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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 AMERICAN SCHOLARSHIPS AT OXFORD.

Probably no will made public in years has attracted so much attention as that of the late Cecil Rhodes. It is characteristic of the man that its provisions should be on such a vast scale as to affect the interests of three continents. The feature of the will which is of the greatest interest to Americans is the magnificent provision for the establishment of scholarships in Oxford University for American students. This desire to bring the three great branches of the Anglo-Saxon race into closer unity and understanding appeals to our imagination and fills us with astonishment, even in a country where we are accustomed to having enterprises established on a gigantic basis. We believe that this is almost the first time in the history of the race that an individual, by means of his will, undertakes by a single provision of that will to bring about so many praiseworthy and far-reaching results. The objects he strives for are apparently: First, the binding together of three great peoples in a bond of common brotherhood; second, the establishing and inspiring of high educational standards; and, third, the establishing, as far as possible, of an ideal standard of manhood.

We believe, also, that this is the first time that a scholarship or fellowship has ever been offered in any university in which the standard of attainment was not based upon scholarship alone. In the present instance, however, the incumbent must possess other great qualities besides that of learning. He must be recognized as a man among men. In selecting the incumbent his character is to be taken into consideration; his manliness and love of athletic sports; and even the qualities of kindliness and unselfishness are to be taken into consideration.

The questions of how the incumbent is to be selected, and how these qualities are to be determined upon are only vaguely set forth in the provisions of the will. The terms of the will state that two candidates shall be admitted from each State and Territory and that the amount of the scholarship shall be $1,500. It is interesting to quote Cecil Rhodes' own words in connection with this matter:

"My desire being that the students so elected to those scholarships shall not be merely bookworms, I direct that in their election regard shall be paid to their literary and scholastic attainments and fondness for and success in manly outdoor sports, such as cricket and football, and their qualities of manhood, truth, courage, devotion to duty, sympathy for and protection of the weak, kindliness, unselfishness and fellowship exhibited during their school days, moral force, character and instinct to lead and to take interest in their schoolmates, for these latter attributes will be likely in after life to guide them to esteem and perform public duties as the highest aim.

"As suggestions for the guidance of those having the selection of the scholarships my ideal of a qualified student would combine these four qualifications in the proportions of three-tenths for the first, literary; two-tenths for the second, fondness for sport; three-tenths for the third, the qualities of manhood, and two-tenths for the fourth, exhibition of moral force. According to my ideas, if the maximum number of marks were 200 they would be apportioned, sixty each for the first and third, and forty for the second and fourth qualifications. The marks for the several qualifications should be awarded independently, for the first, by examination; for the second and third, on ballot of their fellow students, and for the fourth on the report of the headmaster of the candidate's school. The awards should be sent for the consideration of the trustees or some person appointed to ascertain by averaging the marks in blocks of twenty the best ideal of a qualified student."

It must be admitted that as we think over these provisions of the will and the rather nebulous manner in which these provisions are set forth, the plan seems almost Quixotic. It seems as if the testator hardly realized the difficulty of trying to determine how in each State or Territory it would be possible to find the most available representatives to receive the scholarship. From what schools or colleges is the incumbent to be selected. In an empire like Germany this problem is not nearly so difficult of solution. It would be a comparatively simple matter, perhaps, for the Kaiser to elect that the applicant should be selected, in the manner provided by the testator, from certain institutions. Of course, such a method of selection is not possible in the United States. It is probable that large discretionary powers have been vested in the executors of the will. If they are familiar with the conditions of our institutions of learning in this country, it is probable that some method of alloting the scholarships can be determined upon. Perhaps it would be possible to appoint a joint international committee which could delegate to certain schools or colleges, according to their geographical situation and their literary standing, the privilege of offering, perhaps, to their first year men an opportunity to present themselves as candidates. It will be very interesting to follow the fate of these provisions. The problem as presented is entirely novel, and in order that the object of the testator may not utterly fail, it requires the most judicious and tactful handling. At all events, it should place before the youth of the land a high ideal of what scholarship in its highest sense should mean.

UNJUST AND UNGENEROUS.

We regret to see that Marconi is not to be spared the ungenerous criticism which has been made against so many distinguished inventors, just as soon as they had demonstrated the commercial practicability of their ideas. This criticism usually takes the form of denying the originality of the invention, and insinuating or openly stating that the inventor is claiming credit and appropriating profits that rightly belong to another. The last notable instance of such a charge occurred a few years ago, when an attempt was made to prove that not to Bessemer but to some obscure Pittsburg iron worker belonged the credit of inventing the converter with its epoch-making effect upon the world's steel and allied industries. The SCIENTIFIC AMERICAN took an active part in that controversy, which ended in the universal indorsement of Bessemer's claims; and the position we took then upon the question of credit for inventions is the same that we hold to-day in the mat ter of the Marconi telegraphy.

