

Scientific American.

ESTABLISHED 1845

MUNN & CO., - - - EDITORS AND PROPRIETORS.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, - - NEW YORK.

TERMS TO SUBSCRIBERS

One copy, one year, for the United States, Canada, or Mexico, \$3.00
 One copy, one year, to any foreign country, postage prepaid, \$6.00.

THE SCIENTIFIC AMERICAN PUBLICATIONS.

Scientific American (Established 1845).....\$3.00 a year.
 Scientific American Supplement (Established 1876).....5.00
 Scientific American Building Edition (Established 1885).....2.50
 Scientific American Export Edition (Established 1876).....3.00

The combined subscription rates and rates to foreign countries will be furnished upon application.
 Remit by postal or express money order, or by bank draft or check.

MUNN & CO., 361 Broadway, corner Franklin Street, New York.

NEW YORK, SATURDAY, FEBRUARY 17, 1900.

THE AMERICAN PACIFIC CABLE.

It is fitting that the close of the century should find the great project, too long delayed, for a trans-Pacific cable at last fairly launched. Ever since the laying of the Atlantic cables showed the enormous usefulness of this means of communication, the military and commercial value of a cable across the Pacific Ocean has been admitted. The urgent need for its construction was brought home with the strongest emphasis to this country by the stirring and epoch-making events of the Spanish-American war.

In the current issue of the SUPPLEMENT we publish a comprehensive paper by George Owen Squier, which reviews the present status of the trans-Pacific cable question, and shows the route determined upon for the British cable and the alternative routes which are now being surveyed for the proposed cable of the United States. The scheme for a British Pacific cable connecting Canada with Australia has, from the very first, been judged from a national standpoint, both in respect of its strategic and commercial aspects. A Pacific cable, touching only soil belonging to Great Britain, is now assured, both of the colonies named having pledged themselves to assist in the undertaking.

The British cable will be laid from Vancouver to Fanning Island, which lies about a thousand miles due south of Honolulu, the distance from Vancouver being 3,205 miles. From Fanning Island it will run by way of the Fiji Islands to Norfolk Island, from which point there will be two branches, one to Auckland, New Zealand, and the other to Sydney, New South Wales. This cable will complete the telegraphic circuit of the globe and will consequently place every telegraphic station upon it in the advantageous position of being able to communicate with every other station by two distinct routes east or west. The determination to have the stations entirely on British soil has involved the disadvantage that the only available route fulfilling this condition involves a single span of cable between Vancouver and Fanning Island, which will be over 3,500 miles in length. Since the speed of sending cable messages decreases with the square of the length of the cable, and the speed of the whole system is limited necessarily by the speed of the slowest section of it, the British line with its unusually long span is at a decided disadvantage with respect to any other that is not so inconvenienced.

In the proposed American cable route which is now being surveyed, there will be no span over 2,500 miles in length, and, consequently, from a commercial standpoint at any rate, it will be at a great advantage compared with its British competitor. As regards the Alaskan route running by way of Sitka, Kodiak Island, Attu, Japan, Siberia and Formosa to Luzon, which would aggregate in length 5,550 miles, it is enough to say that it would not realize the ideal of telegraphic communication, free from foreign control, between the United States and its Pacific possessions, inasmuch as it would necessitate about fifteen separate stations, of which nearly one-half would be under Japanese control.

From a technical and engineering standpoint there is nothing to prevent the construction of the proposed American Pacific cable. A preliminary survey between the Pacific coast and the Hawaiian Islands was completed by the Navy Department in 1892 which proved that this part of the route was entirely practicable; and thanks to the activity of the Bureau of Equipment of the United States navy, presided over by Rear-Admiral Royal B. Bradford, the United States ship "Nero" has been engaged since April last in a survey of the bed of the Pacific from the Hawaiian Islands westward by way of the island of Guam to the island of Luzon, and northward from Guam to Yokohama. The preliminary report of this survey, recently published, indicates that the route which is being surveyed will prove entirely practicable, and we have just been informed by Admiral Bradford that data received since the publication of the report confirm the practicability of the routes laid down on the chart. The whole line, including the first section, would run from San Francisco to Honolulu, 2,078 miles, from Honolulu to Midway Island,

