PROF. SIR GEORGE H. DARWIN.

Prof. Sir George H. Darwin, M.A., F.R.S., LL.D., D.Sc., the English scientist at present in this country for the purpose of attending the Franklin bicentenary celebration at Philadelphia, is the second son of Charles Darwin, the great naturalist. The Darwin family for generations has included men distinguished in the arts and sciences; and while the originator of the Darwinian theory, one of the most eminent investigators and thinkers England has ever produced, unquestionably overshadows the others, it has not been through his reflected glory that his sons have taken their deservedly prominent position in the world of science. Sir George H. Darwin was born at Down, in Kent, England, in 1845. He was educated under the Rev. Charles Pritchard, who subsequently became a Fellow of the Royal Society, and the Savilian Professor of Astronomy at Oxford. In 1864 George Darwin entered Trinity College, Cambridge, from which he was graduated in 1868 as Second Wrangler and Smith's Prizeman. From 1868 to 1878 he was a Fellow of Trinity College, and was re-elected in 1884. He studied law, and was admitted to the bar in 1874, but he did not subsequently practise that profession.

In the following year he returned to Cambridge, and devoted his entire time to the study of the mathematical and astronomical sciences, and particularly to experimental investigations on the pressure of loose sands, on changes in the level of the earth's surfaces, and on minor earthquakes. His interest in astronomical and meteorological studies and investigations had been aroused prior to this, and in 1870-71 he accompanied the English expedition to Sicily to observe the eclipse which occurred during that period. In 1882 Prof. Darwin assisted Sir William Thomson (Lord Kelvin) in the preparation of a new edition of Thomson's and Tait's "Natural Philosophy," and in the following year was appointed Plumian professor of astronomy and experimental philosophy at Cambridge, succeeding the Rev. James Challis, M.A., F.R.S., to a chair which Prof. Darwin still holds with distinguished success. From 1885 to 1905 he was a member of the Council of the Meteorological Office of Great Britain, and he served on the Meteorological Committee of 1905. He was chosen a member and later, in 1879, a Fellow of the Royal Society. Last year he was elected president of the British Association for the Advancement of Science, and as the head of that association, he formally opened the Victoria Falls Bridge over the Zambesi gorge in central Africa in September of last year. In 1885 he received "a royal medal" from the society for his scientific work, and also one from the Royal Astronomical Society.

Prof Darwin is an honorary graduate of the universities of Glasgow, Dublin, and Padua, as well as a member of several British and foreign academies of science.

Prof. Darwin's published contributions to scientific literature include papers on consanguineous marriages, for the Statistical Society; jointly with his brother on Small Deflections of the Plumb Line Due to Movement of the Earth, British Association Report; a series of reports to the British Association on Harmonic Analysis of Tidal Observations, 1883 and later; several papers on the same subject in the Proceedings of the Royal Society; a series of memoirs on the Effects of Tidal Friction on the Earth and on the Moon, Philosophical Transactions of the Royal Society; papers on subjects cognate to the last, and on Figures of Equilibrium of Rotating Masses of Fluid and on the Mechanical Constitution of a Swarm of Meteorites, Philosophical Transactions of the Royal Society; a paper on Periodic Orbits, in 1896; and one on the Tides and Kindred Phenomena in the Solar System, 1898.

