Correspondence.

The Editors are not responsible for the opinions expressed by their Correspondents.

Cheap Microscopes.

To the Editor of the Scientific American:

"This little microscope is an optical wonder. It reveals the thousands of hidden wonders of Nature; is of permanent use and practical availability. . . . It magnifies ten thousand times, a power which is equal to that of other microscopes of many times its cost. Price $3.00."

The above is the advertisement of a so-called microscope, which is so worded as to convey to novices in microscopy the idea that it is an instrument of real value and utility, and, without actually saying so (which would be a criminal fraud), the farther idea of equality in value to instruments of many times its cost.

Microscopes have now become indispensable to the physician, the physiologist and the naturalist; they are also an attractive educator in the school and the family, and their use and study form an elegant, delightful and instructive pursuit wherewith to occupy the leisure hour. Thousands of instruments are in use in Europe, and almost as many in this country, and the general use of them is rapidly increasing. But there are hundreds of youths, ambitious to procure instruments, who have not the slightest conception of the construction, performance or cost of a good instrument. Such are liable to be, and no doubt often are, misled by such claims as are advertised above, and it is the purpose of this paper to put them on their guard. Such an instrument is not an "optical wonder," is not of "permanent use" and is not of "practical availability." Neither can any microscope, made and sold at any such price, possess those qualities. It may magnify "ten thousand times" in area, but that is only one hundred in linear dimensions, which is the only nomenclature now in use by microscopists; and one hundred linear is a very low power in modern microscopy, where powers of 500 to 1,500 linear are in common use, and powers of 10,000 linear are not uncommon. Mere magnifying power is a comparatively unimportant matter. A good performance of 50 diameters is preferable to a poor one of 100 diameters. Such instruments are not corrected either for color or sphericity, and no good performance can be obtained without both. These instruments, from the above deficiencies, can be used only a very short time without injury to the eyes.

But how shall the inexperienced obtain a good instrument, or a best one? Of all instruments made, there is none of which there is such a variety of shapes and forms. Some of these are patterns made 30 to 50 years ago, and now utterly condemned by experts. Then the difference in quality is as great as the difference in form. What is the buyer (a novice, I suppose) to do? The best advice I can give him is to consult some friend who has used or knows all about the instruments of different makers, and has personal knowledge of the merits and demerits of different forms.

A recent writer on this question suggested that the best reliance of the buyer is on the reputation of the maker or the dealer. I regret to say that that will be a frail support on which to rely. There are very few dealers who really know anything of the qualities or properties of good microscopes. There are a great many makers in Europe, and, if one can believe their catalogues and advertisements, every one puts in the best work and makes better instruments than any one else; while it is notorious to many who have tried the instruments that some who make the greatest pretensions turn out the poorest work.

There are a few makers in this country who, I believe, make better work than the second or third class work in England; while some of them stand at the very head of the art. In the words of Dr. Barnard, President of Columbia College in New York city, in his report on the *Exposition Universelle*, Paris, 1867: "It is not necessary for Americans any longer to go abroad in order to obtain microscope glasses of any description of the highest order of excellence." But buyers of microscopes should not, must not, expect to obtain a good working instrument for an insignificant sum of money. It is the instrument, if properly made, that involves the highest mechanical skill and scientific knowledge of any. No decent efficient instrument can be obtained under a cost of about $50, and from that the prices run up easily to $3,000. The only utility of such instruments as is served for the text of this paper is that, now and then, they may come into the hands, or rather under the eye, of some one whose curiosity or interest may be excited enough to induce him to procure a real microscope. C. S.

Boston, Mass.

Splitting of Trees by Lightning.

To the Editor of the Scientific American:

I noticed in a recent number of the SCIENTIFIC AMERICAN an article which ascribed the splintered and shattered appearance of trees which had been visited by lightning as due to the sudden conversion of the sap into steam, and producing those results by explosion. Now this may be true in the live tree, but why does the same result occur in dead and seasoned timber? Whenever a mast or telegraph pole or fence is struck by a bolt, the same effects are produced; and I know of a fence in my neighborhood, that was struck last August, which was fairly converted into kindling wood for a part of its length.

