ANNUAL REPORT
OF THE
COMMISSIONER OF PATENTS.

UNITED STATES PATENT OFFICE,
January, 1861.

SIR: In compliance with the fourteenth section of the act, entitled "An act in addition to the act to promote the progress of science and the useful arts," approved March 3, 1837, I have the honor to submit a report of the operations of this office during the year 1860.

No. 1.

Number of applications during the year	7,653
Number of patents granted, including designs, re-issues, and additional improvements	4,819
Number of caveats filed	1,084
Number of applications for extension of patents	74
Number of patents extended	29
Number of patents expired, 31st December, 1860	614

Of the patents granted, there were –

To citizens of the United States	4,781
To subjects of Great Britain	21
To subjects of the French Empire	12
To subjects of other foreign governments	5

No. 2.

Statement of moneys received during the year, namely,—

On applications for patents, re-issues, additional improvements, extensions, caveats, disclaimers, and appeals	$240,867 00
For copies, and for recording assignments	15,485 59
Total	$256,352 59

No. 3.

Statement of expenditures from the patent fund for the year, namely:—

For salaries	$100,685 55
For amount paid under the thirty-first section of the act of June 25	10,003 81
For contingent expenses	60,296 01
For temporary clerks	51,497 93
For withdrawals	28,960 00
For refunding money paid into the Treasury by mistake	302 50
For judges in appeal cases	1,075 00
Total	$252,820 80

No. 4.

Statement of the condition of the patent fund:—

Amount to the credit of the patent fund, 1st January, 1860	$85,905 62
Amount paid in during the year	256,352 59
Total	$342,258 21
Deduct expenses during the year	252,820 80
Which leaves in the Treasury, 1st of January, 1861, the sum of	$89,437 41

No. 5.

Table exhibiting the business of the Office for twenty-four years, ending December 31, 1860.

Years.	Applic'ns filed.	Caveats filed.	Patents issued.	Cash received.	Cash expended.
1837	.....	.....	435	$29,250 08	$33,506 98
1838	.....	.....	520	42,123 54	37,402 10
1839	.....	.....	425	37,260 00	34,543 51
1840	765	228	473	38,056 51	39,020 67
1841	847	312	495	40,413 01	52,666 87
1842	761	291	517	36,505 68	31,241 48
1843	819	315	531	35,315 81	30,776 96
1844	1,045	380	502	42,509 26	36,344 73
1845	1,246	452	502	51,076 14	39,395 65
1846	1,272	448	619	50,264 16	46,158 71
1847	1,531	533	572	63,111 19	41,875 35
1848	1,628	607	660	67,576 69	58,905 84
1849	1,955	595	1,070	80,752 78	77,716 44
1850	2,193	602	995	86,927 05	80,100 95
1851	2,258	760	869	95,738 61	86,916 93
1852	2,639	996	1,020	112,056 34	95,916 91
1853	2,673	901	958	121,527 45	132,869 83
1854	3,324	868	1,902	163,789 84	167,146 32
1855	4,435	906	2,024	216,459 35	179,540 33
1856	4,960	1,024	2,502	192,588 02	199,931 02
1857	4,771	1,010	2,910	196,132 01	211,582 09
1858	5,364	943	3,710	203,716 16	193,193 74
1859	6,225	1,097	4,538	245,942 15	210,278 41
1860	7,653	1,084	4,819	256,352 59	252,820 80

It will be seen by the foregoing statement of the operations of this office during the year 1860, that under the protection of the laws provided by Congress, deficient as they are in many respects, the invcntive genius of our countrymen has been active beyond precedent, and that the business of the office has increased in a corresponding ratio.

Although the patent laws of this country, as revised by the act of July 4, 1836, and still further modified by the acts of March 3, 1837; March 3, 1839; August 29, 1842; May 27, 1848 and August 30, 1852, are believed to embrace the most perfect system of patent jurisprudence known to the world, yet they are far from approaching that standard which experience has shown is necessary to place them beyond reproach. Many of the defects inherent in the law have been so clearly and forcibly set forth by the various able and distinguished gentlemen who have been at the head of the Office, that I find nothing to add, in the way of argument, to show the necessity of their correction to the effective administration of the affairs of the Office. Were it otherwise, I should find myself relieved of this duty, since it is understood that a bill has already passed one branch of Congress; which, if it shall succeed in the other, will have a remedial effect that will go far to prevent the grant of worthless patents, to the detriment of the country, and to secure the allowance of valid claims as a reward to the meritorious inventor. I can but hope that the bill will pass at an early day. It has in its main features received the sanction of gentlemen whose legal training and experience lend to their judgment that respect and dignity which are generally the concomitants of, and grace profound attainments. It meets my own cordial approbation.

