Whitney, Chief, Division of Soils, Washington, D. C.; "What Railroads Can Do," William H. Baldwin, Jr., Esq., president L. I. R.R. Co. (Penn. R.R. Co.); "The Aesthetic Side of the Question," John Claflin, Esq., president H. B. Claflin Company, president Morristown, N. J., Improvement Society; "The Exactness of Proofs of Transmission of Malaria," William N. Berkeley, M.D., author of works on mosquitoes, New York; "How a State Appropriation May be Used," Dr. John B. Smith, New Jersey State Entomologist; "What a Rural Community Can Do," Walter C. Kerr, Esq., president Westinghouse, Church, Kerr & Co., Staten Island; "What the General Government Should Do," Frederick C. Beach, Esq., of the SCIENTIFIC AMERICAN; "What New York State Ought to Do," Dr. E. Porter Felt, State Entomologist, Albany, N. Y.; "How Far Does Extermination Exterminate," William J. Matheson, Esq., North Shore, L. I.; "The Long Distance Theory," Spencer Miller, Esq., Engineer, South Orange, N. J., Improvement Society; "Mosquito Engineering," Henry Clay Weeks, Engineer, Bayside, city of New York.

Major Georgas, of the United States Army, addressed the convention on the work that had been done in and about the city of Havana, Cuba, which had been helpful in abating the former conditions.

Dr. Howard sent a letter describing the mosquito plague in the colonies of Great Britain. Germany and Japan were also taking measures to fight the insects.

John Claflin, who was to speak on "The Aesthetic Side," described the malarial breeding places. He stated that the Anopheles, unlike the Culex, breed only in sunlight. Concerning the drainage of a malarial swamp, he said the malaria had apparently been introduced there by Italian laborers. The Anopheles had become infected, and, in turn, transmitted malaria to the residents.

Among the vice-presidents named were: Mr. William C. Whitney; Prof. Nathaniel S. Shaler, Harvard University; Mr. Louis C. Tiffany; Mr. Otto H. Kuhn, Kuhn, Loeb & Co.; Mr. G. Waldo Smith, president of United Civic Societies of Queens Borough; Mr. Colgate Hoyt, Mr. Harvey Murdock, president North Shore, L. I., Improvement Association; Prof. Franklin W. Hooper, director Brooklyn Institute of Arts and Sciences; Prof. Charles B. Davenport, University of Chicago; Prof. L. H. Bailey, Cornell University; Mr. L. C. Weir, president Adams Express Company; Mr. A. J. Cassatt, president Pennsylvania Railroad; United States Senator John Kean, of New Jersey.

The meeting adopted resolutions recommending the appointment of a provisional committee to consider the formation of a central organization of a national character, with which local bodies might co-operate in conducting a general national crusade against the mosquito.

AN ENGLISH TEST OF THE EDISON BATTERY.

Mr. W. Hibbert read a paper on the Edison accumulator before the Institution of Electrical Engineers recently. Since the first announcement of Mr. Edison's invention nearly three years ago, very little of an authoritative nature has been published about the cell; the paper which Dr. Kennelly read in May, 1901, showed that the invention was full of promise, and further results of more extensive experiments and of practical trials have since been awaited with eagerness. A description of the cell itself was published in the SCIENTIFIC AMERICAN and SUPPLEMENT, and as it has undergone little alteration since then we need not describe it in detail here. The active materials, it will be remembered are nickel oxide and iron, and the electrolyte is a 20 per cent solution of caustic potash. The chemical changes on charge and discharge may be represented by the equation

$$\underset{\text{After charge}}{NiO_2} \mid KHOaq \mid Fe \rightleftarrows \underset{\text{After discharge}}{NiO} \mid KHO.aq \mid FeO,$$

