ular estimation in a high place among the "martyrs of Science."

The difficulty is, however, that the statements are pure fiction; and that the inventor's reputation was manufactured for him by the brilliant imagination of a not over-conscientious editor, is the substance of the story which our English contemporary now vouches for as truth. In 1834, there existed in France a journal called the *Musée des Familles*, which was addicted to blood-curdling romances, after the fashion of many of our present periodicals. The editor, wanting an illustration of a maniac in a cell to illustrate some harrowing recital, ordered a suitable engraving. But the engraver failed to finish his work in time, and the cut was not received until after the paper was published. The economical editor, not wishing to lose his picture, thereupon set to work to write up a story appropriate to that engraving, and he accordingly took down a "Universal Biography" to find a fitting historical personage to serve as his crazy hero. Solomon de Caus' name was the first one he saw; and it occurred to him that Solomon's genius might have driven him mad, even if it actually did not. Consequently he made the inventor into a maniac; and to give an air of truth to the romance, the editor put his story in the form of a letter written by a court lady who had seen De Caus in prison, in which letter the visit of the Marquis of Worcester was incidentally described. When the romance was published, it created an unlooked-for sensation; people accepted the story so completely that, even when the editor acknowledged that it was wholly imaginary, he was not believed, and learned antiquaries insisted that it was genuine. Consequently, ever since, Solomon de Caus has been regarded as a wretched lunatic who perished miserably; while the truth is that he never was imprisoned, never went mad, but lived a learned and honorable life, and, on dying, received special funereal honors from his king.

To those excellent readers of ours who occasionally lecture us in their letters on the responsibilities of editors—and of scientific editors in particular—we commend the above story as a text for future admonitions.

ON KEEPING AN INDEX.

The recent production of several books on scientific subjects, in which the authors all state that the work originated in casual notes gathered during the study or active practice of their various professions, will suggest to many the advantages of keeping an index or memorandum of facts met with in reading or observation. A well known engineer of this city lately showed us a huge volume, constructed in a way well suited to this purpose, in which, for several years, he has noted down, indexing as he proceeded, all the useful articles and hints relating to engineering or mechanical subjects which had appeared in the various publications which he deemed worth remembering. He did not of course copy the articles entire, but simply jotted down a sentence or two embodying their gist, and an accurate reference to the source of information—often merely the latter. By practice he had acquired the habit of making these rough notes on the spot, wherever he might be. Once a month or so he gathers his scraps into his book and posts his index; an hour or two's work at the most. The result is that he now has a fund of information at hand, acquired with very little trouble, the value of which can hardly be overestimated.

This is only one instance of others within our knowledge, and we would strongly commend the extension of the practice. An enormous amount of the most useful material never finds its way into books. We would not confine our notes to newspaper articles alone, but include in them all facts likely to be of future use which come under personal observation or are obtained in conversation with others. And the earlier this habit is acquired the better. An apprentice in almost any shop is sure to see the older workmen doing work after a fashion of their own. He may not know why one man who produces particularly good castings—rams his mould, for instance, in a certain way—or hammers an iron plate to straighten it after a certain manner peculiar to himself; yet he can use his eyes and ask questions, and put down what he sees and is told. In after years, he may turn back to his notes and find in them aid which is of money value. In the same way, the student will find a college course far more useful to him if he will watch for "points" in his various studies. Many a professor has a short way of his own for working this or that problem, or a neat explanation or illustration of a knotty fact, or a short cut around some technical difficulty, by which he secures his pupils' more rapid advancement.

We once heard an old housewife say that she saved all the stray bits of carpet, broken furniture, and other apparent trash, because it was, according to her experience, "sure to come useful sometime within seven years." We do not adhere to the mystical number seven; but doubtless she was substantially right, and the same rule will hold good regarding the odd scraps of information gathered. We would more especially commend the above to readers of this journal. If all our one hundred thousand readers, in their great variety of callings, would keep such records, and each one would once in a while favor us with a few lines therefrom regarding interesting facts which had been noted, an immense fund of valuable suggestions could be given to the world, and useful thoughts thus be rapidly interchanged. Besides, the effect would be to spare us the necessity of inserting that paragraph which heads our query column every week, wherein we inform A. B., for perhaps the twentieth time, that a recipe for dissolving rubber or bronzing gun barrels will be found on page so and so, this or that volume, etc. As we said in the beginning, many valuable books are prepared from notes thus made, and these become a source of considerable returns to the compiler.

