REPORT OF THE SECRETARY OF THE INTERIOR.

The following are two extracts from the report of the Secretary of the Interior—Hon. J. Thompson. They do honor to his head and heart, and will be found very interesting to our inventors and farmers:—

PATENT OFFICE.

The record of the operations of the Patent Office during the past year furnishes, as usual, a most satisfactory exhibit of the steady progress of our country in the application of science to the arts.

During the three quarters ending September 30, 1859, five thousand one hundred and sixty-seven applications for new patents were received; eight hundred and thirteen caveats filed, and three thousand three hundred and thirty-four patents issued and re-issued.

By a reference to my report of last year, it will be seen there has been an increase in the business of the office for the past nine months, over the corresponding months of 1858, of one thousand and seventy-six applications for patents, one hundred and seven caveats, and five hundred and eighteen patents granted.

The receipts for the three quarters were $188,538 77, being an increase of £37,554 86 over the corresponding period of last year. The expenditures were $157,101 15, leaving a surplus on hand of $31,437 62.

Congress in its last session, in making provision for the publication of the mechanical portion of the Patent Office report, directed the Secretary of the Interior to cause the report "to be prepared and submitted in such manner as that the plates and drawings necessary to illustrate each subject shall be inserted so as to comprise the entire report in one volume, not to exceed eight hundred pages." With an anxious desire to comply in all respects with the expressed will of Congress, I have given to the subject unusual attention. The plates without descriptions and claims would be unintelligible; the descriptions and claims would be of no value. The plates reduced to the smallest possible dimensions, and the descriptions and claims drawn up without a single redundant word, printed in the type required for all Congressional documents, will necessarily occupy more space than eight hundred pages. A literal compliance with the law is, therefore, a physical impossibility. Yielding to the necessities of the case, I have directed the plates to be prepared with the greatest possible economy of space, and the descriptions and claims with the utmost brevity consistent with perspicuity, and submit the matter to the consideration of Congress, with a frank admission that the law has not been obeyed because it reqired an impossibility.

The principle upon which the Patent Office was organized, and has been conducted up to this time, is, that its business should produce so much in the way of fees as would prove sufficient to defray its necessary expenses. It has developed no burden upon the Treasury of the United States. It sustains itself; and for this reason its friends have felt the greater confidence in appealing to Congress for such legislation as may be required to perfect its organization. For several successive years the attention of Congress has been earnestly invoked to the necessity of certain amendments in the existing laws, which experience has proved to be highly important, if not absolutely necessary.

The committees of Congress to whom the subject has been referred have uniformly approved these amendments, and reported in favor of their adoption; but in every case Congress has failed to consider and act upon the reports.

An increase of the business of the bureau, without a corresponding increase of force to manage it, results necessarily in one or two serious evils; either, on the one hand, vexatious delay, or, on the other, hasty and imperfect examinations of applications for patents. A few facts will suffice to illustrate this: In 1855 when the examining force of the bureau was increased to its present number, there were four thousand four hundred and thirty-five applications for patents. The number of applications for the year 1859, taking the average number of applications per month for the past ten months as the basis of the estimate, will be six thousand nine hundred; showing an increase of business for 1859 over 1855 of two thousand four hundred and sixty-five cases. In 1855 each examining room disposed of three hundred and sixty-nine applications; in 1859 each examining room will dispose of five hundred and seventy-five cases, being an increase in the amount of labor performed of fifty-five per cent. To this it may be added that the labor of making a thorough examination of any application for a patent increases from year to year somewhat in proportion to the similar applications previously received. Under these circumstances it is impossible for the office to do full justice in the transaction of its business either to itself or to the public. This is not right. The income of the office is amply sufficient to meet all the expenses which may be incurred in re-organizing it upon such a basis as will give it the greatest efficiency, and enable it to meet promptly all the demands of the country. The inventors pay for having their business done, and it is therefore but simple justice that it should be done with a proper and careful examination, and without unnecessary delay. It would be judicious, then, in Congress to authorize the appointment, from time to time, of such additional examiners, and first assistant-examiners as may be required to transact the business of the office with dispatch, provided the annual expenses of the office shall in no case exceed the annual receipts.