We believe that if the profits and honor of an invention are to be claimed by any one man, they belong, not to the inventor of some one detail, however essential it may be, but to the man who by a comprehensive study of the whole problem and by patient practical experimentation, develops the idea from the first crude device, or from many separate unrelated devices, to the complete, practicable apparatus, capable of taking its place among the serviceable appliances of our modern life.

Such an inventor is Marconi, and such an invention is the system of wireless telegraphy which bears, and we venture to think will for all time bear, his name. Clerk Maxwell suggested and Hertz discovered the etheric waves by which the transmission of electrical impulses is rendered possible; Onesti discovered, Branly and Lodge improved, and Marconi perfected a coherer by which these impulses might be picked up and thrown upon a telegraphic receiver; and to Marconi belongs the credit of developing what was merely a curious toy into a wonderfully perfect system, which takes rank with the invention of Morse as one of the greatest in modern times.

The scientific world has always been the more ready to give Marconi full credit for his brilliant work, because of his modesty, and the unvarying candor and fairness with which he has acknowledged his indebtedness to Maxwell, Lodge, Branly and other workers in the field of etheric telegraphy; and hence the recent unseemly attack made upon him by Prof. Sylvanus Thompson in the Saturday Review, so far from shaking the public confidence in Marconi, has merely served to awaken astonishment, that charges so manifestly unfair should emanate from a physicist of such high standing. Thompson is entirely in error when he says that Marconi uses without acknowledgment these devices of Lodge, for he has always, at least during his many visits to this country, been ready to give ample credit to their inventor.

Apart, however, from all question of these acknowledgments, is that of the actually accomplished facts of wireless telegraphy. We do know that messages have been sent over 1,500 miles of water, and that signals have been sent clear across the Atlantic; we do know that only one man has done this, or to-day can do it, and we know furthermore that these epoch-making achievements have been wrought by that one man as the crowning triumph of long years of indefatigable experiment, invention and design. Can Lodge send signals across the Atlantic and messages for 1,500 miles? Can Slaby? We think not, and we also venture to believe that had the practical Marconi never turned his thought and zeal to the problem, Lodge's coherer might to-day have been merely a curious laboratory toy, and Slaby's professional zeal might have been confined to the quiet of the classroom and the lecture hall, and might never have been quickened into commercial activity by the alluring possibilities of etheric telegraphy, as demonstrated by the early successes of the young Italian.

THE AIRSHIP AND THE AEROPLANE.

There is no question that as between the airship and the aeroplane, the latter is the more scientific and mechanically the more attractive type of air locomotive—if we may use the term; although it must be admitted that in the present state of the mechanical arts, a practicable aeroplane as yet exists only upon paper. The airship with its huge, unwieldy, and perishable gas-filled balloon, has nothing to recommend it but the fact that it can float at a predetermined adtitude and does not depend for its ability to remain in mid-air upon the continuous working of its motors. The aeroplane does; and the instant its propellers cease to revolve, its buoyancy is lost. But at what a cost and risk the airship maintains its equilibrium is shown by the numerous disasters that have befallen Santos-Dumont in the various (six in all) airships which he has built. The whole trouble with the gas-supported ship lies in the vast bulk of the balloon, and the great area that it presents to the wind. In any but the most moderate breeze, the craft is more or less unmanageable; and we do not yet know how to build a motor which will be light enough to be carried by the balloon and have at the same time sufficient power to drive it against a strong breeze. And even if such a motor could be built, the frame and fabric of the balloon would collapse under the wind pressure to which it would be subjected. In view of the many and baffling problems presented, we cannot but admire the persistence and pluck of Santos-Dumont, who is to try again—this time on our side of the water.

But why do we not hear from Langley, Maxim and others whose experimental work of the last decade was so extremely interesting and so full of promise? The advances that have been made of late in the development of light, high-powered motors, should materially assist in the development of a successful aeroplane.

MEN OF WEALTH AS INVENTORS.

The impression that the American young man of wealth passes his time simply in seeking his own amusement is very far from being the case, as is evidenced by the number of well-known names which may be found among the list of those who have received letters patent. Narrow as the scope of this list may be, it nevertheless proves that the inventive genius of the American is not confined to the mechanic or the farmer, but that men of wealth do their share in enhancing the industrial development of the country.

