the nearest fixed star! In applying this measuring rod to our stellar system, it is found that, through the thickness of the wheel the distance is such that light would occupy about 1,000 years, and through the diameter not less than 10,000 years, in making the passage! In some directions, indeed, the system stretches away into the depths of space beyond the reach of the most powerful telescope to measure.

If we pass through the inconceivable distances we have been considering, out beyond the boundaries of our stellar system, we find a region of empty space, destitute of stars, at all events of those which are luminous and visible. Traversing this void space through distances which appal the mind by their immensity, we find other systems of stars probably similar to our own. And astronomers are now considering the possible relation of these several clusters to each other—whether there is not a system of systems! This is the most snblime problem which has ever engaged the attention of the human mind.

PATENT LAWS AND THE PATENT OFFICE.

We take the following from the Report of the Secretary of the Interior, and to one of its recommendations we enter a decided protest in the name of every inventor in the United States. Our reasons for so doing we give below:—

"The increase of business in the Patent Office, and the magnitude of its operations, give additional force to the recommendations heretofore made for a re-organization of this bureau. The amount of work devolved upon the Examiners is enormous, and it is difficult to believe that the reiterated appeals in this behalf would have been so entirely disregarded, had Congress realized the actnal condition of the business of the office; and as the office is self-sustaining, it is only reasonable that this department should be empowered to graduate the force employed by the work to be done, provided always that the expenditures shall be kept within the receipts.

I take occasion to renew the recommendation of previous reports in regard to the anomaly of allowing appeals from the Commissioner of Patents to one of the three district judges. In addition to the reasons urged in my first annual report for an alteration of the law in this particular, it is to be observed that as each judge acts separately upon the appeal taken, it becomes very difficult, if not impossible to maintain uniformity and certainty in the execution of the patent laws.

The income of the office for the three quarters ending September 30, 1860, was $197,648.40, and its expenditure, $189,672.23, showing a surplus of $7,576.17.

During this period, 5,638 applications for patents have been received, and 841 caveats filed; 3,612 applications have been rejected, and 3,896 patents issued, including re-issues, additional improvements and designs. In addition to this, there have been 49 applications for extensions, and 28 patents have been extended for a period of 7 years from the expiration of their first term."

The recommendation of the Secretary of the Interior to which we object relates to repealing the law which permits applicants for patents to appeal from decisions of the Patent Office to judges in the District of Columbia. Two statements are made as affording causes for the repeal of the statute; to these we will make a brief argument, and we are confident that the Secretary of the Interior himself, by a further examination of the subject, will change his sentiments on this question.

It is stated that the present system of appeals is an anomaly. We consider that it is not so; that it is simply a safeguard against unjust decisions in the Patent Office, and is a very proper method of obtaining redress to inventors. Abolish such a system, and the method of deciding upon all applications for patents would become an *anomaly* indeed, in a free country. In constitutional monarchies and republics, we require checks upon hasty legislation and the decisions of courts; hence our compound houses of legislation and our courts of appeal.

Would it not be unjust, would it not be an *anomaly* in our form of government, were the actions of the Patent Office made an exception to such wise customs and modes of procedure? Certainly this would be the case, and yet this is what the Secretary of the Interior recommends.

Again, the repeal of the statute is recommended because the Secretary states that it is "almost impossible to maintain uniformity and certainty in the execution of the patent laws." We think this statement is unwarranted, but even if the repeal solicited was effected, it would not mend the matter, but rather increase the evil. Justice to inventors and the public is the first object to which we should look in all cases. The right of appeal in the District Courts is for the very purpose of securing this justice, and we do not know of a single reversal of a Patent Office decision which did not secure that object. Surely the Secretary of the Interior does not mean to defeat the means of obtaining justice to inventors, under the guise of obtaining *uniformity* of decisions. If the infallibility of the Patent Office officials could be guaranteed, then the reform solicited might be claimed with a good grace, not otherwise; without such a guarantee, the present system should remain as it is. We are confident that were the present method of appeals abolished, the Patent Office would become a petty despotism.

