

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 or Mexico.....\$3.00
 One copy, one year, for Canada.....3.75
 One copy, one year, to any foreign country, postage prepaid, \$4.00

THE SCIENTIFIC AMERICAN PUBLICATIONS

Scientific American (Established 1845).....\$3.00 a year
 Scientific American Supplement (Established 1876).....5.00
 American Homes and Gardens.....3.00
 Scientific American Export Edition (Established 1878).....3.00
 The combined subscription rates and rates to foreign countries, including Canada, will be furnished upon application.
 Remit by postal or express money order, or by bank draft or check.
 MUNN & CO., 361 Broadway, New York.

NEW YORK, SATURDAY, APRIL 27, 1907.

The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are sharp, the articles short, and the facts authentic, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

THE PEACE CONGRESS.

It is unfortunate that the aims of the Peace Congress which recently closed in this city should not have been more intelligently appreciated and clearly emphasized by the New York press. It is always more difficult to kill a false impression than to create a true one; and unfortunately the later movements directed to the promotion of international peace have been hampered by the misapprehension that peace was being sought by the altogether impractical road of immediate disarmament.

As a matter of fact, the aims of the recent Congress were purely educational—the inculcation and development of an idea. No one realized better than the sponsors of the congress that all those mighty changes in sentiment and practice which because of their magnitude are known as the revolutions of history, are of slow growth, and require, from the time of the sowing of the first seed to the final harvesting of results, a period which is frequently measured by centuries.

War, with everything that the term involves, political, diplomatic, material, and sentimental, is one of the most stupendous facts of national and international life. The forms and instrumentalities of war, both material and human, and all its vast organizations and varied interests, are so interwoven with the national life, that the abolition of war by the immediate disbanding of fleets and armies would be altogether impracticable.

The reign of international peace can be brought about only through a campaign of education similar to that inaugurated by the Peace Congress, which has just closed its labors. Regret it as we may, it is a fact that the average citizen does not realize that war is savagery; that when the citizens of two modern nations set out deliberately to butcher each other, they are simply reverting to that age in the development of the race, when man was emerging from the brute into the human. The world must be made to understand that war is the greatest anachronism of the day. When these facts have been clearly settled in people's minds, and their significance appreciated, a great step will have been taken toward the final abolition of war.

Of the many suggestions advanced at the congress, the most practical, the one which if adopted would produce the most immediate results, was that set forth by Secretary of State Root, in the course of his very able address. After stating that the great obstacle to the universal adoption of arbitration is not the unwillingness of civilized nations to submit to the decision of an impartial tribunal, but rather an apprehension that the tribunal selected might not be impartial, Mr. Root went on to state that what is needed is "the substitution of judicial action for diplomatic action, the substitution of judicial sense of responsibility for diplomatic sense of responsibility. We need for arbitration," said the Secretary of State, "judges who will be interested only in the question appearing on the record before them. Plainly this end is to be attained by the establishment of a court of permanent judges, who will have no other occupation and no other interests but the exercise of the judicial faculty under the sanction of that high sense of responsibility."

Of the success of the Peace Congress there can be no two opinions. Seldom, if ever, has a more representative and distinguished body of men gathered for deliberations of such international importance. In addition to the fact that men pre-eminent in every important sphere of human activity were present from all corners of the earth, the congress received the highest national and local recognition; as witness the fact that the President sent a personal letter and was

represented by the Secretary of State and that the mayor of the city and governor of the State in which the congress gathered were also among its principal speakers.

SCOPE AND PURPOSE OF THE JAMESTOWN EXPOSITION.

The traveler who may be ascending the sluggish waters of the James River, in search of the wealth of historic associations with which its banks abound, after he has covered some thirty miles of his journey, and unless some timely informant be at hand, will be apt to overlook a stretch of shore which, scarcely lifting its uninteresting level above the waters of the river, has little to break its monotony beyond an irregular clump of trees, scarce hidden within which he will, on closer inspection, should his curiosity be so far aroused, discern the dark red and green walls of an old ivy-covered tower. Desolate, remote, and largely sedge-covered, this little island affords the passing traveler virtually no suggestion that it holds all that is left of the crumbling walls and scattered graves of the town and people of Jamestown—the first colonial settlement in America. It needs a creative imagination to realize that here was witnessed the "beginnings of a nation," which to-day, after the lapse of three brief centuries, numbers eighty millions of people, and believes, not without cause, that it is destined to become, at least in material resources and material power, the leading people of the earth.