I merely state these facts to show that, in trying to assign a satisfactory explanation of some phenomena, conclusions are sometimes made which may indeed apply in a cited case, and the same manifestations, which occur where the conditions are essentially different, are overlooked. H.

New Haven, Conn.

Changing Pay Day.

To the Editor of the Scientific American:

I notice several articles on the subject of paying men on Monday instead of Saturday. I have followed that course for several years. During the second year of the war, I found a great deal of trouble in keeping men, and in getting them to work on Monday morning. The railroad ran two trains through here on the Sabbath, morning and evening. Wages were high, work was plentiful, and men could get work anywhere and at any place. Getting their pay on Saturday night, with nothing to do on Sunday, some would take a trip on the cars and not get back in time for Monday or perhaps not at all; others would get on a spree and would not be fit to work on Monday. I at once changed my pay day to Monday; after that all hands were on hand on Monday morning, ready for their pay and for work. I pay my men during the morning while at work. Each man's money is put in an envelope and handed to him at his place of work, so he loses no time in getting his money. The plan works to my entire satisfaction. Some men do not like it, but I say to them that it suits my business and works well.

Geneva, N. Y. W. B. DUNNING.

Cider versus Juice.

To the Editor of the Scientific American:

Your correspondent, E. H., Oct. 12, is right. To obtain good cider, the expressed juice must remain a short time with the pomace, which has been crushed or bruised, not cut as is done by most patent cider mills. The old mills bruised the apples, the new ones cut them. We found, 50 years ago, that, with the advantage we then had of the old fashioned mills, it was better to grind or crush the apples and then let the pomace remain in the trough at least 10 or 12 hours; and if the weather was cool, let it remain 24 hours.

Lima, Ohio. A. G. K.

[For the Scientific American.]

Patent Extensions.

There has never yet been a government or institution of any kind which, though perfect in its vital organization and correct in its leading and great principles, has not had some weak point. So far as the history of the world has shown us, there never was anything, though complete as a system, perfect in all its details, always excepting the "wonderful one horse shay." And as we plume ourselves that the world is gradually approaching perfection, it behoves us to examine, critically and carefully, our old systems, that we may as much as possible correct their faults and verge nearer that desirable perfection. It is my object in this article to point out a hardship, suffered by an ingenious class of our citizens, which should receive the prompt attention of the Congressional Committee on Patents.

Patents prior to 1861 were granted to inventors for a term of fourteen years from their date; and the inventor was expected, within that time, to realize a sum sufficient to remunerate him for the benefit he had conferred upon the public, and the time, ingenuity, and money spent by him in costly experiments and introducing his invention into public use. Through poverty, and in some cases sickness, sometimes on account of the public not at first appreciating the value of the improvement, and at others through the machinations and combinations of unscrupulous capitalists who infringed his patents, his efforts were utterly futile, and toward the close of the term of his patent, he finds himself almost perfectly undone, and worse off than if he had never made the invention; but his energy and faith led him to persevere in it to the detriment of his other business. The inventor thus gets either nothing or a pittance of a few thousand dollars, for a benefit to the public of hundreds of thousands. Seeing the injustice of this, Congress has passed a law to protect him by granting him, on certain conditions, an additional term, or an extension of time for seven years more than the fourteen originally granted, making his protection in all last for a term of twenty one years in patents granted before April, 1861; since which time, in consequence of a second act, patents are originally granted for a term of seventeen years with no extension. But it is with the first that we have to deal. There remain yet about ten thousand unexpired patents granted between October, 1858, and March, 1861, inclusive, among which are thousands of patents covering valuable inventions whose inventors are in the condition set forth above; the original term of the last of these patents expires in 1875. These extensions are conditional, and it is at the discretion of the Commissioner of Patents that they are granted. If in his judgment the invention, the patent for which is sought to be extended, was not new at the time of its grant, or in other words, if it was substantially the same as a prior known device, or if the patent for any reason was bad when it was granted, he refuses the extension, and from his decision there is no appeal, and the protection expires. It is thus given to the Commissioner of Patents to decide finally a question equivalent to a question of infringement; a matter in which even the Judges of the United States Circuit Court are not given the power to make a final decision, as an appeal lies from them to the United States Supreme Court. This glaring example of one man power is not a state of affairs brought about after a long experience and established as a result of investigation and research: it is more the result of accident or oversight, in a department once considered of slight importance, but now grown, with all its defects clinging to it, into a vastly important branch of our governmental organization. Though the judgment of the present Commissioner is good, that of his successor may be poor and deficient; and the accidents and changes of life and office may place this successor in the Commissioner's seat at any time.