I take occasion here to renew the recommendation, contained in my report of 1857, that the fees required from British subjects should be reduced. Her Britannic Majesty's representative at Washington has recently called the attention of this government to this subject. In the kingdom of Great Britain no discrimination is now made between American citizens and British subjects. I think this courtesy should be reciprocated, and that, in respect to office fees, British subjects should be placed on the same footing as citizens of the United States.

Long experience and great familiarity with the working of this important bureau induce me to renew, not only the preceeding but all the recommendations contained in my previous reports, with still greater confidence in their propriety and correctness; and I must add that the inventors of our country, now grown to be a large, worthy and most useful class, have a right to claim a share of the time and attention of the law-making branch of the government, and to complain when their interests and business are wholly neglected or overlooked.

AGRICULTURE.

The following is the more important part of the report relating to this topic:—

The last Congress having greatly reduced the appropriations below former estimates, the policy of distributing seeds of domestic growth was abandoned, and no portion of the appropriation has been expended for their purchase. It is believed to be both wise and just to confine operations to the purchase and distribution of such varieties of plants, seeds, cuttings, &c., as have not already been introduced into the country.

The tea seed has been introduced from China, and germinated in houses prepared for that purpose in Washington. The step next to be taken is to convey the plants to suitable localities, and to cause them to be tested under the supervision of intelligent and responsible persons. This will be done at the earliest practicable period, and with no apprehension as to their successful growth in all cases in which proper attention shall be given.

The successful cultivation of the vine in this country no longer remains an experiment. The breadth of land planted in vineyards is every day extending, and the yield is large and remunerative. The estimate is that we now have more than eleven thousand acres devoted to this culture; and while the product of some vineyards, in the most favorable season, has been eight hundred gallons to the acre, the average crop per acre of the whole country will compare favorably with that of the most successful wine-producing countries of Europe, and its value is five or six hundred per cent greater at the several places of production. The different species of native grapes have been sought for, and, as far as practicable, the value of each for the manufacture of wine has been tested by chemical analysis. The modes of cultivation, and the processes of making and preserving wine, have been examined, and much interesting and valuable information obtained. A large number of cuttings, of the best and most approved varieties, have been prepared for distribution.

Steps have been taken to introduce from foreign countries a variety of seeds, plants and trees, which may be usefully cultivated and grown in this country.

A number of scientific gentlemen in various parts of the United States have been engaged for several years past, without compensation, in making meteorological observations, which have been regularly communicated to the Patent Office; the necessary instruments being provided at the joint expense of the Patent Office and the Smithsonian Institution. To reduce these observations to a condensed tabular form has involved an expenditure which has also been jointly sustained. These observations, thus condensed, are now ready for the press, and will accompany the annual report of the Commissioner of Patents. They exhibit the mean temperature of the seasons in different parts of the country, and thus furnish data esteemed of high importance in scientific agriculture, and as of great value in supplying the facts on which are based important theories of the winds and storms that sweep over the continent.

In justice to the gentlemen who have devoted their time and labor in this behalf, these tables should be printed; but whether the expense should be defrayed by the Smithsonian Institution or by the government is a question submitted to the determination of Congress.

REPORT OF THE SECRETARY OF WAR.

We give a few interesting extracts from the Report of the Secretary of War, as they relate to inventions, the arts and sciences:—

ORDNANCE, ARMS AND EQUIPMENTS.

I have ordered the estimates from the Bureau of Ordnance to be made mainly in conformity to the policy which the action of the last Congress seemed to indicate by its appropriations. I cannot forbear to express the opinion, however, that to abridge the manufacture of arms is, to say the least, a measure of very doubtful economy, and may prove in the end to be both dangerous and expensive. A foreign war would create an immediate demand for an immense number of arms, probably enough, nearly, to strip all our arsenals, and to require the purchase of further supplies from private manufacturers, at whose mercy the government would be in the emergencies of war.