1,140 miles, Midway Island to Guam, 2,293 miles, Guam to Manila, 1,360 miles. The distance as given above must be increased by 10 per cent to allow for slack in estimating the length of the cables. It is considered by Mr. Squier that the American cable should be so connected with the British cable as to furnish each system with all the advantages of a duplicate line. This could be done by connecting the American cable at Honolulu with the British cable at Fanning Island. With this single span, which would be about 950 nautical miles in length, each country would practically safeguard its own line against a total interruption of business, the messages in case of a break on either side of this connecting line being sent by the unbroken line as far as Honolulu or Fanning Island, and sent thence by the lines of the other company. It is also suggested that a short span of cable of about 200 miles between Luzon and Formosa, connecting with the Great Northern Telegraphic Company's route through Siberia, and another cable between Luzon and a Chinese port, would serve to bring Japan and China into direct communication with North America, and by two competitive routes, east and west, with Europe.

A study of the question from a commercial standpoint, based upon the actual business done with our Pacific possessions by way of the present route, gives every reason to believe that the project would prove to be a paying investment from the very first. Its opening will lead to the immediate lowering of the rates to the East, and the construction of the cable would have the by no means unimportant indirect result of promoting the cable-making industry in this country. Of the strategic value of a cable "wholly under the control of the United States"—to quote the words of the President in his annual message—it is impossible to speak too highly. Its construction is the next logical step to the acquisition of the Hawaiian and Philippine Islands and the consolidation of our naval and commercial interests in the East.

AN EXTRAORDINARY PATENT DECISION.

In last week's issue of the SCIENTIFIC AMERICAN SUPPLEMENT, we published an interesting analysis by Mr. Arthur F. Kinnan of a decision rendered by the United States Court of Appeals for the District of Columbia in the case of *Bechman vs. Wood*—a decision of unusual importance to inventors because it is so completely opposed to the time-honored practice of the Patent Office, and because, if allowed to stand, the Commissioner of Patents must make it the basis of future rulings which will often defeat the rights of inventors.

The case which called forth the decision in question was not essentially different from many similar contests which the Commissioner is called upon to decide. Wood filed application for a patent and defined his invention in a limited claim. Two years later Bechman applied for a patent on a specifically different device performing the same function, and claimed his invention in terms so broad that Wood's construction was included. A year later Wood filed a claim similar to that of his rival. In the interference proceedings instituted by the Patent Office in such cases, it was decided, in accordance with the usual practice, that Wood being the first inventor was entitled to the broad claim. Bechman appealed; and the Court of Appeals rendered the strange decision that neither inventor should have the broad claim, because Wood, although the first to conceive, had not properly claimed his device until Bechman had applied for a patent, and that Bechman was not justified in receiving the claim because he was not the first inventor.

In thus ruling the court has acted in direct opposition to one of the fundamental laws which underlie our patent system, a law in which it is expressly stated that a patent for a new invention shall be granted to the first inventor (Sec. 4904). The decision, as a result, conflicts with the long-established Patent Office practice, since the Commissioner has always acted in accordance with the law. It interferes moreover with the statutory duty of the Commissioner, since it is his business to decide in the first instance who is the true inventor, and to grant to that inventor a patent for all that has been invented.

It is a principle well recognized in patent law, and moreover a principle with which the Court was evidently familiar, that the first inventor of a species is necessarily the inventor of the genus in which the species is included. The inventor often knows not whether he has invented a genus or no. Since it is the Commissioner's duty to act for the inventor as well as for the community, he co-operates with the inventor in determining the novelty of the invention and grants Letters Patent in which the new features are properly described and claimed in accordance with the statute. The inventor in order to secure the genus to which he is justly entitled has the privilege of amending his application to broaden his claim; and higher courts have recognized that, even in the face of a patent issued while his application is on file, he has the right to enlarge his patent, provided he does not change his invention (*Singer vs. Braunsdorf*; *Western Elec. Co. vs. Sperry Elec. Co.*) In the case upon which the

Court largely based its decision, the specification had been so modified and the original conception so far lost that a new invention had been created. The error of the Court, as Mr. Kinnan has pointed out, is due partly to a misinterpretation of the word "enlarge;" for it construed the term popularly instead of giving it the specific meaning which it has acquired in patent law.

