logical and other peculiarities of various sites of the mountain range above named are soon to be carefully scrutinized and reported upon. A peak will be selected which, from its high altitude and clear surrounding atmosphere, will afford the finest possible view of the heavens throughout the longest period of the year, and there the observatory will be permanently located.

How large the proposed instrument is to be is of course impossible to say, definitely, nor can its probable cost be with any accuracy ascertained. Experiments must be made with glass, and the most careful investigation will be needed in order to determine the feasibility of constructing a lens of the extraordinary diameter and focal length required.

Our contemporary suggests a 40 inch objective as of a suitable size; but it seems to us that, when this undertaking is begun, nothing short of the grandest possible results should be aimed at. Hence the researches should be made with a view of determining how large a lens can possibly be manufactured. We have already pointed out the capability of a twelve foot objective with a focal length of 120 feet; which, with an eye piece of $\frac{1}{20}$ inch focus, would give a magnifying power of 28,800 times the linear dimensions, or over 800,000,000 times the surface of a body. Although the spectroscope has proved that most of the nebulæ which the great telescope of Lord Rosse has failed to resolve into stars are hot hydrogen, it is possible that so vast a power as above noted would render visible other clusters now totally unseen, and thus give to the eye the ability to gaze into the star depths billions of miles further than it has ever heretofore penetrated. The reader can easily calculate the apparent proximity to which the planets would be carried to our earth, and also the large visual angles which their spheres would subtend. Mars, for instance, would, so to speak, be brought within 4,000 miles of us, and would appear 100 times as large as the moon, covering an angle of 50°. The magnitude of the discoveries which might be made, while we are thus enabled to scrutinize the Martial surface mile by mile, cannot be estimated or even imagined. The problems regarding the physical constitution of Saturn's rings, of Jupiter and his possibly inhabited satellites, of the vagrant intermercurial planet and others which will readily suggest themselves, will receive new light shed upon them, by which, doubtless, a clear path to their solution will be found. As for our moon, let the reader seriously think of having that satellite within eight miles of him; so near that, if inhabitants there be, he can see them. Even if no more astonishing discoveries be made, the effects of volcanic action upon the surface will form a prolific field of study.

About one year ago, when first proposing the idea of so vast an instrument—a plan, by the way, which even up to the present time has continually called forth expressions of approval, coupled, frequently, with offers of subscriptions from many of our readers—we said: "It is impossible to speculate on what such a telescope would discover in regard to the other planets or the vast regions of the firmament; let us hope that some day the amount of capital necessary will be forthcoming, on the most liberal scale, for the progress of the most sublime of all the sciences." The day has arrived; the capital is forthcoming, and there is every favorable probability that, in less than five years, one of the grandest enterprises of modern times will be successfully consummated.

ENGLISH PRINTING PRESSES IN AMERICA.

In the early days of newspaper printing in this country the machinery came chiefly from England; but when the Yankees began to invent, the importation ceased, and for many years the United States supplied novel presses to British and continental publishers. But English ingenuity appears to have taken a new start, and has produced printing machines of such superior capacity that New York newspaper owners are now buying fast presses in London.

We lately witnessed the practical working of two of the celebrated Walter presses, at the *New York Times* establishment in this city, and must confess to an agreeable surprise at their perfection and extraordinary performances. They were built in London by Mr. Walter, the inventor, and set up here, under the immediate supervision of Mr. Gilbert Jones, of the *Times*.

They are known as perfecting presses, that is, both sides of the sheet are printed in passing once through the press. In ordinary presses, the sheets are introduced separately, printed on one side, then passed through again, and printed upon the other side. This involves much handling, the employment of cumbersome machines, and many attendants.

In the Walter press, the paper to be printed is arranged in the form of a roll, like the goods in a calico printing machine. This roll of paper, 3 feet in diameter, weighing one fourth of a tun, and containing paper enough for say six thousand copies of the *Times*, is placed at one end of the machine; the web passes thence between the printing types, which, in the form of curved stereotype plates, are secured upon the exteriors of a pair of geared cylinders. Rollers carrying ink press against the types, and the rotation of the type cylinders draws the paper along between them and the impression cylinders, thus printing the web on both sides; the web then passes between rotating shears, which divide the paper into separate sheets; and these, guided by a beautiful and ingenious arrangement of delivering tapes, are discharged in two separate piles, at the end of the machine opposite to that where the white paper enters. The paper travels through the press with a velocity of ten or eleven miles per hour, and delivers at its highest speed some sixteen thousand printed copies of the *Times*, which, as all our readers know, is a large quarto paper—one of the largest in the country. A single number of the *Times* contains an amount of type matter equal to 147 ordinary octavo book pages. Perhaps we cannot better illustrate the astonishing rapidity of this machine than by saying that the printed matter it delivers in one hour would cover more than two hundred and thirty-five thousand book pages, or nearly four hundred volumes of six hundred pages each.