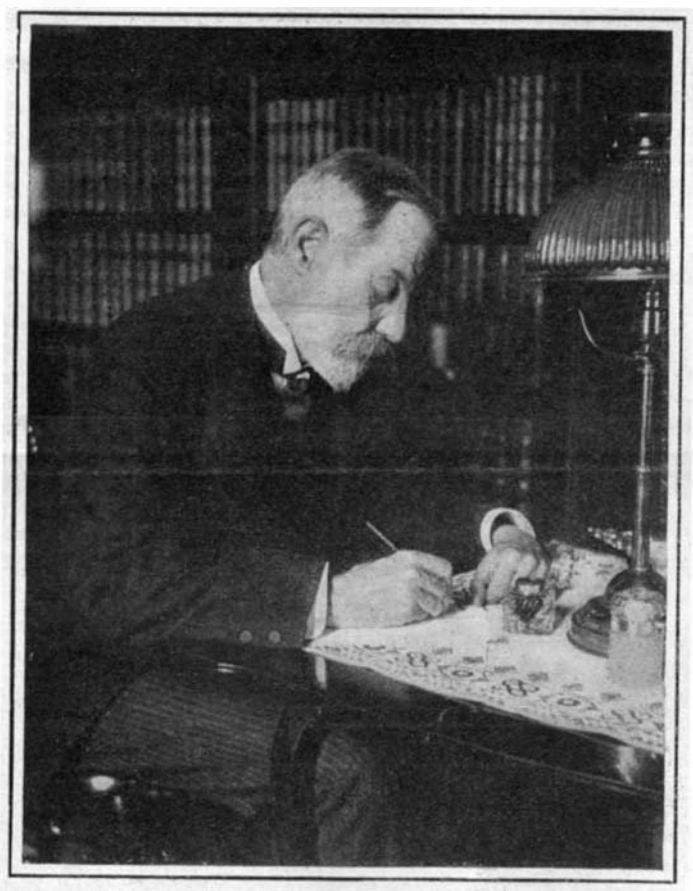
THE PROPOSED AMENDMENT TO THE TRADE-MARK LAW.

A bill has been introduced in the House which has for its purpose the amendment of the trade-mark law of 1905.

One section of the bill authorizes the Commissioner of Patents to establish classes of merchandise for the purpose of trade-mark registration. A trade mark may be registered at the option of the applicant for any or all goods upon which the mark has been actually used. This will enable both attorneys and applicant to know the scope of their trade-mark protection. Up to the present time the Patent Office has registered under one application only goods of the same descriptive properties. By providing for the classification of trade marks, American practice will be brought into accord with the trade-mark practice of other countries so far as classification is concerned. If the bill becomes a law, this provision alone will have a most salutary effect. In foreign countries American marks are registered only for the class of goods covered by the domestic registration. Hence, a large dry-goods house which uses one mark on perhaps several hundred kinds of goods, and which under the existing law is compelled to file a United States trade-mark application for each article of merchandise, is required to file exactly the same number of applications abroad, thereby incurring a considerable expense. By the provisions of the present bill all this will be obviated. One class will be covered in America, and one class in each of the foreign countries in which the trade mark is to be protected.

Still another section of the amendment provides that any owner of a trade mark who has a factory within the United States shall be afforded the same protection for marks used on the products of his factory as though he were domiciled within the United States. Some foreign houses have established manufacturing plants in this country, and manufacture goods which are not marked in the same manner as those made in their native countries. The foreigner cannot register such a mark first at home and then re-register it here. It is to protect these foreign manufacturers that the provision in question has been inserted in the bill.

One other amendment deserves attention. It provides that "a description of the trade mark only when needed to express colors not shown in the drawing" need be filed. Inasmuch as almost every trade mark is more or less colored, the preparation of a detailed description of the mark has been a matter of considerable difficulty. Sometimes the registrant received more than he was entitled to; sometimes he was too narrowly limited. The amendment is intended to cure the evil. Whether the bill will become a law or not, remains to be seen.



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SIR GEORGE H. DARWIN.

THE WHISTLING VIBRATION OF A DROP.

In experiments carried on by T. Terada and set forth in an article entitled "Whistling Vibration of a Drop," which was published in the Physico-Mathematical Soc., Tokyo, Proc., a capillary end is fused in a glass tube 5 millimeters in internal diameter, and the other end is connected to an air-bag of considerable capacity, which is pressed by a constant weight.

On wetting the nozzle with some liquid, such as water or olive oil, and then blowing through the liquid, a musical note of definite pitch is produced, the latter depending upon the dimensions of the nozzle, as well as the quantity and nature of the liquid. A microscopic examination shows that the liquid bubble is wide open while the note is sounding, and that the note is due to the vibration of the edges of the liquid. The pitch varies nearly inversely as the radius of the aperture, and inversely as the square root of the density of the liquid. It varies directly as the square root of the capillary constant. When the liquid is magnetic, like a solution of ferric chloride, the establishment of a magnetic field about it immediately lowers the pitch in some cases, and raises it in others. This phenomenon may be useful for demonstrating the magnetism of liquids, or for exploring magnetic fields otherwise inaccessible.