The sponsors of the Jamestown Exposition are to be congratulated on the judgment and good taste with which they have determined the scope and characteristics of the enterprise. With the memories of the colossal Louisiana Purchase Exposition at St. Louis fresh in the minds of the people, it would have been folly to attempt to rival that over-big affair in the size of its buildings and the number of its exhibits. Magnificent though it was, the St. Louis Fair was big to the point of burdensomeness and boredom. It was a *reductio ad absurdum* of the cult of the superlative; and it taught the valuable lesson that future expositions should aim to be intensive rather than interminable, distinctive rather than discursive.

The Jamestown Exposition will be both intensive and distinctive. It aims at historical and educational results; the one being secured largely by the character of the buildings, the other by a careful selection of the exhibits which they will house. In searching for a fitting means to embody those spectacular effects which have come to be regarded as an essential, and by many people, alas! as the most desirable, feature of a great exposition, the management have availed themselves of the fine opportunity presented by the waters of Hampton Roads, and have arranged for an international display of the naval forces of the world, which, if it does not rival in extent, will possibly exceed in interest, any previous pageant of the kind.

The Jamestown Exposition is essentially a display of the peaceful arts; hence, it is peculiarly fitting that its most imposing feature should consist of a gathering of battleships and cruisers—those stately patrolmen of the high seas, whose day-by-day duty it is to preserve the peace of the world and render the ocean highways secure; whose activities are mainly concerned in the promotion of international peace; and whose pacific purpose is never so clearly manifested as in an international review of the kind now being organized at the mouth of the James River.

RAISING THE ASSOUAN DAM.

The Egyptian government, as a result of prolonged deliberations, has now finally decided to raise the height of the water of the River Nile impounded behind the Assouan barrage to 22 feet above its present maximum level. This project was first mooted shortly after the works were completed and opened, and the plans and calculations were prepared by the Irrigation Department as far back as 1904, and submitted to Sir Benjamin Baker, the consulting engineer, for his consideration and approval in the fall of that year. About this time, however, no little sensation was created in scientific and engineering circles by the paper published by two professors of the London University, Atcherley and Carl Pearson, regarding the theory and stability of dams, in which reference was made to those thrown across the Nile at Assouan and Asyut. As a result of this discussion, the Egyptian government invited Sir Benjamin Baker to visit the works and announce his decision regarding the advisability of raising the level of the works, as proposed in the plans drawn up by the Irrigation Department. Sir Benjamin Baker spent several weeks inspecting both the barrages and the protective apron which had been built below the toe of the dam, to prevent the friable rock of the river bed being scoured away by the force of the water escaping through the sluices. Upon the completion of his surveys he expressed the opinion: (1) That the dam was perfectly safe and sound throughout, and that there was no reason whatever for the slightest anxiety regarding its stability. (2) That extensive works should be carried out on the talus

downstream of the dam. (3) That no decision could be given by him regarding the advisability of raising the dam for at least two years, at the expiration of which time it was hoped that the protective works would have been completed and tested.

In the early part of this year Sir Benjamin Baker visited the barrages and made a prolonged and detailed investigation of the protective works, the greater part of which had been completed, and was able to inspect the behavior of that section of the operations which had been first completed and submitted to practical test for several months. They were found to be perfectly satisfactory, and the increase in the height of the barrages was thereupon approved.

During the interval that has elapsed between the completion of the plans for this work in 1904 and the recent decision, elaborate surveys and exhaustive examinations have been carried out by the Irrigation Department throughout the Nile Valley between Wady Halfa and Khartoum, to ascertain the practicability of throwing a barrage across the river at a suitable point above the Assouan dam, and thereby creating a subsidiary reservoir, as an alternative to raising the height of the Assouan dam. It was found that no such dam could be built.

The raising of the barrage will be a work of only less importance than the erection of the structure itself, while the advantages reaped by the barren lands of the Nile Valley will equal those conferred by the original dam. The additional quantity of water that will thus be impounded by raising the level 22 feet will be two and a quarter times greater than that stored by the existing barrage. By this new supply it will be possible to bring about a million acres of land under irrigation. At the present moment there are approximately 950,000 acres of government land in the northern tracts of the Nile Valley lying untilled because of the dearth of water. It is intended to reclaim the whole of this tract by using the additional water that will be impounded in the enlarged reservoir. The wealth and revenue of the country will be immediately and greatly increased. In the cotton crop alone the increase, due to the additional water supply, will represent, it is estimated, a sum of between \$17,500,000 and \$20,000,000. The undertaking is to be commenced at an early date, and the total cost of completing the work will approximate \$7,500,000, which outlay will include the compensation to be awarded to the inhabitants of Numidia whose land will be submerged. The work will take some six years to complete, so that the country will not reap the full benefit accruing from this huge increase in the water supply for irrigation purposes until the year 1914.