Perhaps the most widely-known rich inventor is Cornelius Vanderbilt. Most newspaper readers have learned merely that he is the patentee of a locomotive boiler of some peculiar construction. Exactly what the peculiarity of this construction is, perhaps only the readers of technical papers know. As a matter of fact, the main feature of the invention consists in a firebox made cylindrical in cross section and having its rim corrugated in a transverse direction; the firebox being located eccentrically within a firebox section inclined to the horizontal, to reduce the water space below the firebox line at the back end, the forward end being submerged to a less extent than the rear, to increase the effective heating surface for a rapid generation of steam. So efficient is this improved construction, that the Vanderbilt boiler is used by the principal roads throughout the country. In 1900 six locomotives were built at the Baldwin Works equipped with Vanderbilt boilers; in 1901 twenty-three were in use on various railroads. Mr. Vanderbilt has not stopped with the invention of a firebox. He has also devised a new type of locomotive-tender which is now in practical use; a process of making truck-bolsters, brake-beams, etc.; a draft-gear; a car-truck, and a tank-car which is now widely used. The annual royalties accruing from these various inventions are substantial and must represent a handsome amount.

Col. John Jacob Astor likewise finds time to invent new machinery. Several years ago he patented a pneumatic road-cleaning machine; and only a few weeks ago he received a patent for a novel turbine which is to be used primarily for the propulsion of steamers.

Both Mr. Astor and Mr. Vanderbilt have devoted their attention exclusively to industrial invention. Mr. P. Cooper Hewitt, on the other hand, has branched out in the field of electricity and physics. At a *conversazione* held last year at Columbia University, and at a recent meeting of the American Society of Electrical Engineers, his mercury-vapor lamp was exhibited—the practical culmination of research in a new field in electro-physics. Turning his attention to the

manufacture of glue, with which the name of his inventive and philanthropic grandfather, Peter Cooper, is associated, he devised noteworthy improvements in apparatus and means for glue-making, among which may be mentioned a glue-manipulating machine, a process of purifying glue, a glue-stock cutter and feeder, an evaporator, and a drier. Besides these, the long catalogue of his inventions includes a condenser, a spring-tire, a centrifugal machine, an apparatus for aerating liquids, an apparatus for manufacturing beer, a sheet spacer, and a leaf for flybooks. Mr. Hewitt has for the past few years bent his energies principally to the perfection of the above-mentioned vapor lamp, which bears his name and for which he has taken out a score or more of patents.

Like his brother, Mr. Edward R. Hewitt has also devised improvements in glue-making, among which is a preparation of glue-stock for boiling. In the fields of physics and mechanics he has also come forward as an inventor. Several years ago he patented a new method of printing photographs in color, and recently began a series of researches in those branches of engineering with which the names of Sadi-Carnot and Dr. Maynard are linked.

Still other well-known wealthy inventors are David Wolfe Bishop, Anson P. Stokes, Jr., and Clarence G. Dinsmore. Mr. Bishop, as one might infer from the prominent part that he has taken in the development of automobilism in America, has been concerned chiefly with improving the motor carriage. Mr. Stokes has invented an ingenious apparatus for playing golf indoors. Mr. Dinsmore has patented a tire-removing and replacing device, and has applied for a patent on a pneumatic-tire protector.

Incomplete though this list may be, it serves to indicate a serious purpose on the part of some of our young men of wealth, which is sure to be highly commended.

RECORD OF AMERICAN AUTO SHOWS.

Although it is barely two years ago since the advisability of holding an automobile show was first seriously considered by the few makers then in the field, even the most enthusiastic of the promoters betrayed signs of a lurking suspicion that despite every effort to make the thing popular, it might fall short of expectations.

Nowadays, no sane man would raise the question, for fear of making himself the laughing stock of the trade and the public. It would be difficult to find simpler and more direct evidence of the sweeping progress made by the automobile industry. Large, well-equipped plants have been laid down, numerous minor factories have sprung up all over the country, mechanical repair shops have entered vigorously into the competition, and many manufacturing establishments have added a factory department for automobile building, not to mention the nearly two thousand individual makers of automobile machine parts, fittings and accessories.

Nowhere has this unique and imposing industrial result been better expressed collectively and comprehensively than at the present Chicago Automobile Show. Almost every type of vehicle, every feature or device which serve as improvements, are to be found there. It is, however, rather difficult to trace the stages by which the present development has been reached, for old pattern vehicles are scarce, and show promoters, no matter how hard they may try, have never succeeded so far in making a collective exhibit disclosing the truly representative stages marking the practical progress in automobile building since it became an industry worthy of the name.