There are, however, other imperfections in the existing laws which I believe the pending bill does not propose to cure, and which, as far as my information extends, have not been heretofore the subject of communication to the Legislature.

By the seventh and eighth section of the act of July 4, 1836, an appeal lay from the decision of the Commissioner of Patents refusing a patent, and in interference cases, to a Board of Examiners, composed of three disinterested persons, who were appointed for that purpose by the Secretary of State; and they, or a majority of them, were empowered, on examination and in consideration of the matter, "to reverse the decision of the Commissioner, either in whole or in part; and their opinion being certified by the Commissioner," he was to "be governed thereby in the further proceedings to be had on such application."

But this Board, temporary in its nature, its members being appointed for each occasion, and their services inadequately remunerated, experience proved to be an entire failure; and hence, by the eleventh section of the Act of 1839, it was abolished, and the appellate jurisdiction transferred "to the Chief Justice of the District Court of the United States of the District of Columbia." This was a step in advance. It was a decided inprovement upon the original tribunal and gave rise to no complaint, until the year 1850, when Chief Justice Cranch announced to this Office that he was unable, by reason of the infirmities of age, to discharge the duties imposed upon him by the Acts of Congress. From this period up to the 30th of August, 1852, a defeated party had no remedy from an adverse decision of the Commissioner; and the Act of Congress of the latter date, which was designed as a remedy for this state of things, was only partial in its effect, for the right to appeal to the Chief Justice still remained; its remedial agency consisting only in the provision that appeals might "*also* be made to either of the Assistant Judges of the Circuit Court of the District of Columbia." The evils resulting from this condition of affairs were grievous, as might have been expected. In *ex parte* proceedings, a disappointed applicant who might be disposed to obstruct the ends of justice, could, although conscious of the substantial correctness of the official decision, by appealing to the infirm Chief Judge, secure to himself the right to manufacture and sell the thing invented during that official's lifetime, if during his lifetime he should be unable, as he was, to discharge the duties imposed on him. Many appeals had been taken to Judge Cranch, before the passage of the remedial act of 1852, by parties aware of his inability to act. Some of the applicants refused to transfer their causes to one of the Associate Judges. In such cases, where there was no opposing party, the evils resulting were such as have just been portrayed; but when the contest was between two *bona fide* and independent inventions, they were still worse. The appellants were not only permitted to make and vend the article invented with impunity so long as the Chief Justice should live, and thus secure a monopoly for more than fourteen years if they should finally secure their patents, but they were enabled to prevent the issuing of patents to the other and successful parties, who were willing and anxious to put the public in immediate possession of the fruits of their genius, which is one of the considerations for the grant of a patent.

Commissioner Hodges was prompt in his energies to meet and crush these great wrongs. He accordingly issued his orders that in all cases where appeals had been taken to the Chief Justice in cases of interference, the appellants should amend by transferring them to one of the Assistant Judges; and that all appeals in like cases that should thereafter be brought should be taken to the same officers.

Commissioner Mason was anxious to support his predecessor; but he doubted the competency of the Commissioner of Patents to limit the right of appeal, however strong the necessity. In a case then before him, he said he had every disposition to do this if he had the power. The matter was therefore laid before Attorney-General Cushing for his advice, who, in pronouncing his opinion, said: "I perceive the inconvenience involved in the fact, that the party against whom the Commissioner has decided, in a case of interference, may, by an appeal to the Chief Justice, which he, by infirmity, is unable to hear and determine, purposely delay and obstruct the final decision of the case in favor of the rightful claimant to the patent, and thus injustice be done. But Congress, and Congress alone, has, in my opinion, power to remedy the evil."

I have been thus minute in tracing the working of the several statutes giving the right to an appeal, for the purpose of stating with the more emphasis that the Act of 1852, devolving upon the Chief Justice and either of the Associate Judges of the Circuit Court of the District jurisdiction in appeal cases from the adverse decisions of this Office, is still in force; that since the demise of Judge Cranch, in 1855, we have had a recurrence of the inconvenience resulting from the Act, in the inability of one of the Associate Judges to attend to the duties of his office for about a year; and that a similar contingency may arise at any day, when, of course, such appeals as may have been taken to the disabled judge must await the issue of events, to the injury alike of the public and of individuals.