Unfortunately, the raising of the water level will entail the still further submergence of the temples of Philæ and other Nubian archeological monuments, upon the protection of which, by elaborate underpinning, a vast sum of money was expended when the existing structure was thrown across the river. Although the government deplures the necessity of partly submerging these historic remains, it is realized that the economic and agricultural demands of the country must receive first consideration. However, the authorities pledge themselves to do everything possible to minimize the injury. An archeological survey, extending from Wady Halfa to Assouan, has been made by the order of the government, and the various archeological societies have been invited to co-operate with the authorities in their task of preserving the remains as far as the exigencies of the country will permit.

AN OPPRESSIVE POSTAL REGULATION.

On April 17 the publishers of the United States received notification from Washington that the Canadian postal authorities had made new regulations affecting the rate on newspapers and periodicals, whereby the postage to Canada was increased nearly six times. This law is to go into effect on May 8, 1907. The publishers in this country are powerless to protect themselves in view of this arbitrary act. It would not be honorable or fair to terminate or curtail subscriptions which have been sent in good faith up to the present time. The result is that the publishers are obliged to pay this considerable increase in postal rates without compensation from subscribers. This is a heavy and unjust burden, which could have been avoided by giving due and reasonable notice of such contemplated change of rate. This act has been done in the most arbitrary and unnecessarily abrupt manner, and it is hoped that when the great injustice to American publishers is understood at Ottawa, and the unnecessary harshness of the provisions of the act, the matter will be reconsidered, and some measures taken to defer the enforcement of the new rate until the end of the year.

While this rule is a matter of such considerable financial loss to American publishers, in the end it is sure to be most severely felt by the Canadian reading public. By far the largest percentage of periodical literature is in the widest sense educational. To increase the cost of such literature to the reading

masses is unwise, impolitic, and sure to arouse the antagonism of those whom the increase affects.

Of course, it will be absolutely essential for publishers to increase the price of their periodicals mailed to Canada on all new business, but as eighty per cent of subscriptions are contracted for during the months of November, December, and January, the injustice done the publishers is apparent, owing to the season at which the change in rates becomes effective.

The publishers are forced to bear the burden of the increased rate without compensation, and this loss will in the aggregate amount to hundreds of thousands of dollars. As a matter of fact, the financial loss to the publishers of this paper arising out of the change in rates will be between two and three thousand dollars.

RULES GOVERNING THE COMPETITION FOR THE SCIENTIFIC AMERICAN FLYING MACHINE TROPHY.

A special committee of the Aero Club of America, appointed for the purpose, has formulated the following provisional rules governing the competition for flying machines of the heavier-than-air type, which will be inaugurated at the Jamestown Exposition on September 14 next.

It is the intention of the SCIENTIFIC AMERICAN, in offering this trophy, to have it always open to competition by inventors the world over. Should the trophy be won by the representative of a foreign aeronautical club, this club, if a member of the Federation Aeronautique Internationale, may become the custodian of the trophy; but the future competitions, even if held abroad, shall be carried out under the same rules and conditions used by the Aero Club of America in the competitions held here.

RULES GOVERNING THE COMPETITION FOR THE SCIENTIFIC AMERICAN AERONAUTICAL TROPHY.

1. This competition will be held annually, and the conditions of the trials will be progressive in character, so as to keep abreast of the state of the art. The first contest will be held at the Jamestown Exposition on September 14, 1907, and all entries for this contest must be made in writing and sent to the secretary of the Aero Club of America, 12 East 42d Street, New York city, prior to September 1, 1907. The rules governing future contests will be formulated by the contest committee of the Aero Club of America in accordance with the results obtained and the lessons learned in this first contest.

2. All heavier-than-air machines of any type whatever (aeroplanes, helicopters, orthopters, etc.), shall be entitled to compete for the trophy; but all machines carrying a balloon or gas-containing envelope for purposes of support are excluded from the competition.

3. The machine which accomplishes the required flight in the shortest time and with the best display of stability and ease of control, shall be declared the winner. If several machines perform equally well, the committee shall have the right to demand further flights in order to determine which is the best. If no machine makes the required flight on the date set for the contest, the one that subsequently first accomplishes such flight shall be declared the winner, and shall not be entitled to make a further flight until the next year, under the changed conditions of the contest.

