THE

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT

NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions for advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

☞ "The American News Company," Agents, 121 Nassau street, New York.

☞ American and Mexican News Company, Mexico, are Agents for the SCIENTIFIC AMERICAN.

VOL. XV., No. 2, [NEW SERIES.] *Twenty-first Year.*

NEW YORK, SATURDAY, JULY 7, 1866.

Contents:

(Illustrated articles are marked with an asterisk.)

EDUCATED MECHANICS.

In a recent number we spoke of the advantages of intellectual education for mechanics and workingmen, in addition to that derived from the shop, the farm, or the road. We alluded to it as a means to raise the position of the workingman and to elevate the *status* of his profession.

In the ordinary prosecution of his business, the artisan must be stolid indeed if he did not gain some knowledge beyond that of mere manual dexterity. His judgment and his capacity for comparison is stimulated by hints, incidents, and accidents, so that he must improve more or less. But an acquaintance with the laws which govern matter in all its forms, whether at rest or in motion, the means of availing himself of the operation of those laws, come slowly to him unless he understands the principles upon which those laws are founded. Such knowledge is not readily gained in the prosecution of his business, but by study. Knowing the existence of the phenomena, of which he is a daily witness, he must spend years in using that knowledge by piecemeal as he receives it, and work over again the experiments, the processes and results of which have been recorded for him, unless by reading and study he is willing to avail himself of the labors of those who have gone before him.

Therefore we cannot too strongly insist on the study of the natural sciences by all who aspire to use the latent or active forces of nature for the benefit of themselves or of mankind in general. An instance of the benefit to be derived by mechanics by a judicious course of study, we cannot forbear to introduce here, an instance of the recognition of merit—in the hope that others may be induced to follow so shining an example. We have mentioned the fact that at the annual commencement of the University of the City of New York, held June 21st, at Niblo's Garden, the degree of Doctor of Physical Science (*Doctor Physicis Artibus, A. P. D.*), was conferred upon Erastus W. Smith, an eminent mechanical engineer. It was the first honorary degree of this character conferred in this country.

We have obtained some facts in regard to the recipient of this honor which may not prove uninteresting. Mr. Smith served an apprenticeship at the Allaire Works, in this city, remaining there four years, when he entered the University and pursued a course of study in the physical sciences, graduating with the class of 1844. He returned to the Allaire Works and spent several years as workman, foreman, and superintendent. He has since filled important positions as engineer of the American U. S. Mail Steamships, comprising the Bremen, the Southampton, the Havre, and the Collins's Liverpool lines.

He designed and superintended the construction of the engines for the New Orleans Water Works, and of the engines of several inland lines of steamers, including the *Metropolis*, of the Newport route, and is now designing and constructing engineer of the Harlem Bridge, the engines of the New York and Bristol line of steamers—the cylinders of which measure 110 inches with twelve feet stroke,—of several other steam-transportation companies, and of the *Dunderberg*, under the Government contractor, Wm. H. Webb.

Application to and love for his business, with a determination to fit himself for the highest positions in his profession, we believe, have been of more service to Mr. Smith than the patronage of influential men or capitalists. In his letter conveying the information of the honorary testimonial, Prof. Draper said:—

"I am sure it will be gratifying to you to learn that yours is the first degree of the kind ever conferred in this country, and is the highest we can give. It is for these reasons all the more honorable to you. The establishment of this degree places the University in connection with mechanical engineering—one of the most important and growing professional interests of our city and country."

Our object in thus noticing this acknowledgment of merit is not to add to the well-earned reputation of the recipient of these honors, but to present it as an incentive to our mechanics. When literary societies and educational institutions accord to the educated mechanic and the scientific engineer the position to which his usefulness and worth entitles him, the *status* of the mechanic is raised and his profession becomes, in the eyes of the world, more honorable. Practical knowledge, combined with natural genius, aided by mental acquirements, is sufficient to enable any intelligent mechanic to reach the uppermost round in the ladder of his profession.

FREE AND EASY LEGISLATION ON PATENTS.

On the 25th ult., Senator Cowan, chairman of the Patent Committee, reported a bill for the extension of Thos. D. Burrall's patent for a corn sheller; he also reported a bill for the extension of Thos. W. Harvey's patent for the manufacture of wood screws; also for the extension of Stephen R. Parkhurst's patent for ginning cotton and burring wool. It remains to be seen what action the Senate will finally take in regard to those important measures.