An appeal should be had either to the United States Circuit Court, to be tried as an ordinary case of infringement, with a second appeal to the Supreme Court, or it should be directly from the Commissioner's decision to the Supreme Court. Why cases of such difficulty and importance should be finally decided by the judgment of one individual who may in many instances be a political party appointee, entirely disqualified for such service, when cases of no more difficulty and often of less importance are submitted to a skillful judge or judges in the Circuit Court, with an appeal from them to the Supreme Court, is hard to understand.

Let the Congressional Committee on Patents bestir themselves and institute a reform in the matter, or the wrong will exist for three years longer, before the last of the extensible patents expires, and the highest talent and inventive skill will often go unrequited. TACITUS.

Patent Decisions of the Courts.---United States Circuit Court, Southern District of New York.

UNION PAPER COLLAR COMPANY *vs.* VAN DEUSEN *et al.*

BLATCHFORD, *Judge.*

The bill in this case is brought by the Union Paper Collar Company, a corporation, against Isaac Van Deusen and others, composing the copartnership of Van Deusen, Boehmer and Company. It alleges the infringement by the defendants of the following letters patent, named by the plaintiffs: Reissued patent No. 1,646, granted to Solomon S. Gray as inventor March 29, 1864, for an "improvement in shirt collars," the original patent, No. 38,961, having been granted to him June 23, 1863; reissued patent No. 1,828, granted to William E. Lockwood as assignee November 29, 1864, for an "improvement in shirt collars," the original patent, No. 11,376, having been granted to Walter Hunt as inventor July 25, 1854; reissued patent No. 1,867, granted to said Lockwood as assignee February 7, 1865, for an "improvement in shirt collars," the original patent being the one of July 25, 1854, above mentioned; reissued patent No. 1,926, granted to said Lockwood as assignee April 4, 1865, for an "improvement in shirt collars," the original patent being the one of July 25, 1854, above mentioned; reissued patent No. 2,306, granted to the plaintiffs as assignees July 10, 1866, for an "improvement in shirt collars," the original patent being the one of July 25, 1854, above mentioned, and a reissue thereof, No. 1,927, having been granted to said Lockwood April 4, 1865; reissued patent No. 2,309, granted to James A. Woodbury, as assignee July 10, 1866, for an "improvement in paper shirt collars," the original patent, No. 38,664, having been granted to Andrew A. Evans as inventor May 26, 1863; patent No. 56,737 granted to said Woodbury, as assignee of said Evans as inventor, July 31, 1866, for an "improvement in paper cuffs or wristbands," and reissued patent No. 1,980, and reissued patent No. 1,981, granted to said Lockwood as inventor June 6, 1865, for "improvements in collars," the original patent, No. 23,771, having been granted to him April 26, 1859.

The defendants admit, by a written stipulation, that they have infringed each and all of the said patents set forth in the bill "by making, using, and selling to be used the things respectively described and claimed as new." The contest is as to the validity of the patent.

The following is a brief of the decision:

The original Hunt patent having claimed a shirt collar composed of paper and muslin and polished and then varnished: Held, that, inasmuch as the collar is a complete article when it is polished or burnished, the varnish only adding further to its useful qualities, a reissue which omits from the claim all mention of the use of varnish is valid.

The Hunt reissued patent for a polished collar of paper and muslin sustained.

A starched linen collar with its surface embossed having previously existed, and also an imitative surface representing starched linen, there was nothing of patentable novelty in the idea of embossing such imitative surface as claimed in Lockwood's patent.

Printing having been done before on a smooth, white, enamelled surface, and a surface imitating starched linen being old, there was nothing of patentable novelty in printing upon such surface (as in Lockwood's patent), nothing being claimed as new in the appliances, machinery, or process for producing the printing.