the electrolyte serving merely as an oxygen carrier, and not taking any actual part in the final changes of the active material, as does the sulphuric acid in the lead-lead-peroxide cell. The active materials are packed in perforated steel pockets, and the plates, though thin, are rigid and light. The construction is thoroughly mechanical throughout, and the lightness is obtained without any sacrifice of durability, which is one of the chief faults of the lighter types of lead cells. The standard size of automobile cell is 13 inches high (over all) and 5.1 x 3.5 inches horizontally. The weight is 17.8 pounds. The E. M. F. is approximately 1.35 volts, and the internal resistance 0.0013 ohm; the output at 60 amperes discharge is 210 watt-hours, the capacity working out, therefore, at 11.8 watt-hours per pound. This figure agrees very closely with those which were published originally. Dr. Kennelly put the output at about 14 watt-hours per pound. In an article in Nature it was very carefully calculated from a discharge curve which had been published that the output was 10 watt-hours per pound. The lightest lead cells in some instances approach, or even exceed, these figures, but on the average the result is considerably better than that obtainable in practice with lead accumulators. It will be seen, however, that in many other respects the Edison cell promises to prove much superior, especially for motor-car work.

Mr. Hibbert's tests were made partly under laboratory conditions and partly on the road. Discharge curves taken in the laboratory show that the Edison cell possesses in a remarkable degree one very desirable characteristic, namely, that of giving a good output in ampere hours when discharged at heavy discharge rates. Taking the normal discharge current as 30 or 40 amperes, the curves show that more than 80 per cent of the normal ampere-hours can be obtained when discharging at so high a current even as 200 amperes. A lead cell under similar conditions would probably not give more than 50 per cent of its normal output. Experiments on the road showed that this result could be obtained under practical conditions. A 32-mile run was made from Leicester to Northampton against a head wind all the way; on the level the current varied from 55 to 60 amperes, as against the usual 40; uphill it was from 90 to 100 amperes, and on one occasion rose above 150 amperes. The total discharge came out as 190 ampere-hours, the normal standing discharge being 160 ampere-hours. The battery had been fully charged before the start, 242 ampere-hours having been put in in 1 hour and 20 minutes. This particular case shows that there is an extra discharge—30 ampere-hours in this instance—which can be got from the cell; it is due to the fact that the voltage at the end of the discharge does not continue to drop rapidly, but, when it has fallen to about half a volt, becomes steady again for another hour. There is, in consequence, a reserve capacity which, though not generally used, may prove very valuable in emergencies such as the above.

Some other results obtained by Mr. Hibbert may be quoted. A cell after being short circuited for 48 hours, recovered its original capacity after two charges, and was apparently none the worse for this severe treatment. Experiments on the rate of charging were tried, and showed that high charging currents can be safely used. A fully discharged cell was recharged for an hour at 177 amperes; 124 ampere-hours, or 70 per cent of the charge, were obtained on discharge at 60 amperes. Experiments on the road confirmed this result, 70 per cent of the charge being obtained after charging at 200 amperes. The efficiency of the cell is not quite so good as that of a lead cell; the following figures were obtained under different conditions: at 30 amperes charge and discharge 66 per cent, at 60 amperes 60 per cent, at 100 amperes charge and 60 amperes discharge 56 per cent, and at 177 amperes charge and 60 amperes discharge about 50 per cent. On the other hand, the cell endures a period of rest before discharge well, and also does not suffer if allowed to stand discharged for some time. If discharged immediately after charge a somewhat large discharge is obtained, but after two days' rest a discharge of 155 ampere hours is given; a further twenty-four days' rest only had the effect of diminishing the discharge to 125 ampere hours, or 80 per cent of the discharge after the two days' rest.

The trials on the road were made in a runabout with a battery of 38 cells, weighing about 700 pounds; the total weight, with two persons, was about 2,000 pounds. The trials were planned to afford answers to the following questions:

(1) Is the capacity the same on the road as in the laboratory?

(2) Will the battery stand excessive discharges on the road?

(3) Will it take a rapid charge and utilize it on the road?

(4) Will it recover after lying discharged for some time?

(5) Does the capacity fall off by reason of the shaking?

(6) What attention is required?

The experiments which we have already quoted show that the answer to the first four questions is in the affirmative. With regard to the fifth question, the results were very satisfactory. The car had run 400 miles before Mr. Hibbert took it over; its capacity was then 159 ampere-hours on standing discharge. Mr. Hibbert ran it in all 500 miles in the course of a month, and at the end of that time the capacity on standing discharge was 158 ampere-hours, showing, therefore, no appreciable deterioration. As regards attention, Mr. Hibbert found very little to be required; none of the terminals worked loose or showed signs of getting unduly warm with the heavy charging currents sometimes used. The only matter that had to be attended to was the replenishing with distilled water which was required after every five or six charges.

