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THE END OF ANOTHER YEAR.

The present number marks the close of the twenty-seventh volume of the SCIENTIFIC AMERICAN and also the expiration of many thousand subscriptions. Following our general rule based on the desire of not forcing our journal upon those who may not desire the continuance of its visits, we cease forwarding it to subscribers when the term, for which they have prepaid, ends.

The next issue will bear the imprint of a new year, a year, we trust, which at its close may find our country still further advanced in prosperity and greatness, and our industries and manufactures even more thriving; and which will in the end, to the inventor and to the artisan, the brain and hands of the nation, be productive of those substantial rewards which their labors so richly deserve.

With reference to the volume, the concluding words of which we now write, we believe that without egotism we may truly assert that it is the best we have ever published. And we may add the conviction that in no other journal can the same amount of valuable and practical information be found, so attractively presented. We point with a pardonable pride to the number and character of the original engravings embellishing every issue; to the fact that fifty-two numbers so copiously illustrated and so replete with interest can be afforded at three dollars a year, less indeed than half the subscription price of the majority of our English scientific contemporaries. Other periodicals, both American and foreign, have repeatedly expressed a natural surprise that so low a rate can be maintained. The explanation is obvious: mechanics, inventors, manufacturers, engineers, chemists, indeed all interested in the industrial progress of the world, make up our list of subscribers; with such a patronage, failure is impossible; aided by such numbers, cheapness of our product is a necessary consequence.

To those who for many years have been constant friends, the promise of increased excellence during the coming twelve months, the assurance that, as in the past, no effort will be spared to make the SCIENTIFC AMERICAN the leading paper of its kind in the world, seems almost superfluous. To others, the proof that former and similar pledges have been amply fulfilled is best found in our circulation, which though steadily increasing, is now larger than that combined of all other journals occupying a similar field. We have printed for some time past 50,000 copies per week, and we have every hope that before the end of 1873 this already large number may be augmented to 75,000.

In conclusion, we ask our old subscribers, many of whom for a score of years have appreciated and encouraged our efforts, not only to renew, but still further assist us by obtaining new names. As the last volume was better than its predecessor, so shall the coming series be superior to that just concluded, and thus we trust that each year may find us the same silent though faithful teacher and, as we advance, a wiser and better guide to all who, whether in the realm of science, industry or art, labor for the benefit of their fellow men.

PROPOSED CHANGE IN THE PATENT LAW.

We have received a copy of the proposed amendments to the patent laws, lately reported to the House of Representatives by the Committee on Patents, which amendments are understood to have originated with the present Commissioner of Patents, General Leggett.

The bill provides for the detachment of the Patent Office from the Department of the Interior, and the forming of a new department to be known as the United States Patent Office, the various appointments thereto and general supervision to be in the hands of the Commissioner.

The rapid growth of the Patent Office and its widespread influence upon the progress of the country seem to render this change desirable, and we should be glad to see it effected.

The bill next provides for the appointment of nine "chiefs of division" and one chairman of the board of appeals, at a salary of $3,500 each, who are to supervise and approve the work of the principal examiners, hear and decide all questions arising upon applications for patents and reissues, give judgments allowing and refusing the same, etc.

In other words, this is a provision to add a bureau of red tape to the business of obtaining patents, and to place unnecessary obstructions in the path of the inventor. One of the distinguishing features of the American Patent Law is the comparative absence of official circumlocution in the grant of patents. We say comparative, bearing in mind the superabundant interference of officials in such matters in other countries. We already suffer from it here, but not to so great an extent as it prevails abroad. It is sufficiently difficult now for the American inventor to get his patent promptly allowed.

It cannot improve the chances of the inventor to have the work of the principal examiners supervised by another set of examiners. We all know how such things work. If the examiner is of opinion that an invention is patentable, the chief of division will be just as likely to be of the contrary opinion. It is a matter of opinion on both sides, and unless the two parties were frequently to differ, the supervising chief would be apt to consider himself to be of little importance. The way to ensure official delays, circumlocution and red tapeism is to multiply officials and place one set to watch and criticize another set.

It seems to us that the new board of chiefs which this bill proposes is unnecessary. In former times, there was greater difficulty in making examinations at the Patent Office than now, for then there were no duplicates of the patents; but now the patents are printed, and the examiner is enabled readily to inform himself as to the state of the arts in his particular subdivision.

If the Commissioner needs more help in examining, let him have more examiners. But the plan of creating a body of nose men to smell out and poke over the doings of the principal examiners, we believe to be unnecessary and injurious to the efficient working of our patent system.

Another section of the bill relates to the qualifications of persons or agents who represent the inventor in making application for a patent. Such agent is to be required to produce, to the Commissioner of Patents, satisfactory evidence of his fitness to practice before the Patent Office. It seems to us that the law is well enough as it stands. It provides that persons who, by their acts, prove themselves to be unworthy shall be prohibited from practice.

If the inventor may apply in person for a patent, he certainly ought to be at liberty to appear by a representative of his own choice. The new proviso prohibits this, and requires the inventor to employ some person upon whom the official unction of the Commissioner has previously descended. Here the unnecessary red tape and official interference again makes its appearance. Give the Commissioner the power to say who shall and who shall not have the privilege of practicing before the Office, and you increase the difficulties and expenses of obtaining patents.

If any changes are to be made in the patent laws, let them be in the interest of simplicity, freedom, reduction of costs, and generous encouragement of inventors. The proposed changes we have criticized are likely to have an opposite effect. We shall refer to the subject again.

TIDAL WATER POWER; A NEW AND USEFUL SUGGESTION.