Calling an embossed or printed collar (Lockwood patent), a new *article of manufacture* confers upon it no quality of patentable novelty, when there is no such novelty in the process or instrument for producing it.

The Lockwood patents for embossed and printed paper collars and cuffs declared invalid, as not covering patentable novelty.

The Gray patent for a turnover paper collar declared invalid by reason of prior inventions.

The Evans invention, as described in the reissue of July 10, 1866, defined to consist in the making a collar out of a long fiber paper possessing the qualities specified, and not in any process for making a paper possessing these qualities.

Collars having been made of other qualities of paper, and of other materials, the making of a collar out of this particular paper by a person who did not invent the process of manufacturing the paper itself, held not to be patentable.

Where E announced to C, a skilled paper maker, that he desired a paper possessing certain qualities, but made no suggestions as to the process by which it could be produced, and C succeeded in producing such paper after many experiments as to the character of the materials used and the mode of treating them. Held, that at the very utmost E can properly assert nothing more than that he and the paper maker were joint inventors of the paper.

The Evans patent of July 31, 1866, for a reversible paper cuff, held valid.

Wm. Whiting and *C. A. Seward* for complainants.

J. J. Coombs and *E. Wetmore* for defendants.

AT some of the English mines, steam, generated in boilers located on the surface of the ground, is conveyed in pipes to the engines within the mine. In one example the steam is conveyed in pipes of four inches diameter, through a total distance of 2,338 feet, and the loss of pressure is stated to be only half a pound per square inch.

A TURK TAKES A PATENT.—Among the patents issued September 24, by the United States Patent Office, was a grant to Mr. Ljubomir Kleritj, of Belgrade, Servia, for a Drill for Boring Wells.

The Hardware and Metal Trades in England.

The last monthly report of Messrs. Blakemore in "Hardware, Metals, and Machinery," Birmingham, England, says:

The enormous demand for hardware and every kind of iron work, which for so long a period has prevailed, now displays many and unmistakeable signs of slackening. Few large orders are being given out, but producers are still heavily engaged, and the numerous orders for inconsiderable parcels of goods, which are being issued, show that the necessities of consumers are yet pressing, and that stocks everywhere are light.

Although the price of iron is now falling, the large establishments are too much occupied with orders received some time ago to permit of their accepting (in the face of a still rising market for fuel, raw material and labor) specifications at prices much under the makers' quotations given in the trade journals. It is only in second class qualities that any palpable reduction has so far to be reported; and, compared with the prices of best iron, what are called the common brands are at this moment disproportionately low. While best Staffordshire bars, for instance, are £16 12s. 6d. and £16, common bars may be had at £13 10s.. The relief to manufactures is, however, very slight; for goods of a reliable quality can be made only out of the more valuable descriptions of iron. What is true of bars is equally true of strips, hoops, sheets, and plates, and of the goods which are made from them.

Pigiron is twice the price it was a year ago; a similar rise has taken place in coal, and labor at the ironworks has advanced between 30 and 40 per cent. Pigs of a good quality cannot be obtained from the furnaces of this district, either by the finished iron makers or the engineers (for foundry purposes), under £8 a ton. Notwithstanding the quotations which these prices necessitate, some good foreign orders for massive goods are still reaching our leading machinists and engineers.

The establishments engaged in the manufacture of railway plant continue very busy. Steam, gas, and water tube makers have their books very full of orders for home and foreign markets; and, if they would accept orders for forward delivery, they might be obtained even at the existing high quotations. The edge tool firms are not busy, yet they have just been compelled to advance operatives' wages from 10 to 20 per cent.

Wares of the domestic class are keeping their producers in active operation. Great quantities of hollow ware are being sent abroad, and the demand for tinplate goods still exceeds the supply, while japanned goods continue to afford ample employment to their makers. It must be observed, however, that prices are not firm, and, though nominally unchanged, orders are being accepted at a reduction. The iron of which japanned goods are made has been reduced £2 in the month; but £29 a ton has still to be paid for that which twelve months ago might have been bought at £16. Then tin plates are 20s. a box dearer than they were a year back; and to keep them at that price, the makers have met, and 30 firms have agreed to employ their workpeople only four days a week, at the same time giving them higher wages. Further, English block tin, that in September, 1871, was £136, is now £158 per ton.