The general results of Mr. Hibbert's tests are most encouraging; the only point on which further information is required is durability, but all the evidence is in favor of this proving satisfactory. It certainly seems as if the hopes aroused by Dr. Kennelly's paper are within measurable distance of realization.

FINAL WORLD'S FAIR DIVIDEND.

The World's Columbian Exposition of 1893 does not seem to have proved such an abject financial failure after all. At the last meeting of the Board of Directors a final dividend of 4.65 per cent on the capital stock was declared.

The dividend is equal to 46½ cents per share, and is payable on March 1, 1904. The transfer books of the stock company close on January 2, 1904.

The dividend will be paid by check to stockholders of record on the secretary's book. The circular to the stockholders states that a small surplus will remain after paying this dividend, but that it will be so small that it will not pay to divide it. It is being retained to cover cost of possible litigation.

All the stockholders are asked to relinquish their claims upon the surplus, so that it may be donated for some public object by the board of directors. The stock is widely distributed. Many of the certificates are framed and hung on the walls of the owners' homes.

The shareholders were paid a dividend of $1 per share soon after the exposition closed. With this coming distribution the return from an investment of $10, the cost of each share, will be $2.46.

TO OUR SUBSCRIBERS.

This is the last issue of the year—the fifty-eighth of the SCIENTIFIC AMERICAN'S life. Since the subscription of many a subscriber expires with the present number, it will not be amiss to call attention to the fact that the sending of the paper will be discontinued if the subscription be not renewed. In order to avoid any interruption in the receipt of the paper, subscriptions should be renewed before the publication of the next issue. To those who are not familiar with the SUPPLEMENT a word may not be out of place. The SUPPLEMENT contains articles too long for insertion in the SCIENTIFIC AMERICAN, as well as translations from foreign periodicals, the information contained in which would otherwise be inaccessible. By taking the SCIENTIFIC AMERICAN and SUPPLEMENT the subscriber receives the benefit of a reduction in the subscription price.

THE CURRENT SUPPLEMENT.

The current SUPPLEMENT, No. 1460, opens with an article by the London correspondent of the SCIENTIFIC AMERICAN on the highest tunnel in Europe, a tunnel which is to be found on the line of the Albula-Engadin Railway, Switzerland. Prof. Berthelot presents an interesting summary of the relation between the intensity of the voltaic current and the manifestation of the electrolytic output. An exhaustive description of the Lake submarine boat will be found in the SUPPLEMENT, an elaboration of the article elsewhere published in the present issue of the SCIENTIFIC AMERICAN. Recent excavations at Gigthis are described and illustrated. The Wilde lecture on the Atomic Theory is concluded. An excellent description of the Renard dynamometric fan for measuring the power of gasoline motors will doubtless interest chauffeurs. Emile Guarini presents an account of the single-phase traction experiments conducted by the Union Electrical Company, of Berlin.

EIFFEL TOWER TO BE DISMANTLED.

An engineering feat of no small importance will be the razing of the Eiffel Tower in Paris, for this renowned structure is doomed to disappear from the Champ de Mars. The concession for the building of the tower will expire in 1910, and probably nothing would be done in the immediate future if it were not for the fact that, like the famous Tower of Pisa, it is beginning to lean to one side. In the case of the Tower of Pisa, the center of gravity is not far displaced, since the tower was purposely built in that position. But with the Eiffel Tower the case is different, since it was designed to stand erect, and any great amount of declination will displace the center of gravity to a point dangerously near the outside of the base.

DISTRIBUTION OF THE NOBEL PRIZES.

The Nobel peace prize has been awarded to the Hon. W. R. Cremer, M. P., publisher of the Arbitrator, of London, for his work in behalf of international arbitration.

A new telegraph cable connecting Great Britain with Australia via Cape Colony is being constructed. Already the first section to the Cape has been laid. The next section will be carried across the Indian Ocean to Mauritius, thence to the Keeling Islands, and from there to Perth, in Western Australia. When this new line is completed there will be three distinct cable routes to Australia, from Great Britain via India, the recently laid Pacific cable, and this new one via the Cape, respectively, thus affording adequate alternative routes should any one or two be interrupted or cut by any agency.