Motor car statistics for 1905 show that 27,840 machines were built in Ameriea. Of this number 22,970 were sold.

THE NATIONAL ACADEMY OF SCIENCES.

BY MARCUS BENJAMIN, PH.D.

The National Academy of Sciences held its stated session in Washington city on April 16, 17, and 18, meeting as usual in the National Museum, with Dr. Alexander Agassiz, the president of the Academy, in the chair. The meeting this year was convened a day earlier, so that on the adjournment of the Academy the members might participate in the anniversary exercises commemorative of the bicentenary of Benjamin Franklin, celebrated later in the week under the auspices of the American Philosophical Society in Philadelphia, Pa.

There were sixteen papers presented at the public sessions. Of these the first was "Recent Developments of Existential Graphs and Their Consequences for Logic," by Charles S. Peirce, and was a special presentation of a method of logic of his own devising. Prof. J. M. Crafts gave a paper on "Primary Standards for Temperature Measurements Between 100 deg. and 350 deg.," which was a report of progress in continuation of the work that he has so successfully carried on during recent years. Of more popular interest was a paper entitled "Interference of Oviposition of a Sargasso Fish with a Flying Fish," by Theodore Gill. It appears that ever since 1872 the Sargasso fish has been famous as the builder of a remarkable globular nest made of the Sargasso weed, in the midst of which it makes its home. This fact was assumed by the elder Agassiz in consequence of the nest being used by the fish mentioned, and has continued ever since to be accepted by writers on ichthyology. During the last winter some eggs of the Sargasso fish were obtained by the Fish Commission and examined by Dr. Gill, who at once came to the conclusion that such nests could not be made by the Sargasso fish. It is well known that eggs of certain flying fish possess filaments that could readily become entangled with the floating seaweed, and consequently build such nests. The arguments in favor of this theory were skillfully presented by Dr. Gill. A highly technical paper on "Commelinaceæ. Morphological and Anatomical Studies of the Vegetative Organs of Some North and Central American Species," by Theodore Holm, a non-member of the Academy, was presented through the interest of Dr. Gill.

The second day's programme began with the presentation of "The Distribution of American Men of Science," by J. McKean Cattell. It will be recollected that Prof. Cattell has recently published his book on "American Men of Science," in which he stars the thousand leading men in their leading specialties. In the printed table which he distributed there were five tables showing (1) the birthplaces and residences according to States, (2) the residences in cities, (3) the distribution according to colleges and other institutions, (4) the attendance at various educational institutions, and (5) the branches of sciences in which the men considered pursued graduate studies. These facts he presented.

Major Clarence E. Dutton, with the title "Radio-Activity and Volcanoes," showed that the origin of the former could be traced to the latter. This paper, although technical, on account of the timeliness of the subject attracted much attention.

Prof. Henry F. Osborn read a paper written by W. J. Sinclair, a non-member of the Academy, entitled "Volcanic Ash in the Bridger Beds of Wyoming," in which the announcement of the finding of extensive quantities of volcanic dust in the Bridger beds in southwestern Wyoming was made. This was interpreted as explaining the peculiar formation of these deposits, which had been previously supposed to be due to erosion. The presence of volcanic dust would explain in a reasonable way the lack of certain forms of life, and also show that a shorter period of time covered their formation. Over the title of "Faunal and Geologic Succession in Eocene and Oligocene Basins of Rocky Mountain Region," Prof. Osborn showed that the various expeditions sent out by the American Museum of Natural History had located very complete series of strata showing the entire Eocene formation, so that from the study of these, full information as to the life prevalent at that time and other facts would be available. This was very gratifying, as nowhere else was so perfect a series of strata of that period to be had.