The first American auto show of January 1, 1900, was really more of a compromise with the cycle show, in conjunction with which it was held at Madison Square Garden, than anything else. It was ninety-nine per cent "bike" and one per cent "horseless." The automobile was put into the bicycle show as a special feature to attract the public, which it did in a way not foreseen by the cycle makers; for the spectators seemed disposed to ignore the presence of bicycles and prefer gazing at the baker's dozen of automobiles displayed. So that the auto feature accomplished much more than the exhibitors had hoped for, and proved instrumental in breaking the ice for future shows. It was a trial balloon, showing the makers which way the wind was blowing, and it was sent up just in the nick of time.

Immediately there was a renewed interest in automobiling and a corresponding activity among the makers. Chicago, jealous of New York's "horseless" affair, moved into line with an automobile show, which was intended to be a good deal more than it turned out to be. It was held in September, 1900, at the Washington Park, under the auspices of the Chicago Automobile Club. It was an outdoor affair, with plenty of room for track events and exhibitions of every conceivable kind. There were some thirty-odd exhibitors, ensconced behind very creditable-looking stands. It was to be a big treat, but—it rained, the crowds went home, the makers lost courage, the special hill-climbing events and track tests were slovenly and unsatisfactorily conducted by people apparently entirely unfamiliar with such exhibitions, and everything seemed to go wrong. In spite of this setback, the show did some good, and the impression produced by it was by no means lost. Improvements in the vehicles displayed were easily noticed, and there were many indications that the automobile industry and the popular interest in it had taken a forward stride since January.

The question of making the automobile show a permanent institution now came up for vigorous discussion, and in November, 1900, New York city was able to muster at Madison Square Garden an automobile show in which practically all the makers took part. This show was a clean-cut exhibition exclusively devoted to automobiles, and under the efficient management of the Automobile Club of America, it proved a commercial as well as a popular success. All doubts as to the instrumentality of such shows were swept away. The industry was copiously and intelligently represented by motor-vehicle types of a variety of designs and for many purposes; the spectacular feature was signally supplied by a small speeding track on which vehicles in motion were displayed; the public patronage continued large throughout the week; and the commercial result was such as to encourage the exhibitors greatly. The Automobile Club of America at this show made the first attempt on record toward the getting up of a historically instructive feature by a very judiciously-arranged collection of models—curious and significant "stepping stones" in the line of motor vehicle construction.

No sooner did the doors close upon this show than another one, under different management, took place, during the following week, at the Grand Central Palace. This exposition was in reality arranged previously to the Madison Square Garden affair, and the management stuck to its date, even when it was found that it would practically cause a collision between the two shows. The Central Palace exhibit proved to be more of mechanical interest than was anticipated, as a few makers that had not shown at the Garden took an opportunity to display some new things at the Palace. Commercially the show was fairly profitable, but it lacked the popular patronage of its immediate predecessor.

Inspired by the brilliant success of the Garden show in New York city, Boston, Washington and Philadelphia produced automobile shows of their own during the winter of 1900.

Under the auspices of the National Automobile and Sportsman's Exhibition Company, Washington made a very respectable bid for honors in the auto show field. The exhibits were mainly gotten up by the local branch managers, and proved ultimately to be of direct trade benefit to them. The attendance was very good, but the show was mainly of local interest.

In Philadelphia the Automobile Club and the Cycle Board of Trade waged a war of dates for some time, the outcome of which was two mediocre shows in foolish competition, when conditions were favorable for making a national impression by joining hands in the promotion of one single show. The Cycle Board of Trade's show was half cycle and half auto, and the Philadelphia Automobile Club's show had the largest number of exhibits.

The Boston show was given up because the promoters, who, by the way, were none too enthusiastic, failed to secure the patronage of a sufficient number of makers.

During the last week of March, 1901, Chicago again forged to the front with a prodigiously advertised show at the new Coliseum, and again—it rained. But this time the show was indoors, and despite six days of steady downpour, and contrary to all expectations, it turned out to be a commercial success of no mean order. At all the stands sales were constantly reported, and the class of people who paid admittance were obviously mainly divided between those who were mechanically interested and those who wanted to make a careful pick before buying.

The January, 1901, automobile show of New York at Madison Square Garden was held under the management of the Automobile Club of America. This was a "mixed" show, in which the bicycle again fought it out with the automobile, and it did not attract much attention. The practicability of the motor-cycle was fully demonstrated, and the chief interest seemed to center around those self-propelled "silent steeds."