That constant progress in the improvement of arms and other appliances of warfare which has of late characterized the military service of other nations, has been, up to this time, no less active in ours. The experiments which have been in progress for some time past to ascertain the fitness of iron for the construction of gun carriages for sea-coast and garrison cannon, have resulted in complete success. They demonstrate the practicability of using iron in place of wood for the fabrication of such carriages, not only to very great advantages in point of economy, but also in quality. The ultimate saving to the country by this manufacture can hardly be estimated. Gun carriages heretofore have been not only expensive, but it has been found impossible to preserve the wood of which they were constructed from decay; so that each gun in all our forts must be remounted once every ten years to be fit for service. The substitution of iron for wood has remedied this perfectly, and the gun carriage may now be considered as indestructible. Models of wrought-iron sea-coast and garrison carriages have accordingly been adopted, and iron will be used in their fabrication hereafter.

Improvement has been introduced, also, in the forms of cannons, greatly increasing their endurance under repeated discharges, and rendering them consequently more reliable for service. In view of the not unfrequent accidents from the bursting of iron cannon, and the disastrous consequences that may result therefrom, it is important that the adopted models should be the best adapted for strength, and that none but the best material should be used in, and the best processes applied to, their fabrication. Experiments to ascertain the best model have been instituted and carried on with satisfactory results. They are still in progress, with special reference to a class of cannon of heavier caliber, for the more complete determination of the best mode of distributing the given weight of metal throughout the different parts of the cannon so as to obtain the greatest strength.

The subject of rifled cannon and projectiles has received much attention, and careful experiments have been instituted to test a variety of such contrivances. It is not deemed advisable to proceed to the manufacture of such cannon, beyond those required for experimental purposes, until full and fair trials shall have demonstrated, practically, which of the various inventions possesses

most advantages, or whether a combination of the advantages peculiar to several of them may not furnish the best government model.

BREECH-LOADING ARMS.

Under the appropriations heretofore made by Congress to encourage experiments in breech-loading arms, very important results have been arrived at. The ingenuity and invention displayed upon the subject are truly surprising, and it is risking little to say that the arm has been nearly if not entirely perfected by several of these plans. These arms commend themselves very strongly by their great range and accuracy at long distances; for the rapidity with which they can be fired, and their exemption from injury by exposure to long continued rains. With the best breech-loading arm, one skillful man would be equal to two, probably three, armed with the ordinary muzzle-loading gun. True policy requires that steps should be taken to introduce these arms gradually into our service, and to this end preparations ought to be made for their manufacture in the public arsenals.

CAMELS AS "SHIPS OF THE DESERT."

The experiments thus far made (and they are pretty full) demonstrate that camels constitute a most useful and economical means of transportation for men and supplies, throughout the great deserts and barren regions of our interior. A camel will go safely with its burden over ground so rough and precipitous that a mule will scarcely pass over it unladen without assistance. They require no forage but what they gather in the most sterile and barren parts of our continent, and for many days together live conveniently without water. An abundant supply of these animals would, beyond all doubt, enable our army to give greater and prompter protection to our frontiers, and to all our interoceanic routes, than three times their cost expended in any other way. As a measure of economy and efficiency, I cannot too strongly recommend the purchase of a full supply to the favorable consideration of Congress.

MILITARY SIGNALS.

Assistant-surgeon Albert J. Myer, of the medical corps of the army, having submitted to this department a system of military signals for the purpose of communicating intelligence or orders between distant points of land, a board was convened in March last to examine into its merits. The board reported favorably to the adoption of this plan for the uses of the army. A series of experiments with the field signals, instituted under special instructions from this department, have developed results which promise to be of value to the service. With an equipment simple, strong, weighing but sixteen pounds, and so compact as to be readily carried from place to place by a soldier mounted or on foot, which requires for its use but a single man, communication has been kept up and messages transmitted by day, and at night, a distance of fifteen miles. Messages have been sent five miles without any apparatus specially provided for the purpose.

