks has not yet spread all over Europe, yet the savage Feejee Islanders have long had table forks in use. At a time when almost all of Northern Europe was destitute of the article, these people, the most cruel and most ingenious of all the natives of Polynesia, used forks in conveying to their mouths dainty morsels of *puaka-balava* (long pig), as they called cooked man.

None of the sovereigns of England had forks till the reign of Henry VIII., all, high and low, using their fingers. Queen Elizabeth had several forks presented to her, and although she was seen to use them on state occasions it is doubted if she used them ordinarily.

Voltaire states that table forks were first used by the Lombards in the fourteenth century, and Martins says that they were in common use in Italy in the fifteenth century. Coryat, in his "Crudities," published in 1611, states that he observed a custom in all Italian cities through which he passed that he had seen nowhere else in all his travels. "The Italians, and also most strangers that are cormorant in Italy, doe alwaies at their meales vse a little fork when they cut their meat." Heylin, in his "Cosmograph" (1662), says: "The use of silver forks, which is by some of our spruce gallants taken up of late, came from China into Italy, and thence into England." Another writer states that at the period of the revolution (1688) few English noblemen had more than a dozen forks of silver, along with a few of iron or steel. But after this steel forks became an article of manufacture at Sheffield, and they came into general use, having, however, only two prongs, and it was only in later times that the three pronged kind were used. These were originally forged and filed to shape slowly by hand, but in the present mode of manufacture, after the tang, shoulder, and shank are formed, a portion is flattened for the prongs, which is then struck up into form by a swage drop, leaving only a thin film between the tines, which is cleared away by the file. These processes are followed by hardening, tempering, grinding, and polishing, and securing the handles.

Although silver forks have long been in use to some extent, it was not until of late years that their use became in anywise common, as very few, even among the wealthy, used them until about fifty or sixty years ago, and the steel ones are still very largely used among the poor.

Many patents have been granted of late years on forks of various kinds, over a dozen being for means of combining the "finger guard" on carving forks with a "rest," so that the raising of the former will lower the latter. In addition to these we find many patents granted for various improvements relating to ordinary dinner forks. One granted to F. C. Beach, December 5, 1865, shows a fork provided with a simple device for sharpening a knife; and the same gentleman, in connection with A. C. Klăncke, obtained another patent September 4, 1866, for making the handles of knives and forks hollow, so as to form a pepper box, the sprinkler being provided with a valve so as to shut off the supply when not needed. C. A. Durgin's patent of May 8, 1866, shows a fork having the two inner tines dropped below the outer ones, so as to make a kind of spoon, for taking up peas or other small articles. J. S. Jennings' patent of September 11, 1866, shows a fork having pivoted to it a swinging knife, the two being so connected as to be readily used by a one-handed person, as the swinging knife may be readily operated by a single finger of the hand holding the fork. A combined knife, spoon, and fork, in one instrument, is shown in the patent of N. Ames, September 17, 1871, a spoon being formed on the end of the back of the knife, and the point of the spoon terminating in short tines. The patent of S. W. Francis, February 3, 1874, and C. Reese, April 23, 1878, both show spoons, having cutting edges at the sides of the bowl and tines at the point, thus combining a spoon, knife, and fork in one implement. A very elegant fork was patented by J. C. Draper, February 18, 1873, which was designed to be used in eating fruit, and is provided with a small bowl at the junction of the tines to catch the juice of the fruit. Another peculiar fork is shown in F. M. Dixon's patent of February 13, 1877, designed to be used for holding green corn in the ear, and has a long central tine to pierce the cob, and a short one on each side intended to enter the cob just sufficient to prevent its turning.

A YEAR'S WORK IN THE PATENT OFFICE.

The report of the operations of the Patent Office during the fiscal year ending June, 1878, shows no abatement of the inventive spirit of the American people. The number of original applications for patents was 19,657, and 14,100 new patents were granted. There were also 627 reissues and 722 patents granted for designs. Twenty-seven hundred and thirty-seven caveats were filed during the year. The receipts of the office amounted to $734,888, and the total expenditures were $665,906. Of the amount expended, however, $50,000 was for the restoration of 18,563 models injured by the fire of last year, and, omitting this item, the excess of receipts over expenses appears to have been $118,982.

The number of trade marks registered was 1,505, as against only 938 for the preceding year, and the receipts from this source and from the registration of 492 labels, amounted to $42,762, a sum eight times greater than the total expenses of conducting the division.

NEW RULE IN TRADE MARK CASES.

Commissioner Paine of the Patent Office has lately adopted a new and very excellent rule in trade mark cases, which consists in dividing the payment of the government fees, so as to lessen the expense of applying for registrations.

The government charges for every trade mark registration are twenty-five dollars, and heretofore the rules of the Patent Office have required the payment of the whole amount in advance, before the examination of the case. If on the examination it was found that the proposed trade mark was old, or if for any other reason the case was rejected, then the applicant was obliged to lose the whole of the fee paid.

By the new rule now promulgated by Commissioner Paine, the applicant pays only ten dollars in advance. If the case is rejected he has no more to pay; but if registration is allowed he then pays the balance, fifteen dollars.

The new rule will promote public convenience and have the effect to increase the number of applications for registration. Full particulars how to apply for trade mark registration, expenses, etc., will be found in the "Scientific American Hand Book," which may be had at this office by all who choose to send for it, free of charge.

Electric Light in Chancery.

Recently an interim injunction was obtained against Messrs. Wells, of Shoreditch, restraining them from continuing the use of the system of electric lighting, the apparatus of which is shown in one of our engravings this week. The applicant, Mr. Wild, claims that the Jablochkoff system, which is the property of a French company, is virtually the same as that invented by himself, and for which he took out a patent in 1863.