Mr. A. E. Gordon, the editor of the New Brunswick, N. J., *Times*, has made a suggestion in reference to the utilizing of the power of the tides, which appears to us not only novel but practical and important.

The use of tidal water power to drive mills is common along our coasts. The ordinary method is to shut off the mouth of a small inlet by means of a dam having sluice gates to admit the sea water which, by the rise of the tide, enters and fills the enclosure. By the fall of the tide the enclosed water derives sufficient head to drive a turbine or other wheel, and so give motion to the mill. But when the tide again rises of course the head is destroyed, so that the mill can only run alternately, during two separate periods of a few hours each out of the twenty-four. It is this alternating and irregularity in the hours of motion, together with the periods of entire inactivity, that prevent the employment of this species of motive power for general industrial purposes.

The improvement suggested by Mr. Gordon consists in providing two water basins, both of which are to be shut off by dams from the sea. One of the basins is to serve as a constant supply reservoir of water, and it is to have a close dam of such width and hight that the tide water, when it has risen to within one foot of its normal hight, will begin to pour over the dam and quickly fill the reservoir. The dam of the other basin is to be provided with swing valves which permit exit of the water at low tide but prevent ingress of water from the sea. This basin, we will now suppose to be empty. The water wheel is to be placed between the two basins, and the fall of water from the reservoir into the discharge basin will afford continuous motive power so long as the supply of water lasts and until the rise of water in the discharge basin destroys the head. But as this latter basin is entirely emptied at every tide, the head will be always kept good, presupposing, of course, that the reservoir and the discharge basin are made of proper size. In respect to this last point, it is well known that basin capacity on our coasts is almost unlimited, and there are thousands of localities where extensive water powers may be thus provided and maintained at a comparatively small cost. We trust that Mr. Gordon will proceed to elaborate his plan and place it before the hydraulic engineers of the country for discussion.

THE PLANET JUPITER AS REVEALED BY THE MODERN SPECTROSCOPE, PHOTOMETER, AND TELESCOPE.

From a cosmical standpoint our sun is only one of the millions of stars which fill the infinity of space, and its annihilation would scarcely be perceived, while our moon is of no more consequence than a pebble on the seashore. From a terrestrial point of view, however, they are the most important heavenly bodies, and next to them comes the planet Jupiter, for reason of his immense size, which is more than twelve hundred times that of our earth and nearly equal to all the other planets taken together, for which reason Proctor calls Jupiter "the giant planet."

It is not only his size, but everything in relation to him which is astonishing. His axial rotation of 10 hours is so rapid that masses near his equatorial zone are carried round with a velocity of over 7 miles per second, a velocity sufficient to overcome all terrestrial gravitation, as a cannon ball fired upward from the earth with this velocity would never return. The consequence of this is that Jupiter's polar axis is 7,000 miles shorter than his equatorial diameter, which is 82,000 miles.

It is clear, then, that the ordinary notion, the result of the study of our astronomical text books, that the planets Mercury, Venus, the Earth, Mars, are of about equal importance with Jupiter, is erroneous; those four inner planets are very insignificant when compared with the colossal outer planets, Jupiter, Saturn, Uranus, and Neptune.

The next remarkable feature of Jupiter is his low density, The specific gravity of his mass is not much above that of water, while that of the earth exceeds water six times; and this fact has been a puzzle to astronomers, especially as falling meteoric masses from the planetary space have never shown any substances not present in our earth, and also as the spectroscope appears to reveal to us that the whole universe consists of the elements which are all known to us by terrestrial investigation.

What can then be the cause of Jupiter's low density, when he is most likely a collection of the same elements and chemical compounds found on our earth? And here, three different kinds of investigation, each requiring its special apparatus, have been at command of the astronomers, and have satisfactorily answered this question. The first is the telescope, the second, the photometer, the third, the spectroscope.

The telescope revealed the fact that Jupiter is surrounded by a series of vaporous belts laying parallel to his equator. Some of these belts are creamy white, others of a copper color, becoming bluish near the poles. These belts are subject to immense changes. In 1860, a rift in one of them behaved so as to prove the existence during six weeks of a violent hurricane, raging over a surface equal to that of the whole earth, and with a velocity of over 150 miles per hour. Such a storm on earth would destroy every building, tree, ship, etc., in fact would totally desolate the earth's surface. In 1870, it was discovered that the creamy white belt on the equatorial zone became orange, lost its sharp outline, and showed appearances which astronomers compared with post-holes, pipe bowls, oval moldings, etc.; while at the present day Lassell, President of the Royal Astronomical Society of England, and Father Secchi, possessing the finest telescope in Rome, agree that Jupiter is now presenting a most wonderful aspect, which only can be explained by the hypothesis that what we see of his surface is nothing but vapors of different substances, and that thus the planet possesses a much higher temperature than our earth.

The photometric observations of Zöllner in Germany, and of Bond in America, prove that Jupiter gives more light than could be reflected at his distance from the sun, if it was only solar light which we see. Zöllner found that he gives four times more light than would be the case if his surface was like that of our moon, and the conclusion to which we are driven is that the planet shines partially with its own light, is in fact red hot, and is surrounded by vapors.

The spectroscope has verified this view, and proved that the visible surface of the planet contains enormous quantities of aqueous vapor highly heated; in fact, it consists chiefly of superheated steam, of such very high temperature that it is self-luminous, and thus the planet itself is of a much higher temperature still.

The four satellites, in the meantime, are cold; they are so much smaller that they have cooled down far below the temperature of the planet, and may be inhabited, while the heat of the planet makes up for the great distance from the sun. Our earth and moon were probably once in the same condition, geology proving that the earth's crust was once in the fluid state, and our globe surrounded with red hot vapors. At that time the moon had probably not cooled down