The second annual automobile show was held at the same place and under the same auspices during the first week of December, 1901. This was the most important automobile exposition ever seen in this country. It was in every way a well-arranged, tastefully furnished, elegantly appointed exhibition, showing in a compact, convenient form the immense mechanical progress made in motor-vehicle building from the perfecting of parts and accessories to the modeling of bodies and the structural feature of motors and manipulating devices. Nearly all the important makers were represented; the attendance was very large; and the result decidedly gratifying and extremely flattering to the American automobile industry.

SCIENCE NOTES.

L. Vanino (Berichte) finds that when guncotton is treated with a 20 per cent solution of formaldehyde its sensitiveness to shocks is greatly diminished and almost entirely destroyed. When moistened with formaldehyde solution and dried on the water-bath the guncotton loses its explosive power without suffering decomposition. By removing the deposited paraform by means of boiling water, the original properties of the explosive are restored.

A new source of malarial fever has been discovered by one of the assistants of the Liverpool School of Tropical Medicine now at work on the west coast of Africa. Hitherto this complaint has been attributed to the bite of malarial mosquitoes, but the result of recent investigation proves that there is another parasite which is equally as deadly in the propagation of this malady. The new disease-bearer is said to resemble the insect which causes "fly disease" among horses in South Africa.

The workmen digging the foundations for the enlargement of a religious building in Turin discovered, at the depth of about six meters below the soil, a number of articles of great archæological interest. The most important is a hollow bronze head, life size, and a masterpiece of art, in excellent preservation. The hair, the ears, and the eyes show traces of gilding. It is supposed, from comparison with other heads of the same period, to represent Tiberius. It is hoped that further research may lead to the recovery of other parts of the statue.

Out of the 4,200 species of plants gathered and used for commercial purposes in Europe, 420 have a perfume that is pleasing and enter largely into the manufacture of scents, soaps, and sachets. There are more species of white flowers gathered than any other color—1,124. Of these 187 have an agreeable scent, an extraordinarily large proportion. Next in order come yellow blossoms, with 951, 77 of them being perfumed. Red flowers number 823, of which 84 are scented. The blue flowers are of 594 varieties, 34 of which are perfumed, and the violet blossoms number 308, 13 of which are pleasantly odoriferous.

The expedition which started last year under the auspices of the British Royal Society, to explore the cave fauna of the Malay Peninsula, has accomplished some very interesting biological work, and many geographical observations have been made which prove existing maps of this country to be erroneous. The expedition has crossed the Peninsula from Singgora to Kedah, and has discovered that the high mountain range marked on maps does not exist in that part. About 120 miles north of Penang the mountains are over 6,000 feet high. The chief object of this scientific expedition is to study tropical cave fauna with a view to ascertaining whether it will throw light on the history and evolution of cave-dwelling animals.

Dr. E. Ule contributes to Engler's Jahrbuch (30, Beiblatt) some interesting observations on "ant-gardens" in the Amazon region, where they abound on a large number of woody plants. They are generally spherical in form and about the size of a walnut. They are formed by several species of ant, which appear to collect the seeds of many different plants and to sow them in these nests, covering up the seedlings with humus when they begin to germinate. In the structure of these "ant epiphytes" the foliage and the roots display characters which especially adapt them for the situation in which they grow, and promote also the protection of the ants themselves in their nest. Quite a number of the epiphytes were found by Ule as denizens of the ant-gardens and nowhere else. Among them were three species of Piperaceæ, five of Bromeliaceæ, five of Gesneraceæ, one of Moraceæ and one of Cactaceæ.

The extraordinary dust fall in Europe a year ago (March 9-12, 1901) has been studied by Hellmann and Meinardus, whose memoir has lately appeared in the Abhandlungen of the Royal Prussian Meteorological Institute. It is shown beyond dispute that the dust came from the Sahara, and not from South America, as the famous Ehrenberg concluded for similar dust-falls many years ago. Dust storms were observed in the Algerian Sahara during the days immediately preceding the dust fall in Europe. South of the Alps there was a stormy sirocco; further north, the lower air was relatively quiet, but the higher currents were strong from the south, their velocity of seventy kilometers an hour agreeing with the rate at which the dusty area was extended northward. The microscopic analysis of the dust showed it to be a mineral composition such as the Sahara could furnish. Around the the Mediterranean the dust fell during the dry sirocco, but further north, especially in northern Germany, the dust came down with rain and snow. Most of it fell south of the Alps. Further north the size and the specific gravity of the particles were reduced. The average weight of a grain of quartz dust in northern Germany was 1-3,200,000,000 gramme. The total fall is estimated to have weighed 2,000,000 tons.