During the last session of Congress, when the patent bill was up for discussion in the House of Representatives, its further consideration was postponed until the second Wednesday of this month. As this bill contains the provision recommended by the Secretary of the Interior, we trust that the friends of inventors in the House will see that it is struck out and condemned as unnecessary and unjust.

THE PATENT OFFICE DEFENDED.

MESSRS. EDITORS:—After carefully perusing your strictures on the Patent Office, published in your last number, allow me to remind you of the saying that "one story is good until another is told." It is to be hoped that your articles have not left any of your readers in the predicament of the Pennsylvania judge, who was perfectly able to decide the case after hearing one side, but was nonplussed on the presentation of the other side. The ideas put forth are too narrow—not sufficiently comprehensive—just, perhaps, when viewed with an eye single to the interest of one class of individuals, but absolutely unjust when the interest of the whole community is taken in view. This Revisory Board, which you complain of, is, in my judgment, essential to the proper administration of the duties of the Patent Office. As you have taken the other side of the question, and as I take it for granted you are but seeking the enlightenment of your readers, you will not close your columns to a fair discussion of the subject.

It is a well-known fact that, previous, to say, 1853, it was far more difficult to obtain a patent than it is now. Since that time, patents have been issued with more regard to the increase of the revenues of the Office than to the proper validity of the patent itself. Hence it is that so many patents utterly worthless in themselves, are now before the public for sale. There are two kinds of patents taken out in this country (and it may be in others), and the precise merits of each are well-known to the inventors. Class No. 1 is that kind of patent which the inventor not only believes to be good, but is willing to expend his means or procure the assistance of his friends to demonstrate its utility previous to offering it for sale. These are commendable patents. Class No. 2, which in number exceed No. 1 (for the rejected applications may be fairly considered under this class) are those taken out for the express purpose of traffic, the inventor, caring but little for either their originality or usefulness to the public. His object is to procure a patent. He seems to be regardless of the strength of his claim, because his object is only to sell—*not to introduce.* It is quite common that, after having made up a claim that he or his agent supposes *may* pass, to request the Examiner, in case he cannot allow *that* claim, to suggest one that he can. I am not speaking of isolated cases, for I believe that this class predominates. Let any one examine the list of patents passed for the last seven years, and he will be utterly astounded at the barrenness of the claims, and his own inability to understand what they mean to claim as new. As I understand it (and I know nothing save that which is before the public), the object of this abused Revisory Board is to correct this; and its action is therefore commendable. It will reduce the revenues of the Patent Office, but, at the same time, it will lessen the loss in a tenfold degree of those persons who have been induced to embark in the enterprize and invest means in the patent, simply from the fact that it contains the great seal of the country. Many believe that a patent is incontrovertible, while it is notorious that not one in ten will stand the test of a court. The intention ought to be that when the government grants a man a patent, it should be fair to presume at the time that it is giving that which can be maintained, and the object of the Board is to approximate to that point as near as possible. It is no uncommon thing in Europe (Prussia, alone, excepted) for a patent to be granted five and six times over, to as many different individuals, and for one and the same thing. There is some excuse for this on their part. They must have revenue; and my experience teaches me to believe that they will grant a patent for anything, without any regard for its originality, novelty or utility. Thank God, our government is in no such predicament. We can therefore afford to have a Revisory Board—nay, inventors will be benefited by it in the end. The country is flooded with patents now, and the majority are so utterly worthless that they throw discredit upon the good ones. Many a good patent now lays in the drawer of the inventor, for the want of some one to invest means to introduce it. This evil has become so great that a man is thought to be in a failing condition who consents to deal in patents. I am fully aware that I am tramping on the toes of patent agents; but as I am seeking loftier results, let them stand from under. There is no reason why a man should not engage to introduce a patent to the public without being looked upon with suspicion; while it is notorious that such enterprises are viewed as a series of gambling by our business men. This difficulty would vanish if a closer scrutiny was applied to every application, and none passed which had not the stamp of originality on them. There are places in New York where any number of patents can be purchased for amounts ranging from $100 to $1,000. They are, it is true, worthless except for gambling purposes, and never should have, and, in my opinion, never would have been granted if this Revisory Board had been in existence and *done its duty.*

FAIR PLAY.