Another serious objection to the Act of 1852, and in which particular it should, in my opinion, be amended, flows from the rate and manner of compensating the judges for their services. By the thirteenth section of the Act of the 3d March, 1830, the Chief Justice was paid annually out of the Patent Fund, in consideration of the duties therein imposed, the sum of $100. But this section was repealed by the Act of 1852, and the Commissioner of Patents was required to pay to the Chief Justice or Assistant Judges, according as the appeal might be taken to either, the sum of twenty-five dollars, required to be paid by the appellant into the Patent Office by the eleventh section of the Act of the 3d March, 1839.

The reason of this enactment it is now difficult to discover; but the evils resulting from it must, I think, be apparent to every reflecting mind, and are very forcibly stated by the Hon. Secretary of the Interior, in his annual report to the President of the United States for 1857:

"The appellant not only selects the judge who shall try the case, but also pays the fee of twenty-five dollars allowed him. The amount of compensation thus received will depend upon the number of cases brought before him; that number will inevitably be influenced by his course of decision. The judge is thus placed in a position of embarrassment, if not of humiliation, alike to be deplored by himself and the country."

There is still another point in which the Act allowing appeals imperiously calls for amendment. The eleventh section of the Act of March 3, 1839, requires the Commissioner to "lay before the said judge all the original papers and evidence in the case, together with the grounds of his decision fully set forth in writing, touching all the points involved by the reasons of appeal to which the revision shall be confined." This "evidence" most commonly consists of the *records* of the Office, the drawings, specifications, and models of patented and rejected applications, which are needed always in the Office for the transaction of its current business, and yet this law requires that with every appeal, the Commissioner shall transmit to the selected judge that portion of the records appertaining thereto, which, as proceedings are at chambers, means to the residence of the judge. In the meantime, these records are withdrawn from public inspection, and instances have occurred in which applications for patents have been suspended for months, in consequence of the danger of acting upon them in the absence of a portion of the records relating thereto.

Such are the evils incident to the laws of appeal, as they now exist. There is no difficulty in the way of their amendment, and, in my opinion, no time should be lost in applying the proper remedies. Why could not appeals from the adverse decision of the Commis-

© 1861 SCIENTIFIC AMERICAN, INC.

sioner of Patents be taken to the Circuit Court of the District of Columbia, instead of to the individual judges? Why should not each judge for the duties thus imposed be allowed an annual compensation of, say $500, and when a patent cause should be heard, why not require the Circuit Court to sit in the Patent Office, ina room to be provided for that purpose? I confess I can see no objection to an amendment of this nature and respectfully recommend that such a law be enacted. It would obviate all the defects above explained, and, it is confidently believed, would meet with the approbation of the judges.

Previous to the month of December, 1857, it was the practice of the Commissioner to hear appeals in person from the adverse action of the examiners; but it was soon found, from the natural increase of the business of the Office, that this was becoming a physical impossibility; and hence was adopted the alternative of deputing temporary Boards of Examiners, which, in some measure, relieved the Commissioner of the burden thrown upon him. But the plan soon developed its own imperfections. Each Board had its own principle of action, and, in many instances, this differed from the rules prescribed by the Commissioner. As a corrective, it was at length determined by Commissioner Holt to establish a permanent Board of Appeal within the Office, whose members, three in number, should be taken from the Examining Corps, and whose duty it should be, to examine all *ex parte* rejected cases, and submit their report and recommendation, as to their final disposal, to the Commissioner for his approval. This Board has now been in existence for over three years, and the wisdom of its creation is a matter placed beyond all doubt. Guided in its principles of action by the doctrines established by the Courts, and illustrated by such eminent Commissioners as Mason, Holt, Bishop, and Thomas, whose confidence it has always enjoyed, "the result of its action," as stated by Mr. Holt in his report for 1858, continues to be "eminently satisfactory," and "to command, it is believed, the entire confidence of the country."

Since its establishment, the Board of Appeals has revised 1,790 cases, 748 of which it has reported for final rejection, while 271 have received its partial action. Of those rejected, only 42 have been carried up on appeal to the Judges of the Circuit Court of the District. It is confidently believed that no other tribunal of a like nature can exhibit such evidence of public approbation.