4. The flights shall be made in calm air, if possible. If a wind of over 20 miles an hour is blowing, no trial need be made. Aeroplanes may start by running along on wheels on the ground under their own power, but no special track or launching device will be permitted. A smooth, level roadway, or a reasonably smooth, turfed field will be provided from which to make the start. Machines need not fly more than a few feet above the ground, or higher than is necessary to avoid obstacles. They should be capable of being steered both horizontally and vertically, and of alighting without being damaged. If there is a wind blowing, the flights shall be made in such direction as best suits each operator. The start should preferably be made against the wind.

5. The committee shall make arrangements to accurately time and measure all flights, as well as the distance traversed and time taken in starting and stopping. Accurate observations of the speed of the wind and other weather conditions at the time of the flight shall also be made and recorded by the committee. Complete specifications of the competing machines, giving weight, supporting surface, details of motors and propellers, etc., together with a description of any performance that the machine has made, shall be forwarded to the contest committee with the entry or when application is made for a trial.

6. Anyone desirous of making a flight at any subsequent time can arrange for such a test by communicating with the contest committee of the Aero Club of America, at least fourteen days in advance, and asking this committee to appoint a suitable time and place for the trial. If the committee believe the machine to be impractical, it can require the inventor either to prove the incorrectness of such belief by an

informal demonstration with the machine itself, or by demonstration in some other satisfactory way which will show that the machine is operative.

7. The first flight shall be for a distance of one kilometer (3,280 feet) in a straight line.

8. After every competition, the name of the winner will be inscribed upon the trophy. If it is won three times in different years by any competitor, the trophy will then become his personal property.

Aeronautical Competitions, Jamestown Exposition, Norfolk, Va., April 28 to November 30.

No. 1. Special race limited to members representing recognized aero clubs for club championship, May 4.

No. 2. Dirigible balloon competition, June 1.

No. 3. Competition of balloons for distance, June 15.

No. 4. Competition of balloons for duration, August 3.

No. 5. Competition of balloons for objective point, September 7.

No. 6. Competition of balloons for altitude, November 16.

No. 7. Competition of balloons in pursuit of pilot balloon, August 17.

No. 8. Competition of carrier pigeons; flight from aeronautical concourse, exposition grounds, May 18.

No. 9. Simultaneous release of large number of small balloons carrying messages, May 18.

No. 10. Flying devices heavier than air, with motor and operator, September 14.

No. 11. Flying machine models with motor, August 24.

No. 12. Flying machine models without motor, and carrying operator, September 14.

No. 13. Kites for altitudes, November 2.

No. 14. Kites for steepest angle of flight, November 9.

No. 15. Kites carrying operators, November 16.

No. 16. Registering balloons, July 13.

No. 17. Competition of balloons and automobiles. (Date to be coincident with the arrival of the automobile tour.)

No. 18. Competition of dirigible balloons and automobiles, May 25.

No. 19. Competitions of photographs taken from balloons or kites.

No. 20. Competition of photographs taken of balloons, aeroplanes or other aeronautical objects.

No. 21. Competition of photographs of meteorological phenomena. (Exhibits for Nos. 19, 20, and 21 to be ready April 26, and continuing on exhibition throughout the exposition.)

No. 22. Signaling competitions with balloons or kites, October 12.

No. 23. Hot air balloon competition, October 5.

No. 24. Dropping (harmless) shells nearest selected objective point or target.

No. 25. Competition for longest trip, open during exposition.

New Means of Producing Ballast for Balloons.

A new method of producing ballast during a balloon trip has recently been tried in Berlin. In a balloon ascent just made by Capt. Von Krogh, the pilot of the Parseval balloon, a quantity of chemicals were carried, which have the property of absorbing moisture, and thus increasing their weight in a damp atmosphere. The experiments took place under the superintendence of Dr. Knoch of the Meteorological Institute, and as far as can be gathered at present, were of a successful nature. The ascent was made in the spherical balloon "Betzold" from Tegel (Berlin). After reaching a height of 5,904 feet a landing was effected at Ratteick near Koslin, 186 miles distant. Time taken was about six hours.

The Building of the United Engineering Society.

The dedicatory exercises of the new building of the United Engineering Society, at 25 West Thirty-ninth Street, New York city, to which Andrew Carnegie gave \$1,500,000 for construction and still more when it came to raising an endowment fund, were held on April 17, 1907. The exercises were in the assembly hall of the new building, which is one of the finest auditoriums of its kind in the city.