New York, Nov. 26th, 1860.

REPLY TO "FAIR PLAY"

In a letter accompanying the above communication, the writer informs us that if we should refuse it a place in our columns, he would procure it an insertion elsewhere. If we had treated it as it justly deserves, we should have declined its publication; and no doubt its appearance elsewhere would have subjected its author to the mortification of seeing the word *advertisement* standing at its head.

There is a certain amount of smartness in the communication not unlike that of some rattle-brained attorney who rushes to the rescue of his cause, without regard to truth or candor.

The position assumed by the writer is manifestly so one-sided and unjust that we might have been excused if we had taken the liberty of substituting "Foul Play" as a proper signature for his communication. In the first place, it is a gross libel on inventors generally; and, in the next place, if allowed to pass unrebuked, it would tend to injure the value of useful patented inventions in public estimation: hence our willingness to give "Fair Play" a chance to be heard. The author of this libel on the rights of inventors and their property purports to reside in this great city, where evidences are presented on every hand of the great value of patented inventions; and yet we feel bound to say that he is either the mere echo of some one who has felt the force of our criticisms, or whose mind has become so perverted that an invention seems of not much more importance than a bundle of straw.

If the ideas of "Fair Play" are sound, it would be better for the interests of the people that the Patent Office be abolished at once, as, on his theory, it is simply putting an instrument into the hands of a few for no other purpose than to cheat the multitude—a business which the government, at least, would not sanction. Fortunately, we are enabled to put forth with our own views in contradiction to the above, those of both the Secretary of the Army and the Secretary of the Navy, who, in their late reports, stamp the leading sentiments in the letter as false, and pernicious to the interests of the government and people. Imbued with the very sentiments set forth in the above communication, a United States Senator prepared a bill, and obtained its passage at the last session of Congress; but what has been its effects?

NAVY PATENTS.

The following extract, from the report of Secretary Toucey on the state of the navy, affords a most practical answer:—"The provision in the act of Congress of June 23, 1860, which prohibits the purchase of patented articles for the use of the army and navy, will be found injurious to the latter service. Since the introduction of steam to propel ships of war, a great variety of patented articles have, in the construction and repair of a steamship, become of daily use, and, in many cases, of indispensable necessity. Patented boilers, surface condensers, friction thrusts, governors or speed regulators, steam pumps, capstans, air ports, boat detachers, galleys or cooking stoves, ventilators, steering apparatuses, lanterns, logs and leads, vulcanized rubber, barometers, counters, hydraulic jacks, water gages, and many tools for manufacturing machinery and driving and drawing bolts, are of this description. And what is true of the steam machinery is also, in some measure, true of the armament. A war steamer built now according to the fashion of the past, excluding all modern patented improvements, would be an antiquated object, far behind the present age, and as inefficient as it would be antiquated. The best modern patented improved boiler will make a saving of 18 per cent of steam. To dispense with all patented surface condensers would be wanton extravagance. To arm a ship of war without a modern patented invention would give great advantage to the enemy. To prohibit the sailor the use of his seamless pea jacket and cap would be to deprive him of the comfort of some of his light, warm, most durable and cheap, and nearly waterproof clothing. To withhold from him the use of American patent desiccated vegetables would take from him a portion of his most nutritious and acceptable food. It is impossible to build, equip, arm and provide a steam ship of war, having anything like usual modern efficiency, without trespassing on all sides upon modern patented improvements. Something, also, is due to the inventive genius of our countrymen. It is within the memory of the living when the great inventions and discoveries which have almost revolutionized the world were unknown."

ARMY PATENTS.