Mr. Cowan reported the House bill, which provides for the payment of a ten-dollar tax on all cases taken from the primary Examiner, on appeal, to the Examiner-in-Chief. After the Senator had stated the nature of the bill, the following debate took place:—

Mr. Cowan.—I will merely state that an application for a patent is first referred to the primary Examiner, and if the decision is adverse there is an appeal to the Board of Examiners, but on that appeal there is no fee now paid. It is complained in the Office that parties do not appear before the primary Examiners, because they can appeal without any additional cost; and it is therefore thought to be advisable, for the purpose of compelling them to attend to the case before the primary Examiners, that there should be an appeal fee, to be paid before going to the Examiners-in-Chief. The committee think this is proper, and have therefore recommended the passage of the bill.

Mr. Grimes.—Is that all there is in the bill?

Mr. Cowan.—That is all.

The bill was reported to the Senate, ordered to a third reading, read the third time, and passed.

Thus a bill which will draw from the pockets of inventors between $4,000 and $5,000, annually, passed without a show of opposition. Mr. Cowan's, "That is all," satisfied the Senate, and the thing was done.

We regret the success of this unjust measure. The Patent Office has nearly $150,000 surplus funds, and does not need to tax inventors any more for the privileges they now enjoy.

A FOUR-TOOL PLANER.

Some few weeks ago we gave a description of a seven-tool lathe for working out railway cranks with accuracy and dispatch, which was in use at the locomotive works of Crewe, England. We find, in a recent number of the *Engineer*, an engraving and brief description of a planer designed to economize time, it being well known to practical men that half the time of an ordinary tool of this class is wasted; or, in other words, that during the return of the bed the tool is idle.

Planers that act both ways are not new, by any means, Whitworth having, long ago, introduced a machine of this class with a rotating tool post that faces about after the bed has made one stroke, and cuts on the return. What degree of popularity this device meets with in England, we are unable to say, but few machines have been imported to this country. On long lathe beds, steam engine bed plates, and similar work, such an arrangement would seem to be very desirable, but there must be some practical difficulties in the way which prevent their adoption.

We have been informed that it is a matter of difficulty to adjust the tool so that the cut is equal in running both ways, and that the least hesitation or inaccuracy in the reverse action of the tool causes it to take a heavier cut at one time than at another, and so, break the tool or spoil the work.

In Elder's machine there are two sets of standards or uprights in the middle of the bed, which face each other, and are fitted with sliding carriages and headstocks, as usual, there being two headstocks on each slide. These are so arranged that but one or all may be in use at the same time; that is, two cutting when the bed runs one way and two when it returns.

This duplication of parts, of course, entails great expense in construction and adds to the weight of the machine, besides rendering it much more complicated; but there is no question about its efficiency, which is the main point to consider.

A JUST MEASURE.

In a previous number we stated that the bill to pay Examiners in the Patent Office, for extra service rendered by them, had passed Congress. A dispatch to the Associated Press made it appear that the money thus appropriated was to come from the Treasury, which is not the case. The facts are simply these: Soon after the breaking out of the rebellion the number of applications for patents was greatly reduced, which caused also a considerable reduction in the patent fund, and in order to comply with the law making the Patent Office a self-sustaining bureau, the Commissioner was obliged to reduce the salaries of Examiners and Assistant Examiners below the amounts fixed by law, which was the best course he could adopt as a temporary expedient, as it could not be regarded wise to remove experienced Examiners in such a contingency, which was not likely to last for a long time. During the years from 1852 to 1860, the average number of cases examined per man was one hundred and forty-two; from 1860 to 1865 the average was two hundred and forty—an increase of eighty-two per cent. This increased amount of labor was done on reduced salaries and at a time when the cost of living was double what it was before the war broke out. The Examiners, as a body, are a faithful, laborious, intelligent set of men, and, at best, are not overpaid for their services, and now that the patent fund has so largely augmented, there is great justice in the act of Congress which authorizes the Commissioner to pay Examiners and Assistants out of the patent fund for services actually performed by them.

Mr. Wentworth, of Illinois, attempted to defeat the bill, but his effort did not produce any effect. Mr. Jenckes, the mover of the bill, and to whom much credit is due, met all the objections, and the bill passed by a large majority.

THE 9·22-inch bore or 12½-tun Armstrong gun burst to splinters a few days since at Shoeburyness during ordinary gun practice, and after 390 rounds had been fired. The gun's crew had a very narrow escape for their lives, and Capt. Reeves, who was conducting the practice, was nearly struck by a large piece of the gun as it flew past him.—*Mechanics' Magazine.*

ALUMINIUM ARMOR.—A trial has just been made at Florence of a cuirass of aluminium, which is as light as an ordinary waistcoat, nearly as flexible, and capable of turning a musket ball fired at the distance of 38 paces, and of resisting a bayonet thrust from the heaviest hand. Each cuirass costs only 5 frs. Two regiments are, it is said, to be immediately provided with them.