Mr. Carnegie shared attention with the venerable Dr. Edward Everett Hale, President Arthur T. Hadley, of Yale, Ambassador Creel, of Mexico; Sir William H. Preece, president of the Institute of Electrical Engineers of England, and John Fritz, of the building committee, who received the most prolonged applause of any of those present.

Charles Wallace Hunt, who presided, had as a gavel the setting maul which Mrs. Carnegie used when she laid the cornerstone of the building. T. C. Martin, president of the Engineers' Club, read this telegram of congratulation from President Roosevelt:

The White House, Washington,

April 13, 1907.

My Dear Sir: I heartily congratulate you on the opening of the building of the Engineering Societies. The building will be the largest engineering center of

its kind in the world. It is, indeed, the first of its kind, and its erection in New York serves to mark and emphasize the supremacy which this country is steadily achieving through her proficiency in applied science. The whole country is interested in the erection of such a building, and particularly, of course, all of those who follow either the profession of engineering or any kindred profession, and in no branch of work have Americans shown to greater advantage what we like to think of as the typically American characteristics.

With all good wishes, believe me, sincerely yours,

THEODORE ROOSEVELT.

Mr. T. C. Martin, 114 Liberty Street.

President Hadley delivered the principal address and declared that a combination of ethical and technical standards would produce the best professional service.

Ambassador Creel voiced the greeting of President Diaz of Mexico, and a letter was read from Charles A. Haswell, who, at the age of 97, is the dean of New York's community of engineers. Just before Mr. Carnegie was introduced, Charles F. Scott, the chairman of the building committee, delivered an historical address.

When Mr. Carnegie rose to speak, he asked the audience not to applaud him too long, lest he should conclude that they did not want to hear him.

"It is the spirit of the men that does the work," said Mr. Carnegie; "the safety of human society lies just here. Whenever we coalesce to do some good, a unification takes place and a consolidation; and whenever men meet to conspire against the public good—to do some evil—they find themselves unable to trust each other. That's why you needn't lie awake nights and worry about the future and about what problems society is going to meet. As sure as the sunflower turns toward the sun so the human race turns toward better things.

"This is the rock on which I rest, and on which I meditate sometimes. Nor can you deny this, that, quite apart from whatever evil exists, there is that principle of improvement inherent in us. To-day is better than yesterday and to-morrow will be better than to-day. So I look forward to the future of this building and I know that the organizations to whom it is devoted will advance and continue to meet the developing needs of our age."

Peary's Proposed Arctic Trip.

Commander Robert E. Peary has definitely decided to make another attempt to reach the North Pole. He stated that he would sail from New York as near July 1 next as possible. Sufficient money had been raised, he said, for repairing his ship, the "Roosevelt," and a fund of \$100,000 necessary to equip the expedition would be available before July 1.

Commander Peary said that he expected to arrive among the ice fields by the middle of July. His equipment and crew, he said, would be practically the same as on his recently completed expedition. He will buy two hundred dogs when he arrives in Greenland. He expects that the trip may be made in about the same length of time as the 1905 trip, which required sixteen months.

The Current Supplement.

In the current SUPPLEMENT, No. 1634, the article on "How Coke is Made," begun in the last number, is concluded. Charles S. Walden writes on multiplex telephony. Some highly interesting experiments on the behavior of thin aluminium sheets in electrostatic fields are recorded. Prof. H. Geitel, well known for his splendid work in radioactivity, contributes an authoritative article on radioactivity and atmospheric electricity, which may safely be accepted as the latest utterance on the subject. An exceedingly interesting piece of physical apparatus, and one that any amateur can make and use, provided he has a little knowledge of electricity and a source of direct current at his command, is the speaking arc. In the current SUPPLEMENT Mr. A. Frederick Collins describes very explicitly how such an arc can be made at home. Prof. C. E. Lucke and S. N. Woodward have for months past been conducting an elaborate investigation for the purpose of ascertaining the comparative efficiencies of alcohol and gasoline in farm engines. The results of their investigations are published in the current SUPPLEMENT. G. K. Gilbert's most interesting monograph on the rate of recession of Niagara Falls is concluded. Sanford E. Thompson, a well-known authority on concrete, writes exhaustively on forms for concrete construction.

Ira Remsen Chosen President of National Academy of Sciences.

The National Academy of Sciences has elected Prof. Ira Remsen, of Johns Hopkins University, president, vice Prof. Alexander Agassiz, who retires after five years' service. The vacancy in the vice-presidency caused by the promotion of Prof. Remsen was filled by the election of Charles D. Walcott, secretary of the Smithsonian Institution.