Director Charles D. Walcott gave an account of the "Cambrian Faunas of China," with lantern illustrations. He told of the expedition sent out under the auspices of the Carnegie Institution to study certain geological horizons in China, and that as a result information has been obtained showing that a better series of Cambrian strata could be found there than elsewhere. Then passing to the discussion of the brachiopoda from there, he pointed out the new forms, and also indicated many specimens of which similar

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of oil over steam is that it retains its heat better, and will not chill at 20 to 25 deg. Fah. below zero. Furthermore, if it should chill, it will not expand and burst the pipes as water would when freezing. Steam must be delivered to the pipes at a high temperature, while oil can be circulated without pressure at any degree between 20 deg. below and 400 deg. above zero, and furthermore, the plant can remain idle in very cold weather when it is not required for melting snow. A test of this system was carried on at one of the switches in the yard of the Boston & Maine Railroad at Boston last winter. The plant for heating the oil was located about 350 feet away from the switch, and consisted of a 3-horse-power fire-tube boiler, a gear driver, a screw pump, and a tank. The heater and tank contained the special oil, which was carried to the switch in an underground line of pipe. The oil was forced through the pipes by the pump at any desired temperature, and returned again to be reheated. At no time was it found necessary to heat the oil above 270 deg. At the switch a number of covers or boxes were placed over the pipes, so as to retain the heat and keep the ground in the vicinity in a normal summer condition. The great value of this was that in time of a snowstorm the melted snow would drain off into the ground just as it would during a summer shower, as the ground would be kept from freezing by the heat of the pipes. The past winter furnished no very severe storms which could show the value of this system under extreme conditions. However, on March 15 last, a snow storm occurred which continued all day and a part of the night. From seven to nine inches of snow fell. A wind of between 30 and 40 miles an hour drifted the snow to a depth of two feet or more in many places. The accompanying photograph shows the condition of the switch immediately after this storm. It will be observed that not a particle of snow remained about the switch except in a few places on the ties, which are insulators of heat, nor was there any collection of water to freeze afterward and cause trouble, because the moisture was all drained away into the dry ground. On the average eight inches of snow is equivalent to one inch of rain. Hence it will be evident that even a very heavy fall of snow would be melted and drained off without any serious difficulty.

THE NATIONAL ACADEMY OF SCIENCES.

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forms had been found in this country. The final paper was on "Recent Solar Investigations," by George E. Hale, who showed with lantern slides the installation of the observatory erected on Mount Wilson in California, and dwelt especially on certain forms of apparatus specially desired for the study of the composition of the sun. In the domain of astro-physics Dr. Hale stands foremost in this country, and exceptional opportunities have been afforded him by grants from the funds of the Carnegie Institution.

On Wednesday the final session of the Academy was devoted to the consideration of a paper on "Some Recent Solar Eclipse Results," by W. W. Campbell and C. D. Perrine, of the Lick Observatory, and was a preliminary presentation of a number of photographs taken during recent eclipses by the authors. The peculiar features of the corona were the subject of their special consideration, but no final decisions were attempted. Prof. M. I. Pupin discussed his work on "Feeble, Rapidly Alternating Magnetization of Iron," and described the difficulties encountered and overcome in the securing of an iron suitable for his special researches. Essentially, he found that the mechanical treatment of an iron had much more to do with accomplishing this result than its chemical composition. By what might be called a slow process of annealing, he believed that the molecules of iron arranged themselves so as to be most satisfactory in yielding a permanent kind of iron.

A paper entitled "The Life History of Pterophryne," by Theodore Gill, was presented by title, and in the absence of the authors, biographical memoirs of Admiral John Rodgers by Asaph Hall and of George P. Marsh by William M. Davis were also presented by title only.

The final paper of the session was "On the Classification of the Cidaridæ," by Alexander Agassiz and H. L. Clark, and was presented by the senior author. He first called attention to the fact that the Cidaridæ represented a variety of sea urchins that had persisted since the Jurassic period, and said that numerous authors had attempted to make a classification of this family, but the results had not been satisfactory. Too much stress had been laid upon special features, such as the spines, which subsequently were found to vary in individuals, thus vitiating the classification. Finally, Mr. Clark had made a complete investigation of the family, and from a study of all of their characters had prepared a classification that was applicable to both the fossil and living members of the family.