The decision will place one of two contestants in similar cases in the very peculiar position of being unable to concede to his rival the whole right to an invention. Not infrequently it happens that an interference is asked by an inventor solely for the purpose of enabling him to ascertain who is the prior inventor; and it appearing to his satisfaction that his opponent has actually antedated him, it is not unusual for him, as the defeated one, frankly to acknowledge the other's right by conceding the interfering claim, and thus facilitating the grant of the patent, instead of appealing. Will not the present decision frustrate this honest practice among inventors in many cases?

Priority of invention was awarded to Wood because his filed application, which in law is a "constructive" reduction to practice, antedated the invention of Bechman. The decision will inevitably, in many future interferences, penalize an early filing of an application, if such application be an inadequate though earnest effort by the inventor to comply with the most technical of all the requirements governing patent claims. But in many interferences, an actual reduction to practice by the making of a machine is relied upon for priority. And here the Court was led into the error of giving to Wood's application a significance other than that of a mere equivalent to an actual reduction to practice. Had Wood preceded Bechman's filing date by an actual instead of a constructive reduction to practice, the filing of Wood's application might properly have been subsequent to Bechman's filing of the broad claim without in any way affecting the question of priority; and so long as the invention had not been in public use two years, delay in filing the application would have been within his rights.

Assuming an actual reduction to practice, it follows that the application of Wood and his broad claim might, according to the decision, have been profitably delayed until after Bechman had filed his. Indeed, with an actual instead of a constructive reduction to practice he would have prevailed over Bechman even had he filed his application after a patent had been issued to Bechman, and might even have copied Bechman's claim to emphasize the issue. It must, therefore, be evident that, to have made the broadening of Wood's claim or his delay in presenting a broad claim the basis of the decision is without justification in law, in reason, or even in policy.

OUR BOOKS IN 1899.

The Publishers' Weekly each year tabulates the number of new editions which have appeared during the year. The year 1899 left the impression of being an abnormally busy one to the publishers, and a reference to the figures shows that this is the case. Of new books, 4,749 were issued during the year, and there were 572 new editions, making a total of 5,321; 3,626 books, including new editions, were by American authors and were manufactured in the United States; 571 of the books were by English and other foreign authors, including new editions, and these were manufactured in the United States; and 1,124 books were by English authors and were imported, bound or in sheets, into the United States, making the total already given of 5,321. Fiction naturally leads the list with 749 new books and 183 new editions; then comes law with 454 books and 35 new editions; then juvenile, 434 new books; education with 397 new books; theology and religion, 393; literary history and miscellaneous, 304; poetry, 302; biography, 288; history, 246; political and social science, 226; fine arts and illustrated books, 194; description and travel, 190; physical and mathematical science, 176; medical science and hygiene, 120; useful arts, 99; mental and moral philosophy, 63; domestic and rural, 55; sports and amusements, 43; humor and satire, 26.

WOMEN IN SCIENCE.

At a recent meeting of a society of ladies in Brooklyn, Mrs. A. E. De Friese took up the subject of women's contributions to science and gave as examples Miss Fleming, who recently found a new star; Miss Dorothy Klumpke, the first woman to obtain from the Paris University a doctor's degree in mathematics and astronomy. Miss Charlotte Scott, of Bryn Mawr, Miss Whitney, of Vassar, and Miss Byrd are all three astronomers of good standing. Mrs. Brown-Davis is one of the chief computers upon *The Nautical Almanac*, and Florence Bascom was recently employed by the government to make a geological survey of Chester County, Pa. Various women inventors were also cited, and Mrs. De Friese concluded by saying that this activity of women is rich in results. The fortunate inventors sometimes secure large royalties, and the inventions being of so practical a nature, the labor of thousands of women is lessened by their introduction.