Prior to the 1st July, 1860, interferences were declared, examined, and the result reported to the Commissioner, by the separate Examiners to whose class they belonged. While the business of the Office was comparatively light, and the number of Examiners few, there was not much objection to this course; but as the number of applications and examiners increased —the former, however, in a greatly augmented ratio to the latter—it was found to be impossible for the Examiners to attend to their current duties in an intelligent manner when they were subject continually to be called off, to devote, in many instances, a week at a time, to the hearing and determination of questions arising between contesting applicants. But this, perhaps, was not the greatest evil. The Examiners had increased in the course of a few years from two in number to twelve; and as each Examiner disposed of his own interferences, there were as many different sets of rules and principles established as there were differently constituted minds. The want of harmony, the confusion, in short, resulting from such a state of things, was a source of great complaint, and involved the Office practice in a mist so impenetrable that the most acute became discouraged in their search for a clear and well-defined guide to the path they sought. A remedy seemed to be imperative; and as the only resource within his power, Commissioner Thomas deputed one of the most practiced and competent Examiners to discharge this duty, whose action, characterized by great industry and ability, it is believed, has given eminent satisfaction.

I would suggest that Congress make the designation permanent with reference to this particular service, giving the sanction of positive enactment to a rule eminently successful, if not imperatively required, in the future conduct of the business of the Office.

S. T. SHUGERT,
Acting Commissioner of Patents.

HON. JOHN C. BRECKINRIDGE,
Vice President of the United States.

ANILINE DYES.

Those beautiful aniline colors on silk and velvet, varying in tone from a crimson to a delicate lilac, and which have been known by the flash names of solferino, magenta, mauve, roseine, violine, purpurine, &c., are the products of an alcohol solution of an organic alkali combined with mineral oxyds. This alkali is aniline, a peculiar substance principally derived from coal tar, but it can also be manufactured from indigo. The production of these colors involves some of the most subtle and intricate processes known in chemistry; a more simple and connected explanation of some of them than has yet been given to the public will therefore be of very general interest.

Organicsubstances are exceedingly puzzling to chemists, on account of the great variety of products obtained from one general substance, such as bituminous coal. When this is distilled in a retort, one of its products is tar, from which, by distillation and rectification, the following are derived, the first three columns being liquids :—

NEUTRAL.	ACIDS.	BASES.
Water.	Rosolic.	Ammonia.
Benzole.	Brunolic.	Methylarnine.
Toluol.	Phenic.	Ethalymine.
Cumole.	Acetic.	Aniline.
Cymole.	Butyric.	Quinoline.
Propyle.		Picoline.
Butyle.		Toluidine.
Amyle.		Cumidine.
Caproyle.		Phyrrhol.
Hexyline.		Pætinine.
Heptyline.		
Oil of tar		

GASEOUS PRODUCTS.	SOLID PRODUCTS.
Hydrogen.	Carbon.
Carbureted Hydrogen.	Naphthaline.
Bicarbureted Hydrogen.	Paranaphthaline, or Anthraceine.
Various Hydro-carbides.	Paraffine.
Carbonic Oxyd.	Chrysene.
Sulphide of Carbon.	Pyrene.
Carbonic Acid.	
Hydro-sulphuric Acid.	
Hydro-cyanic Acid.	

Here are no less than forty-two different products obtained from coal. Some of these have truly jaw-breaking names, and some of them emit the most horrible stench; while others, such as benzole, afford a very pleasant odor. Different coals yield varying quantities of these products in their tar: some contain little benzole and considerable naphthaline, while others contain a preponderating quantity of benzole and phenic acid.

Aniline can be obtained by treating the tar of coal with acids and alkalies, and then distilling it with milk of lime; but the most simple method to obtain it is to operate with benzole, because it is now a common article of commerce. Benzole is a peculiar hydrocarbon fluid, which is employed in some instances for illumination, and for cleansing soiled silk and light colored kid gloves. It dissolves gutta-percha, has an agreeable odor, and, when inhaled, produces intoxication. To make aniline from benzole, the latter is treated with aquafortis, as follows :—

A certain quantity of nitric acid is placed in a capacious glass vessel surrounded by cold water, and about an equal quantity of cold water is added to it, until two layers of the liquid begin to appear. The glass vessel is then removed from the cold water, and slightly heated, until the two layers of liquid have united; the whole is now thrown into six times its bulk of cold water, when a heavy yellow oil sinks to the bottom. This is nitro-benzole, which is afterward repeatedly washed with water for use. It possesses an agreeable odor, and may be used as a perfume. By saturating a solution of nitro-benzole and alcohol with ammonia, then passing a current of sulphureted hydrogen gas through it, a deposit of sulphur falls to the bottom, and aniline is the other product. Another method of obtaining it is by treating nitro-benzole with nascent hydrogen. Being an alkali, aniline combines with acids, forming salts, and also with various oxyds, forming quite a variety of compounds.