The biennial conferment of the Henry Draper gold medal for distinct contributions to astronomical science was this year made to William W. Campbell, director of the Lick Observatory in California. As Dr. Campbell was present at the meeting, the actual presentation was made at the dinner given on Tuesday night by President Agassiz.

Only four persons may be elected during one year to the Academy, and the names undergo the most careful scrutiny even before they reach the electing body. This year three new members were chosen. They were Josiah Royce, professor of the History of Philosophy in Harvard University in Cambridge and famous for his historical and philosophical writings; Benjamin Osgood Peirce, also of Harvard University, where he fills the chair of mathematics and natural philosophy; and William Berryman Scott, who is professor of geology and paleontology in Princeton University. Prof. Scott has long been known as the leader of the Princeton expeditions to the West for paleontological material.

In addition, Prof. Wilhelm Ostwald, of Leipzig, and Prof. H. A. Lorentz, of Leyden, were elected as foreign associates.

The Academy will hold its autumnal meeting in Boston, Mass., beginning on November 20 next.

THE HENDRICK HUDSON MEMORIAL BRIDGE.

In a little over three years from the present date, New York city proposes to celebrate the tercentennial of the discovery of the Hudson River, by the formal opening of the truly magnificent memorial bridge which forms the subject of our front-page engraving. That the event will have the enthusiastic co-operation of the State through which the Hudson River runs, is certain, while national interest will be as broad as the Union itself in an event which cannot fail to awaken interest throughout the whole world. It is not our purpose in the present article to dwell upon the facts connected with the discovery of the Hudson by the intrepid English navigator. It is enough to state that although he was English by birth, it was from the Dutch that he received the recognition and financial assistance which enabled him to set sail in the little "Half Moon." It was natural that, after the scant encouragement which he had received in his native land he should signalize his appreciation of his royal welcome by the change of his name from Henry to Hendrick. This, according to the best authorities, is the name under which he sailed, and by which the centennial memorial should be known.

The voyage which resulted in the discovery of the Hudson was begun in the early spring of 1609, under the direct orders of the Dutch East India Company. Hudson made land in latitude 44 degrees north, and then sailed south until he discovered the noble river which bears his name. For fifty leagues the adventurous navigators of the "Half Moon" pushed their way up the river, crossing its broad bays, stemming the swift currents where the stately mountains converge in the highlands to narrow its channel, and finding the country "a land as pleasant with grass and flowers and goodly trees as any they had seen."

From a study of the perspective drawing on the front page of this issue, an excellent idea may be gained of the great proportions and architectural and engineering beauty of the proposed memorial bridge. It will span the Harlem River at the point where it connects with the Hudson, and it must be acknowledged that, in view of the topographical and scenic features of the site, no better one could have been found within the limits of Greater New York. Apart from its intrinsic worth as a memorial structure, this lofty viaduct will form an important and greatly-needed link in the parks and driveways, which at present lie scattered over Greater New York, in a somewhat disjointed and unrelated way, and with no adequate means of communication from one to the other. The bridge will have particular value as forming an important extension of the Riverside Drive which reaches from Seventy-second Street, by way of the steel viaduct across Manhattan Valley and the Lafayette Boulevard, to the picturesque heights of Inwood. Here the viaduct will carry the driveway, at an elevation of about 170 feet above the water, to the opposite heights above Spuyten Duyvil, where the automobilist and the driver will find themselves in touch with the fine system of roads which extends up the easterly bank of the Hudson and radiates through picturesque Westchester County.