The following extract from the report of the Secretary of War is equally pertinent as an answer to the above:—"The law which prohibits the purchase of any arms or military supplies whatever which are of a patented invention, is too general and comprehensive in its terms, embarrasses the operations of the War Department, and is, in some respects, injurious to the military service, both as regards the army and the militia. There are certain arms and military supplies of patented inventions, the merits of which have been so well established as to have caused their introduction regularly into the service. These are frequently embraced in requisitions for supplies coming from the army and from the States; but the few left on hand of those which were purchased before the passage of the prohibitory law constitute the only source from which those requisitions can be met, and that source is now either entirely or very nearly exhausted. It is therefore recommended that the law be so amended as to except from the prohibition such arms or other military supplies as constitute a regular part of the armament or equipment of troops, and also the improved patented mode of casting and cooling for iron cannon. It should be repealed as to all articles used in the Quartermaster's Department."

If the spirit of the author of the above communication were to prevail in administering the affairs of the Patent Office, we have no doubt but that our whole country would soon become as embarrassed in its manufacturing and agricultural improvements as our army and navy have been in theirs. Very few, if any, inventions are useful but those which are patented. It is, indeed, true that all improvements are not of equal value and utility; it is not every day that we can have such a great invention as the steam engine, cotton gin, telegraph, printing press, reaping machine or power loom; but every improvement, however small, deserves a patent, because it is a drop added to the tide of invention, progress and civilization.

The author of the letter is entirely wrong in his statements respecting the difficulty of obtaining patents prior to 1853, and the validity of those issued of recent years. Previous to that year, the decisions of the Patent Office were more proverbial for the rejection of good improvements and the granting of patents for trifling discoveries. Every person who has been long acquainted with the business of the Patent Office knows that vast improvements have been made in the drawings, specifications and models furnished to the Office. Very few of the patents issued prior to 1850 could bear a critical examination in a court of law, because they were prepared by very incompetent persons. Those which are now prepared for the Patent Office are far more accurate and complete in every respect, and are therefore better able "to stand the test of a court." This is a well known fact to us, if it is not to "Fair Play."

We object to the Revisory Board in the Patent Office, because, unless it embodies more wisdom and more knowledge of science and inventions than all the Examiners combined, it must do evil, and not good, to inventors and the public. This requires no argument; it is a self-evident fact. According to law and custom, a patent must issue for every invention that contains *any degree of originality and utility*. Our correspondent seems to be either ignorant or oblivious to numerous legal decisions on this point. His egotism respecting his judgment of what are worthless and what are valid patents, approaches to the ludicrous. The low prices for which patents can sometimes be purchased is not a true test of their inherent merits. We could name a number of patents, which were sold for quite small sums, that afterward became of immense value, and yielded large profits to purchasers; and we have no doubt but that such will be the case in many instances again. The majority of our inventors are mechanics of limited means, who are frequently compelled to sell good patents for small sums, but probably there is not another man in the country, except our correspondent, who would have the audacity to fling their poverty in their teeth, and denounce their patents as useful only for *gambling purposes*. It is a libel upon our inventors and a stigma upon the benefits which they have conferred upon the public.

VALUE OF DIFFERENT KINDS OF FUEL

The following table of the comparative value of different kinds of fuel we have collected from various sources, and it embraces the principal results obtained by numerous experimenters, from Count Rumford down to Dana and Johnson. For convenience of comparison we have reduced the several tables all to one common measure, the number of pounds of water heated from the freezing to the boiling point by one pound of the fuel:—

Kinds of Fuel. One pound, when burnt, will heat:	Pounds of water raised from 32° to 212°.
Lime tree, dry wood, 4 years old	34
" slightly dried	38
" strongly dried	40
Beech, dried 4 or 5 years	33
" strongly dried	36
Oak, common firewood, in small shavings	26
" the same in thick shavings	24
Ash, common dry wood	30
Sycamore, strongly dried	36
Bird cherry, common dry wood	33
Fir wood	30
Poplar	34
Hornbeam	31
Charcoal	68
Peat, French	18
" Irish	62
Coke, gas coke, from Paris	50
" from coal of St. Etienne	65
Coal, lignite from Meisgner	43
" brown coal from Meiszner	58
" Newcastle	70
" cannel coal, from Glasgow	56
" anthracite, from Pennsylvania	69
" anthracite, from Laval	74
Rock oil	40
Alcohol	38
Hydrogen	246

Johnson, by his experiments at Washington, in 1844, found that the amount of water evaporated from 212°, by one cubic foot of coal, varied from 440 to 556, with different specimens of anthracite; from 350 to 478, with bituminous coking coal; and from 355, with Scotch, to 459, with English bituminous coal. In the English experiments of De la Beche and Playfair, the Newcastle coal varies from 325 to 559; and Scotch coals, from 352 to 460.