A great number of patents have been taken out in England and France for dyeing aniline colors. The first on the list is that of Mr. W. H. Perkins, of London, which was obtained in August, 1856, and was for the celebrated *mauve*—a deep violet. He took a cold solution of the sulphate of aniline (aniline combined with sulphuric acid), and a similar solution of the bichromate of potash, and mixed them thoroughly together; then allowed it to rest for twelve hours. A black deposit fell to the bottom of the vessel; this was washed with water, then dried, and afterward digested with benzole, which dissolved out all the tarry matter contained in it. It is thus described in Perkin's patent, which shows that he used very impure aniline, because if he had commenced to obtain it with pure benzole, it would not have been combined with tarry matter. The chromate of aniline thus made is a rich claret color, but is insoluble in water. To renderit fit for dyeing silks, &c., it is dissolved in alcohol or wood spirit; and in this condition, it is now sold to dyers.

The French method of treating aniline to obtain a red color (solferino), is the invention of M. Verguin, a chemist of Lyons, who sold his discovery to M. Renard Freres, who took out a patent in 1859, and gave the color the name of "Fuchsiacine." It is made by mixing ten parts (by weight) of aniline with six of anhydrous chloride of tin, then boiling them for fifteen minutes. The mixture first becomes yellow—then assumes a beautiful red. Considerable water is now added to the solution; then it is boiled for a little while longer, and filtered while hot. The filtered liquor contains the coloring matter in solution. When common salt is added to this solution, the color is deposited; and it may then be separated by decantation, dried, and sold in powder. In this condition it is insoluble in water, and requires to be dissolved in alcohol for common use in silk dyeing. It is sold in both conditions, but most commonly as an acoholic liquor.

A red color can be obtained with aniline and several anhydrous chlorides—such as bichloride of mercury, perchloride of copper and perchloride of iron; also, the hydrate of bichloride of tin, bibromide of tin, iodide of tin, and a host of other "ides" and "ates." By the employment of acid and alkalies as alteratives to produce reactions in the dyeing liquors, almost any shade or color can be produced with aniline solutions, from a crimson to a deep lavender approaching a blue. We have examined ten English patents granted for making aniline colors, and find that most of them have a very close relationship to the first that were issued to Perkins and Renard Freres.

The colors derived from aniline are exceedingly brilliant in hue, and they withstand washing very well; but after having been thoroughly tested, they have failed in one particular feature demanded of all colors exposed to light, viz., they fade when exposed to the beams of the sun. This is one essential point to which the attention of color chemists should be directed in order to discover some oxyds which, when combined with aniline, will not be changed by solar light.

The colors hitherto manufactured from aniline have been chiefly of one class—crimson and purple. But why may not other colors—such as green, blue, brown, &c.—be also obtained from aniline? And cannot the analogues of aniline in the above table be also employed in the manufacture of new coloring compounds? A beginning has just been made by the distinguished English chemist, F. C. Calvert, in this line. He has recently, conjointly with two associates, taken out a patent for an aniline green color, called "emeraldine," which is said to be exceedingly beautiful. We have no doubt but brilliant coloring matters may be obtained from the bases cumidine, toluidine, &c., &c., as well as aniline.

We have given a simple and brief description of the peculiar products of bituminous coal, and how aniline and its beautiful colors are manufactured. These substances are very high in price at present, which affords us good grounds for concluding that there is plenty of room for improvement in the processes now employed to obtain them. The coal fields of America embrace an area of 180,000 square miles; they contain inexhaustible stores of these coloring materials, and there is nothing in the whole range of chemical science opposed to the reasonableness of the conclusion that every color known in the arts may yet be manufactured from the products of coal—yes, and from the very refuse of our gas and coal oil manufactories.

CONDITION OF THE PATENT BILL.—At the time of our going to press, the Senate and House had voted to disagree to sundry amendments made by each, to the Patent bill, and a conference had been agreed upon between the two branches, so that it is probable some compromise may be agreed upon, and thus the bill may be saved. It will afford us much pleasure, if, in our next issue, we can congratulate our readers upon amendments of the patent laws, such as we have been contending for for years past.

© 1861 SCIENTIFIC AMERICAN, INC.