There is not much demand for builders' requirements; and, considering the price of materials, they are not dear, though much higher than in past times.

Galvanized goods keep up, though prices have a downward tendency for all but the best qualities.

There is an excellent demand for brass season goods, such as tubing, chandeliers, and the like. Owing to a sensible drop in copper, prices have been reduced about five per cent., and the further fall of £10 a tun, in the official quotations of English smelters, which has just been announced, would, in ordinary times, cause a corresponding alteration in the value of manufactured goods. But this is neutralized now by a general advance of 15 per cent in operatives' wages, which employers have been obliged, very reluctantly, to grant.

Notwithstanding the considerable advance the colliers have already obtained, those in this district are demanding an addition of 6d. a day, and in North Staffordshire a further 25 per cent. If their demands should be conceded, the price of coal will be again increased one or two shillings a tun, which may occasion some embarrassment to ironmasters and manufacturers, but need not trouble consumers. Such demands, though powerful to stimulate an upward movement in prices, are incapable of arresting a backward tendency when the flood has ceased and the ebb of the tide has manifestly begun.

Comet Prizes.

The Academy of Sciences of Vienna instituted in 1869, for the purpose of encouraging astronomers to search for comets, eight special prizes, which it has kept up each year since as part of its programme. Each of these prizes consists of a gold medal of the value of 20 Austrian ducats (between $45 and $50). They are intended to reward observers who discover a telescopic comet, or a comet visible only by telescope at the time of its discovery. One condition is that the comet has not previously been seen, and that its appearance has not been previously proved with certainty. The discovery should be immediately announced to the Academy by telegraph or otherwise without waiting for further observations, the Academy undertaking to notify at once to the different observatories the fact of the discovery. The place and time of the discovery ought to be indicated, as well as the position of the comet and its orbit as exactly as possible with the first intimation; the data should be completed at leisure by further observations if it be possible to make them. When the comet has not been seen by other observers, the prize will be presented only when the observations of the discoverer have been sufficient to enable the orbit to be determined. The prizes are decided each year at the general meeting of the Academy held at the end of the month of May. If the first announcement of the discovery reaches the Academy between March 1 and May 31, the prize cannot be decided till the following year.—*Nature.*

MALLEABLE IRON.

Mr. Russell W. Davenport, Ph. B., of the Sheffield Laboratory of Yale College, communicates to the *American Journal of Seience and Arts* an interesting paper on a chemical investigation of some points in the manufacture of malleable iron. Analyses were made of two samples of ¼ inch in thickness, each annealed twice and analyzed before and after each annealing to show what influence the process has upon the impurities contained in the iron. The material used was a fairly good charcoal iron, the unannealed castings showing a white fracture. The annealed castings, when broken, were up to the average toughness of malleable iron, and their strength did not materially decrease after the second annealing. The conclusions drawn were: first, that the silicon, phosphorus, and manganese are in no way affected by the annealing process; second, that the amount of sulphur is not diminished and may be slightly increased; and third, that the amount of carbon is reduced by each annealing until a mere trace remains. It appears that, when a casting does not exceed 1 8 of an inch in thickness, the carbon is approximately eliminated throughout the whole mass by the ordinary annealing process; when, however, the casting is thicker, the elimination only extends from the surface into the mass for a certain distance, but may be carried farther in by a repetition of the process. It would also seem that, in the interior of a thick casting, where the amount of carbon is at all events only partially reduced, that which remains is, by the high heat and subsequent slow cooling, changed its state of occurrence from combined carbon to a species of uncombined or graphitic carbon; for where the iron before annealing is white and very hard, after annealing it shows a dark fracture and is quite soft.