As a preface to our description of the memorial bridge, we wish to emphasize the fact of its monumental proportions, which are on such a scale as to render it by far the most important memorial structure of its kind ever planned. From abutment to abutment it will have an extreme length of a little under half a mile, or to be exact, 2,500 feet. It will consist of a central steel arch, measuring 825 feet from center to center of end pins, and two massive masonry approaches consisting on each side of a series of arches of from 65 to 90 feet span. The center steel span will be the largest but one in the world, being only 15 feet less in length than the celebrated steel-arch bridge over the Niagara gorge. As herewith shown, the center span is carried on four great trussed arches of the three-hinged type, although if the larger appropriations asked for be granted, it is probable that among other improvements that will be rendered possible, will be the substitution of two-hinged arches for the three-hinged, as here shown—a change which will insure more perfect harmony of the steel span with the architectural features of the whole design. The viaduct throughout will have a width over parapets of 100 feet, and will provide for two 18-foot sidewalks, and a central 60-foot roadway. The main abutments are each pierced by two colossal arches of 65 feet span and no less than 120 feet clear interior height. Beyond these the northerly approach is carried on five arches and the southerly approach on two, the latter each being of 90 feet span.

A notable fact in the design is that the engineer and the architect have thoroughly co-operated in the production of the final plans. Too often, in fact almost entirely, it may be said, there has been no such collaboration in the design of municipal bridges, and some of the most important structures in New York city have suffered greatly in this respect. The architectural treatment is what might be called the modern classical. No attempt has been made at elaborate adornment, the colossal scale of the work rendering such adornment unnecessary and futile. The decorative features have been confined almost entirely to details of a kind that can be seen and appreciated from the driveway itself.

The strictly memorial character of the bridge will be greatly assisted by the fact that at the approach to the viaduct on the Inwood side and in line with the axis of the bridge, there is a natural hill or knoll similar to that on which Claremont is situated at the corresponding entrance to the Riverside viaduct, which will be utilized for the erection of a Hudson memorial. The knoll is about 35 feet in height and the roadway will swing around it on the east and west and meet in the plaza which forms the entrance to the viaduct. This memorial will take the form, probably, of a massive pedestal surmounted by a statue of Hudson, or possibly a model of the historic craft in which he sailed. This feature, however, is not included in the plans which are covered by the present and requested appropriation, but will probably be carried through by popular subscription.

As the tercentennial takes place in a little over three years from the present date, it is evident that a start on the construction of the bridge should be made at once. The city has already appropriated $1,000,000, and a committee of the Board of Estimate, including the Comptroller, and the Presidents of the Boroughs of the Bronx and Manhattan, has recommended that a further appropriation of $2,000,000 be made, thus bringing the total appropriation for the whole structure up to $3,000,000. The proposal has the hearty indorsement of the Mayor, and it is probable that it will be carried through at an early date.

The Current Supplement.

An article on single-phase locomotives and motor cars in Bavaria and Sweden, by Frank C. Perkins, opens the current SUPPLEMENT, No. 1583. Of technological importance is an article by Felix Lindenberg on the uses of natural asphalt in the arts. Valuable formulæ are given. Mr. James P. Maginnis's third installment on Reservoir, Fountain, and Stylographic Pens is published. The selection of Portland cement for concrete blocks is discussed by Richard K. Meade. Alexander G. McAdie presents the third installment of his treatise on lighting and the electricity of the air. To the man who likes to experiment at home and learn something for himself of the elementary laws of physics, an article on experiments with a lamp chimney will be welcome. Other articles of interest are those on the Renovation of Worn-out Soils, the Mystery of Man's Capacity to Answer a Simple Question, Liquid Crystals, and Heat Insulation.

Self-Igniting Mantle.

Platinum sponge becomes incandescent on contact with gas and causes its ignition. This phenomenon has given rise to various arrangements for producing the flame direct. MM. Rouxeville and Michaud have patented in France a process in which the addition of any foreign apparatus to the mantle is avoided. They have recourse simply to a mixture in which platinum sponge is the essential ingredient, composed of refractory and adhering substances. Impregnated with this mixture in its upper texture, the mantle has the power of igniting the gas, and of thus becoming incandescent. The stem may also be covered with the composition, and the same result secured.

A statue of Mathias Baldwin, founder of the Baldwin Locomotive Works, has recently been presented to the city of Philadelphia by the officials of the works, and will be placed in Fairmount Park.