Our review of the patent coal oil suit, noticed in our last number, is necessarily delayed until our next issue.

RENEWED ACTIVITY AT THE PATENT OFFICE.

As usual, immediately previous to the commencement of a new year, the *attachés* of the Patent Office are hard at work, bringing up arrears.

The list of claims on another page faithfully indicates the labors of the Examiners, and we congratulate the inventors generally, and our patrons in particular, that there is one period in a year beyond which their business before the Patent Office is not often delayed.

The list of claims referred to above shows the number of patents issued last week to have been eighty-five; the number issued during the same week in 1859 was seventy-three, thus showing a considerable increase over last year.

It occurs to us that the Revising Board must have been very busy during the past week to have examined carefully *over eighty specifications and drawings and passed them for issue!* The largest class of cases represented in this week's list is the agricultural, which numbers thirty-six.

A New Stimulant.—The decoction of the leaves of the coca—a Peruvian Erythoxylon, recently introduced into Europe, is exciting attention as possessing a peculiar stimulating power and favoring digestion more than any other known beverage. These leaves chewed in moderate doses of from four to six grains, excite the nervous system, and enable those who use them to make great muscular exertion, and to resists the effect of an unhealthy climate, imparting a sense of cheerfulness and happiness. In larger doses coca would occasion fever, hallucinations, delirium. Its exciting power over the heart is twice that of coffee, four times that of tea. It has no equal in its power of stimulation, in cases of forced abstinence. Dr. Mantegazza, of Milan, states that, although he has a weak constitution, he has been enabled, by the use of coca, to follow his usual studies uninterruptedly for forty hours: without taking any other aliment but two ounces of coca chewed during that time. He adds that he felt no fatigue after this experiment. The Indians of Boliva and Peru travel four days at a time without taking food, their only provision consisting in a little bag of coca. It is regulary administered to the men who work in the silver mines, and who, without it, could not resist the hard labor and bad diet to which they are subjected. What a chance this is for a patent medicine man!

The Largest Yield of Corn Yet.—We find the following statement in the *Country Gentleman*, of Albany. It far surpasses anything we ever heard of before in the way of corn crops:—Ellis R. Lake, of Marion county, took premiums on corn at the Indiana State Fair, as follows: For 1 acre, 263 bushels; 5 acres, 247 bushels per acre; 10 acres, 263 bushels per acre. The soil was sand and loam, based on clay, a river bottom; the one acre was plowed ten inches deep and planted in drills three feet apart, and merely plowed out with shovel plow three times; the five acres were plowed six inches deep and planted in hills three and a half feet each way, plowed out with shovel plow four times, hoed once; the ten acre piece was plowed six inches deep and had the same cultivation as the five acres. The corn was measured by weight, and would probably shrink considerably in drying.

There is a greater difference between the New York and the Cincinnati ferry boats than between the former and those on the Mersey, at Liverpool (England). The Ohio ferry boats are very high; their machinery is cumbersome and occupies so much of the middle part as to shut off communication between the two ends. One end contains cattle, the other, foot passengers. These boats land sideways, and two gangways conduct to the decks.

If our larger gold coins were made thinner and broader, it is believed that much fraud would thereby be prevented. Cunning and skillful forgers frequently split our thick gold pieces through the middle, and take out a portion of the gold; then they fill up the interim with inferior metal, press the whole together, and remill the edge. It is very difficult to detect such frauds, but if the coins were made thinner, the rogues would find a barrier to the success of their nefarious practices.