For the distances at which communication by signals would be needed for military uses, the plan appears to be ready and reliable. The trials in progress give reason to believe that by the use of such signals there may be secured to the service a mode of communication more easy, safe and available than any hitherto known.

FORTIFICATIONS AND GAS-LIGHT THEREFOR.

I regard the statistics of the combined naval and military operations of the French in the recent Italian war as indications of the correctness of my estimate of our danger from such attacks, and as warranting the renewal of my recommendation to Congress to take steps toward carrying out the plan sketched in my last report for the defense of New York, in particular, from such attempts. The appended memoir on "American Fortification," prepared at my instance by Lieut. Morton, of the engineer corps, explains the details of the plan in question, with the aid of an accurate topographical map. It also contains an analysis of the general subject of coast defense, which I deem worthy of your notice.

It is eminently desirable that our completed permanent forts should be lit with gas, and I recommend that a small appropriation be made to introduce it into the most important ones without delay. By that improvement the risk would be diminished of accidental fires breaking out in the officers' quarters or the barracks, now to be apprehended from the vicinity of the magazines. The introduction proposed may also be recommended on the ground of economy. The post of West Point has been lighted in this manner with satisfactory results.

EXPLORATIONS—ARTESIAN WELLS.

A second expedition was sent into the Territory of Nebraska to explore certain tributaries of the Yellow Stone, the sources of that river, and of the Missouri. A portion of its labors has been accomplished, and the operations will be resumed in the ensuing spring.

A large amount of geographical and scientific information has been added, at small cost, through the labors of the different field parties, to our knowledge of the resources of the regions west of the Mississippi. Considerable tracts of country yet remain unknown, and the economy of continuing these explorations is evident when it is considered that they may open the country to travel, develop its mineral and agricultural wealth, shorten and afford new information concerning emigrant routes, and designate those portions of the wild territory that are susceptible of settlement.

I would respectfully invite your attention to the report of Lieut. Michler, who, under assignment of the War Department, was engaged upon the survey of an interoceanic ship canal near the Isthmus of Darien, *viâ* the Atrato and Truando rivers. Since his return from the scene of his field operations, considerable progress has been made in the reduction of observations and preparing the maps, until the want of means compelled him him to suspend progress and discharge the computers and draughtsmen. The valuable information procured by Lieut. Michler should not be left in its unfinished condition in the archives of the bureau, to prevent which a small appropriation will be required.

The wagon road upon the thirty-fifth parallel, reaching from Fort Smith, Arkansas, to the Colorado of the West, is completed as far as the appropriation would do it. It is now sufficient for any travel of troops, military supplies or immigrants. This route abounds in grass and water, offering very great advantages at this time for travel, which will be still further enhanced when the posts contemplated shall have been added to those already on the line.

The experiment of sinking artesian wells upon public lands has been further prosecuted, but still without attaining the desired results, and the appropriation for the object having become exhausted, it was directed that the work should be suspended. The details of the experiments are set forth in the accompanying reports. It may be considered now as demonstrated that to bring water from subterranean streams, to overflow the surfaces of the great western plains, is, for any reasonable amount of expenditure, impracticable.

REPORT OF THE SECRETARY OF THE TREASURY.

It is a very curious circumstance that, in this long and elaborate report, there is no clear statement of the total receipts and expenditures for the year, or of the amount of the public debt. There are, however, data from which the first of these important facts may be obtained, and we have taken the trouble to put them together for the convenience of our readers.