Such books, moreover, are generally exceptionally good because they relate to pure practice and what has been done, and are free from speculations, mere theories, and second-hand statements. It is well to remember also that the necessity of keeping indices or notebooks is a growing one. The tendency of every profession, every trade, every calling, is toward differentiation. People are becoming specialists by force of circumstances. No one now pretends to know any one science or trade thoroughly: certainly not in this country, where the progress of invention is so rapid, or in this age, when new discoveries are of almost daily occurrence. The greatest portion of any man's knowledge must remain in the condition of an index; he may not remember the details of a subject, but he can know where he can place his hand on a source whence he can derive all the information; and to this last species of knowledge the well maintained notebook is a most important aid.

No one, we believe, has ever imputed the gift of prophecy to that great satirist and poet, Alexander Pope. We are inclined to think him in a most prophetic mood, however, when he penned the couplet—far more true in our days than in his:

"For index learning turns no student pale,
Yet holds the eel of Science by the tail."

AMERICAN INVENTIVE PROGRESS.

The future historian of the inventive progress of this country will find that the record of the same naturally divides itself into two distinct parts, each marking a separate era. These may be termed respectively the period of conception and the period of development. During the former most of the great American inventions were first originated; during the second, which includes the present time, the tendency of inventors has been more towards seeking new applications for established principles or improving upon earlier embodiments of the same.

The first era begins with the labors of Franklin, Rittenhouse, Hare, Evans, and their contemporaries. It terminates with the end of the year 1849. Inspection of the records of the Patent Office shows quite clearly the substantial basis for the division we have suggested. The first patent granted by the United States was dated July 31, 1790, and was issued to Samuel Hopkins for a process of making pot and pearl ashes. During that year, the total number of patents was but 3; the following year it amounted to 33, and then for sixteen years the aggregate fluctuated, falling as low as 11 and reaching as high as 99. For the seventeen years following the variations were between 100 and 300, the last-mentioned number not being exceeded until 1825. The increase subsequently was more rapid; and by August, 1836, when the present system of numbering the patents began (it appears with those of Thomas Blanchard, for turning irregular forms), the total had reached 10,041; or, for the period of sixty years comprised in the first era, the aggregate amounted to 17,447. Yet in this small number are included Whitney's cotton gin, McKean's first steam saw mill, Whittemore's wool and cotton card-making machine, Hare's oxy-hydrogen blowpipe, Blanchard's tack machine, Fulton's steamboats, Hall's breech-loading fire-arms, Perkins' steel engraving, Stevens' tubular boiler and screw propeller, Lowell's power loom, Burden's horseshoe and spike machinery, Mott's stoves for small coal, Saxton's magneto-electric machine, Bogardus' ring fiyer for cotton spinning and the long category of other important devices of that wonderfully prolific inventor, Professor Henry's splendid electro-magnetic discoveries, Morse's telegraph, Guthrie's discovery of chloroform, Boyden's patent leather, Baldwin's improvements in the locomotive, Howe's pin machine, McCormick's reaper, Colt's revolvers, Wells' hat body machine, Goodyear's vulcanization of india rubber, Bigelow's carpet loom, Howe's sewing machine, Sickel's cut-off, Morton's discovery of the anæsthetic qualities of chloroform, Rodman's hollow casting of ordnance, House's printing telegraph, and Ericsson's steam fire engine.

To show with what rapidity inventors made improvements on inventions embodying original principles, it may be noted that in the early days of the sewing machine 116 patents were granted for improvements thereon in a single year; and out of the 2,910 patents issued in the year 1857, 152 were for improved cotton gins and presses, 164 for improvements in the steam engine, and 198 for novel devices relating to railroads and improvements in the rolling stock. In the year 1848, three years after the publication of this paper was commenced, but 660 patents were granted; but under the stimulus of publishing those inventions as they were patented, ten years later, in 1858, the number had increased sixfold, reaching 3,710, while up to January 1, 1850, as already stated, the aggregate of patents issued amounted to 17,447; since that time and up to the present the total is 181,015.

Curiosity here leads us to review our own work, extending back for, say, twenty years, or to 1857, a period during which 170,745 patents have been issued. We find, by actual count, that 62,662 applications have been made through the Scientific American Patent Agency for patents in the United States and abroad. This averages almost ten applications per day, Sundays excluded, over the entire period, and bears the relation of more than one quarter to the total number of patents issued in this country up to the time of writing.