The manufacturers of malleable iron are occasionally troubled by a lack of toughness in the annealed castings when these are exposed to a sudden blow or a bending strain. This weakness is at times doubtless caused by the natural rottenness of the iron, owing to the presence of an excessive amount of silicon, phosphorus or sulphur; but it also must be frequently due to a crystalline structure, which the iron under certain unknown conditions assumes while being annealed. This structure shows itself in the fracture of an annealed casting in the form of bright crystalline faces, which occasionally extend entirely across the fracture. Analyses made afforded no explanation of this crystalline structure, so that its cause must be determined by future careful experimenting. Another analysis was made of an annealed casting which, when bent, showed a greater degree of toughness than common. It was of circular section, ½ inch in diameter, and was bent cold through an angle of 90° without showing fracture.

From this analysis, it was inferred that the silicon may run as high as 0·7 per cent without affecting the toughness of the annealed product, while it also tends to show, what might certainly be expected, that an iron low in phosphorus and sulphur is most suitable for making malleable iron.

NEW METHOD FOR SENSITIZING COLLODION.

"Dried carbonate of soda, prepared by heating a little of the best bicarbonate of soda to low redness for a quarter of an hour, eighty-seven grains, dissolved in four ounces of water. Half an ounce of nitrate of silver solution, containing thirty-five grains of the salt. Mix half an ounce of the soda solution with the above; agitate with glass rod." The precipitate of carbonate of silver will subside in a few minutes; then pour off the clear liquid, add two ounces water, agitate, let it subside, and pour off the water. Wash the precipitate with half an ounce of spirits of wine; pour off and add half an ounce of absolute alcohol; agitate well and add the whole to two ounces of Wortley's uranised collodion. Then add, drop by drop, nitric acid to convert the carbonate of silver into nitrate, testing with litmus paper until a distinctly acid reaction is reached. The editor of the *British Journal of Photography*, in suggesting the above method, states that at no period of its preparation does this emulsion exhibit a tendency to precipitation. It is perfectly smooth, and not at all granular-looking. On glass, it gives a more dense film than the usual emulsion, and is free from air bubbles. On the whole, it seems to be a convenient, economical and reliable method, and in view of the increasing uses of sensitized collodions, is likely to be of value to photographers.

FILIFORM SILVER.—J. H. Gladstone has shown that metallic silver might be obtained artificially in the same filiform condition in which it frequently occurs in a mineral, and thus throw light on the origin of this native variety. Specimens of the metal were exhibited, from Kongsberg in Norway, associated with calc-spar, and from Chili, associated with greenstone, and in each case the silver resembled twisted threads or wires, noncrystalline but often bending at sharp angles. Under the microscope were exhibited precisely similar threads of silver produced by the decomposition of nitrate of silver by suboxide of copper. The latter substance is partly dissolved and partly converted into the black oxide, while filaments of the white metal shoot forth and bend in every direction. Most of these are extremely fine, perhaps $\frac{1}{2500}$ of an inch in thickness, so that, as was said, a gramme of such wire would stretch from London to Brighton. Since suboxide of copper is no rare metal, it seems probable that filiform native silver may often, if not always, originate from it.

The Manufactures of the United States.

The tabulation of the statistics of manufactures of the United States, for the year ending June 1, 1870, as returned at the ninth census, has just been completed at the Census Office. The number of establishments is 252,148; number of steam engines, 40,191, with a horse power of 1,215,711; number of water wheels, 51,017, with a horse power of 1,130,416. The average number of hands employed during the year was 2,053,988, of whom 1,615,594 were males above sixteen years of age, 323,768 females above fifteen, and 114,626 children and youths. The amount of capital invested was $2,118,247,069; of wages paid, $775,621,593. The value of materials consumed was $2,488,291,952; of products, $4,232,625,892. Of this production $13,040 644 is returned from Alabama, $185,410 from Arizona, $4,629,234 from Arkansas, $66,594.556 from California, $2,852,820 from Colorado, $161,065,474 from Connecticut, $178,570 from Dakota, $16,791,382 from Delaware, $9,292,173 from the District of Columbia, $4,685,403 from Florida, $31,196,115 from Georgia, $1,047,624 from Idaho, $205,620,672 from Illinois, $108,617,278 from Indiana, $46,534,322 from Iowa, $11,775,823 from Kansas, $54,625,809 from Kentucky, $24,161,905 from Louisiana, $79,497,521 from Maine, $76,593,613 from Maryland, $553 912,568 from Massachusetts, $118 394.676 from Michigan, $23,110,700 from Minnesota, $8,154,758 from Mississippi, $206,213,429 from Missouri, $2,494,511 from Montana, $5,738,512 from Nebraska, $15,870,539 from Nevada, $71,038,249 from New Hampshire, $169,237,732 from New Jersey, $1,489,868 from New Mexico, $785,194,651 from New York, $1,921 327 from North Carolina, $269,713,610 from Ohio, $6,877,387 from Oregon, $712,178,944 from Pennsylvania, $111,418,354 from Rhode Island, $985,898 from South Carolina, $34,362,626 from Tennessee, $11,517,302 from Texas. $2,343,019 from Utah, $32,184,606 from Vermont, $38,364,322 from Virginia, $2,851,052 from Washington Territory, $24.118,031 from West Virginia, 77,214,326 from Wisconsin, $765,424 from Wyoming.