The revenue of the government for the year ending June 30, 1859, was—

Customs	$49,565,824 38
Public Lands	1,756,687 30
Miscellaneous	2,082,559 33
Total	$53,405,071 01

The expenditures for the same period were—

Civil foreign intercourse and miscellaneous	$23,635,820 91
Interior Department (Indians and pensions)	4,753,972 60
War Department	23,243,822 38
Navy Department	11,712,810 24
Total	$66,346,226 13
Year's Deficit	$12,941,155 12

There are a number of figures given in regard to the public debt, but in such a manner that we are unable to understand them with certainty; and we accordingly await the receipt of the schedule which presents a full statement of all the items and the amount, before attempting to give our readers the simple truth in regard to this important matter. The fact that the national debt—whatever its amount—was increased during the last fiscal year more than $12,000,000, in a time of profound peace, is disgraceful to the government, and induces us to respond heartily to the recommendation of the President, that some efficient means should be adopted to stop this ruinous practice of borrowing. We do not want to see the capital of the country—even now insufficient for the demands of business—absorbed in the maelstrom of an ever-growing public debt, and the industry of our people saddled with the support of a host of idle fund-holders, such as those under which the nations of Europe are staggering. The total imports for the year were $338,768,130, whilst the exports for the same period were $356,789,462.

REPORT OF THE POSTMASTER-GENERAL.

From the able report of Postmaster-general Holt, we learn that the expenses of the department for the year ending June 30, 1859, were $14,964,493 33, while the revenue amounted to $7,968,484 07; showing an excess of expenditures over receipts of $6,996,009 26. This enormous annual deficit Mr. Holt proposes to reduce in accordance with the following plans and estimates:—

Retrenchments already adopted, mostly in the subsidies to steamships	$1,539,221 00
Abolition of the franking privilege	1,800,000 00
Reduction in the exorbitant pay of railroads	1,084,558 00
Overland mails to California and Utah	1,229,756 36
Total	$5,653,535 36

The last item—the overland mails—the Postmaster-general proposes that the government should pay from the Treasury, as they have been established for purposes of state policy, and yield no revenue to speak of. The remaining deficit of $1,342,473 90, Mr. Holt thinks would be overcome in a few years by the increase of receipts, and by the adoption of still further practicable curtailments; and thus this great and important department of the government might be restored to the independent, self-sustaining position which it always occupied until within a few years. We cordially endorse the recommendation of these reforms.

THE LIME LIGHT AT THE LONDON CRYSTAL PALACE.

"The gas monopoly of the day is becoming so obnoxious that the introduction of any improvement in artificial light that can break in upon the present system will be sure to meet with public encouragement. This is very likely to be brought about by the Lime Light Company, whose brilliant light was exhibited at the Crystal Palace, a few evenings ago, before a large company of professional gentlemen. The power of this lime light is immensely in advance of the gas, which presents a very dull and miserable effect in contrast. The present Trinity House lamp, assisted by the most powerful reflectors, transmits light to about twenty miles, while the lime light, under similar circumstances, can be seen at a distance of ninety-five miles. On the evening in question one of these lights was placed in the Crystal Palace, at the end of the long transept, and emitted a light so intense as to illumine the whole length of the building, so that the smallest print could be read with the greatest ease at the extreme end. The great advantages of this light over the electric and other lights are its volume and continuity, as well as its economy, being the cheapest of any known light. It is admirably adapted for coast lights, for which we now pay £353,000 a year, one-half of which may be saved by the lime light."

[A correspondent sends us the above which he says he cut from an English paper; and asks us how the light is produced. The lime light—calcium light—Drummond light—as it has been variously named, is produced by the burning of a bit of lime in the flame of the compound blow-pipe. It has been known many years, and various efforts have been made to turn it to a practical use, but without success. One of the difficulties has been the delicacy of the manipulations required to keep up the supply of gases. The compound blow-pipe consists of two reservoirs, one of pure oxygen and one of pure hydrogen, with a small pipe leading from each so as to bring the gases together just before they issue from the jet. In volume twice as many gallons of hydrogen are required as of oxygen, though as oxygen is sixteen times heavier than hydrogen, the weight of the oxygen consumed is eight times that of the hydrogen. The result of the combustion is pure water. The compound blow-pipe was invented by Dr. Hare, of Philadelphia, and it produces the most intense artficial heat known. If the lime light will succeed anywhere, the Crystal Palace at Sydenham is just the place for it, as a large quantity of light is required, and a chemist competent to perform the necessary delicate manipulations may be profitably employed.—EDS.