These remarkable printing presses are built with steel at all of the gearing parts, are the perfection of mechanism, and run with the steadiness of time pieces. One machine, attended by two men and two boys, is capable of a duty nearly equal to that of two of the old style, separate-sheet, ten-cylindered presses, operated by twenty-five men. One of these old time monsters now stands idle in the *Times* press room. It is twenty feet high and forty feet long, full of complications. The new and simple new comer, by which it is replaced, occupies hardly a third the room of the other.

We have not space here to describe the various other mechanical appliances employed in printing the *Times*, such as double engines, boilers, blowers, steam ink pumps, folding machines, stereotype apparatus, etc., all of which are of admirable character, and have cost the proprietors over one hundred and twenty thousand dollars. This peculiar machinery, taken in connection with the enormous editions of the *Times*, exemplifies to a certain extent the wonderful progress which the world is constantly making in knowledge and the mechanic arts.

THE NOVEMBER METEORS.

We would remind our readers that on the 13th and 14th of the present month the earth crosses the second of the great meteor belts, and that on the nights of the above dates, if clear, a quite brilliant display of shooting stars may probably be seen. The November star showers appear to be periodic in splendor. For intervals, ranging from a single year sometimes to five and six, meteors appear of remarkable magnificence and in extraordinary numbers, then they wane, and itis not until a cycle of 33 years has elapsed that the maxima again arrive. In other words, instead of these vagrant bodies being distributed uniformly around their vast orbit, forming a complete ring of meteoric particles, a large majority of them are clustered together in a dense cloud which makes a revolution around the sun once in 33 years, and intersects the earth's path at the position of our globe on the 14th of November.

It is a remarkable fact that, as astronomers have shown the coincidence of the path of the August meteors with that of the bright comet of 1862, so have Peters and Schiaparelli independently discovered that Tempel's comet of 1866—a body visible only with the telescope—has elements which may be regarded as absolutely identical with those of the November belt. As to what connection exists between comets and meteors, it is, with our present knowledge, impossible to determine. We know, however, that meteors have paths as eccentric as those of the orbits of comets, and hence it is deduced that the earth encounters no less than 56 meteor systems, thus giving proof that the total number of these systems in the universe must be estimated by billions.

The November meteors appear to radiate from the constellation *Leo*, and the aphelion of their orbit is something beyond the planet Uranus. Proctor considers that the denser portion of the system, known as the "gem of the meteor ring," cannot be less than 1,000,000,000 miles in length, while its thickness is in the neighborhood of 100,000 miles. The width is estimated at ten times the latter dimension; and taking the average of four displays, in the years 1866–69, it was found that the earth encountered one meteor per minute. Roughly calculated, the distance separating meteor from meteor would be about 1,000 miles, so that the great cluster cannot contain less than one hundred thousand million members. Herschel, from observations of the amount of light given by these bodies, and also by calculations based on the velocity with which they enter our atmosphere, concludes that they are very small, rarely exceeding a few ounces in weight; or, on an average, not over one one-hundredth part of an ounce each. This would make the weight of the cluster one thousand million ounces, or only 28,000 tuns.

Professor Daniel Kirkwood communicates to the *American Journal of Science and Arts* a note on the November meteors, in which he mentions displays, remote from the regular epochs, which, he thinks, cannot be satisfactorily accounted for by the hypothesis of a single great cluster. He points out that, as the display on November 14 occurs in but five or six consecutive years at most, the nebulous cloud cannot extend around more than one fifth of the orbit. But meteoric phenomena have been witnessed about the 13th of November, when the principal group was near its aphelion, and in the years 1787, 1818, 1822, 1823, 1846, 1847, 1849. Those of 1818, 1822 and 1823 may be regarded as all derived from a single extended swarm. Those of 1787 were due to a return of the same cluster, as the intervening period was about 33 years; hence we may expect another shower from this source between 1885 and 1889. A short interval of 12 years, between 1787 to 1799, cannot be explained on the hypothesis of a single group, and accordingly it is inferred that the Leonids entered the solar system in two separate masses, to which the disturbing influence of Uranus gave slightly different periods. The meteors of 1846, 1847 and 1849 were observed after the periodicity of the shower had been recognized, and were noticed in consequence of a watch instituted for the purpose. In regard to these straggling members, it is considered that, whenever the earth passes through the meteoric current, its disturbing influence changes the orbits of such meteoroids as happen to be moving in its immediate vicinity. These disturbed portions of the ring, at their subsequent returns, must pass through the point of greatest perturbation. As the periods will vary within very wide limits, the same is considered an obvious explanation of the phenomena.