Tempering Steel.

A valued correspondent, Mr. P. McCormick, of Newark, N. J., comments on the specification of Siegfried's patent, described by us on page 239 of our current volume. He states that he has been engaged in working steel for the past 30 years, and finds, in new processes, always the same story of "imparting extraordinary hardness and durability to the poorest quality of steel;" and he says that all external working of steel, after the forging is done, has but one effect, namely, that the outer portion cools and contracts first, and so impresses and compacts the interior, so that, when a piece is broken, it shows a closer granular appearance after dipping, but will often be so brittle as to break with a slight blow. And if annealed to its previous condition, it is no better than at first. He would like to know how to make poor steel into good steel, but fears that he will have to wait for the knowledge till he can go to Sheffield in a flying car driven by a perpetual motion.

The Coast Survey.

From the report of Professor Benjamin Pierce, superintendent of the coast survey, we learn the following:

In all the northern sections, parties are yet in the field and will so continue until the approach of winter, when operations will be resumed on the southern coasts. Work has also been done and is in progress along Lake Champlain. Magnetic elements have been determined in the vicinity of Philadelphia and at Washington, D. C.; tides have been regularly recorded at Old Point Comfort, Va.; a geodetic reconnoisance is in progress near Harper's Ferry; the detailed survey of James River, Virginia, has been extended upward to Warwick River; twenty new charts have been published during the year. and nine others, which show extensive additions in comparison with their first issue, and tide tables for the ensuing year have been prepared, and will be published as heretofore.

Caffein from Roasting Coffee.

Caffein is much employed as a valuable medicine, but, as now usually prepared, is difficult to obtain, and is very expensive. According to Thomson, the waste of this valuable alkaloid could be prevented in the process of roasting coffee if an adapter, nine feet long, were to be attached to the axi of the drum, through which the fumes could be passed and condensed. A pound of coffee yields, on the average, 75 grains caffein. According to this, in England, with an annual consumption of 13,000 tuns of coffee, the yield would be 140 tuns of caffein. The United States would yield nearly as much more, so that a little economy in roasting coffee would give us a surfeit of this medicine, and very possibly result in its being found applicable to other useful purposes. Caffein is insoluble in a concentrated solution of carbonate of potash; it can therefore be separated by this reagent from sugar, gum, resins and extractive stuffs. If the tannic acid be precipitated from an infusion of tea or coffee by means of acetate of lead, and filtered, the caffein can be precipitated from the filtrate by carbonate of potash, afterward dissolved in alcohol, and obtained in crys als by sublimation. If an aqueous solution of caffein be evaporated to dryness in a sand bath, a few drops of chlorine water added, and again dried, a blood red residue will be obtained. In this way 1-1,000th of caffein can be detected.—*Journal of Applied Chemistry.*

WHERE personal interests come into play, there must be, even in men intending to be truthful, a great readiness to see the facts which it is convenient to see, and such reluctance to see opposite facts as will prevent much activity in seeking for them. Hence a large discount has mostly to be made from the evidence furnished by institutions and societies in justification of the policies they pursue or advocate.—*Herbert Spencer.*