We might indulge in some pardonable egotism in claiming to have done no small share toward aiding the development of the inventive genius of our country, and thus advancing our national prosperity—the above statistics would seem to justify it—but this we forego, or better, leave it to be done by the editor of the SCIENTIFIC AMERICAN a century hence. He will have a larger story to tell, and likely, be less modest than the editor of to-day.

EXHIBITION OF MICROSCOPES.

The *soirée* of the American Microscopical Society was held in the large hall of Kurtz' photographic establishment, 23d street, New York city, on the evening of March 6. The exhibits were admirably arranged by Dr. Rich, the President. On each of twenty tables were four instruments, illuminated by one or two student's lamps, so that about eighty instruments were exhibited, representing thirty or forty exhibitors. Various kinds of microscopes were shown, from the most elaborate and expensive to the simplest: while some were noticeable for originality and special adaptation. No inferior instrument was to be found in the collection.

Dr. Rich exhibited six microscopes, a Beck grand binocular, a Zentmayer grand, a Curtis mounting microscope, two Wales and Hawkins improved, and a Beck "popular." Special mention must be made of Dr. E. Curtis' invention, which, in regard to convenience in use, originality of design, and capability of diverse applications, stands foremost; it is undoubtedly the best dissecting microscope, it may be used as a binocular, and is simple as well as compound. The stage and illuminator are not attached to the microscope, but consist of an oblong rectangular box which stands on the table under the objective lenses, and the whole arrangement is evidently the result of the experience of a hardworking professional microscopist. Dr. Rich exhibited under these instruments most beautiful specimens of the wing cover of the West Indian beetle, and also some remarkable arrangements of diatoms, first produced several years ago by a lady in London: they were for a long time a profound mystery, until the German scientist Müller, in Holstein, produced them for the trade. The diatoms are on slides containing 100, 400, or 600 specimens each, all classified in species according to an accompanying catalogue.

Among the appendages shown was the improved section cutter of Dr. E. Curtis, in which the knife is inclosed in a frame moving over a plate of glass, in the center of which the object to be cut is screwed upward through a hole, and may be made to project a distance as small as one thousandth of an inch or thereabout.

Mr. Rutherford exhibited a microscope by the famous Italian maker Amici, which was presented to him by Amici, when in Italy thirty years ago. The connoisseurs present all agreed that Amici was far ahead of his time; and his instrument, so far as optical effects are concerned, compares favorably with many of the best imported microscopes of the present day. Professor Julien, of the School of Mines, Columbia College, showed five sections of various stones, such as granite, agate, etc., by means of two Power and Leland grand binoculars, which have an ingenious arrangement for swinging the polarizer in and out of the tube. Dr. Vander Weyde exhibited four instruments: one by Andrew Ross, to which various attachments had been made to change it into a single dissecting microscope, an inverted chemical microscope, a horizontal microscope, especially adapted for drawing, and an instrument to which had been attached an eyepiece for two observers, the invention of the exhibitor. In this device, one observer sees the object under polarized light and the other under unpolarized. Dr. Vander Weyde also showed a large inverted microscope of his own invention, with a colossal eyepiece and a large field (this was illustrated and described in the "Record of Scientific Progress" for 1865, published by MUNN & Co.); and also a new polarizing instrument for observing the colored rings around the axes of crystals, whereby the system to which they belong may be determined. The same inventor also showed several little contrivances, which he explained to those interested in practical microscopy: such as new methods of illumination, a new finder, and a micrometer of new and peculiar construction. His most remarkable exhibit consisted of the muscles of the human eye, which contract and dilate the pupil: these muscles can only be revealed by the use of polarized light.

Want of space prevents our mentioning in detail all the exhibits, although many of them deserve honorable mention; but Zentmayer's improved stand, with rotating and centering stage, an arrangement which causes the mirror to work in the optical axis, McAllister's four microscopes, and those of George Wales and Pike, may be specially mentioned. Crouch, of London, was represented by eight splendid instruments, all provided with his own objectives. Woolman exhibited some fine instruments by Queen of Philadelphia, and four London ones, three by Beck and one by Crouch.

The visitors were all much interested in the exhibition, which will doubtless do much to popularize the fascinating study of microscopy.

Steam in the Streets of Philadelphia.

Seven steam street cars were placed upon the Market Street Railway, Philadelphia, on March 21. A small boiler incased in wood is placed in front of the car, and by an ingenious contrivance the whole power of the engine can be concentrated on the brakes. The trial trips were very successful, the cars being stopped in a few seconds, even when going at high speed, heavy grades not causing as much trouble as had been anticipated. The engines were noiseless, and horses were not frightened.