DECORATED SCIENTISTS.

"It seems to us unjust and cruel that men of science, to whose labors it is mainly owing that our country and the world generally are mounting higher and higher in the scale of civilization, should be practically debarred from accepting the few honors that come in their way. Moreover we should think that those who have the framing of these regulations * * * should afford every facility to those who are thus honored to accept and wear the foreign orders which may be offered them."

We extract the foregoing lines from a recent issue of our excellent English contemporary, *Nature*, in which they occur in the course of an editorial on "Foreign Orders of Merit." It appears that the Emperor of Brazil and the King of Sweden wanted to decorate some of the British scientists, but these gentlemen, "from loyalty to Her Majesty's stringent regulations," refused the proffered distinctions. Whereupon the above named journal deprecates the course of its government in having such regulations, and urges that there is no reason why men of science, as well as military men, should not receive foreign rewards.

While no one more than ourselves would delight in seeing the scientific workers of any nation gain the most exalted of human distinctions—and no class of people better merit the same—we utterly fail to perceive either the applicability of these so-called orders as a reward for the attainment of learning or for original discovery, or even the inherent honor which our contemporary thinks so great. Does *Nature* mean to say that the fame of such men as Tyndall, Huxley, Lockyer, Spencer, Proctor, Darwin, Roscoe, Huggins, Carpenter, Joule, Grove, and a score of others whom we might readily name, would be enhanced in the smallest jot if their Majesties of Sweden or Brazil should hang a scrap of ribbon or a jewelled star on their doctors' gowns? Or further, is it supposed that any one of these illustrious discoverers would value, to the extent of a snap of his finger, the conferring upon him of medals and crosses by all the crowned heads on earth, in numbers sufficient to make the breast of his coat look like a checker board, like Marshal Bazaine's, as represented in published portraits? "Flunkeyism," as Thackeray terms it, and science can never be made to coöperate. The snob and the scientist are never mingled in one person. And if an ostentatious pride in a worthless gift, not from a people or even given in their name, but merely as a mark of favor by an individual or a ministry in power, is not arrant flunkeyism and snobbery, we fail to appreciate what is. For our parts, we doubt if a much more absurd idea could be proposed than to suggest that men whose grand labors and discoveries have benefitted a world for all time, and whose names will be household words to posterity for centuries, could be honored by the notice of a person who, now a king, will in a few years live in the memory of mankind but as an abstract index to a period of his country's existence.

Some time since we noticed in an English journal a somewhat similar article to that above quoted from, but which advocated the elevation of certain eminent scholars to peerages as a reward for their varied attainments. While it struck us then that Lord John Tyndall, or Earl Darwin, or Baron Huggins would sound decidedly incongruous, a rather more laughable idea occurred to us as to the probable effect if our American scientists should, through the pages of their favorite newspapers, set up a howl because the constitution prevents them, while citizens of this country, from obtaining patents of nobility or orders from foreign powers. Suppose, for instance, that Professor Agassiz should think himself ill used because Congress would not pass an act or constitutional amendment allowing him to be Duke of Penikese, or that Professor Mayer, of the Stevens Institute, should feel deeply injured because he would not be permitted to receive, from the Governor of New Jersey or the Khan of Tartary, a diamond cross or a red feather in recognition of his recent admirable discoveries in the mosquito line?

If the time ever should come when scientists of any nation seek after foreign baubles, such men will not be of those whom people call great, nor will the latter be the ones upon whom such distinctions will be conferred. In fact the distribution of honors will, we imagine, be something resembling the award of prizes by a certain old French semi-scientific, semi-literary society. This learned body rejected an essay by Voltaire, but eulogized to the skies a paper in which reference was made to the "freezing and torrid poles of our earth."

The Niagara River Bridge.

The last span of the bridge across the Niagara river, from Buffalo to Fort Erie, was quite recently placed in position. There are eight piers of solid masonry incased in an armor of half inch iron plate, to protect them from the ice. The Pratt truss, of iron, extending over spans of from 197 to 240 feet, is used. One of the two draws on this structure has an opening of 160 feet, and is said to be the largest in the country. The bridge has but one railroad track, but is leased by four roads—the Grand Trunk, Great Western, Canada Southern, and New York, West Shore, and Chicago railways.

PROGRESS OF THE HOOSAC TUNNEL DURING OCTOBER, 1873.—Headings advanced westward, 170 feet; eastward, 140. Total advance during month, 310 feet. Distance opened from east end westward, 14,747 feet; distance opened from west end eastward, 10,042 feet. Distance remaining to be opened to November 1, 1873, 242 feet. The whole length of the Hoosac tunnel is 25,031 feet.