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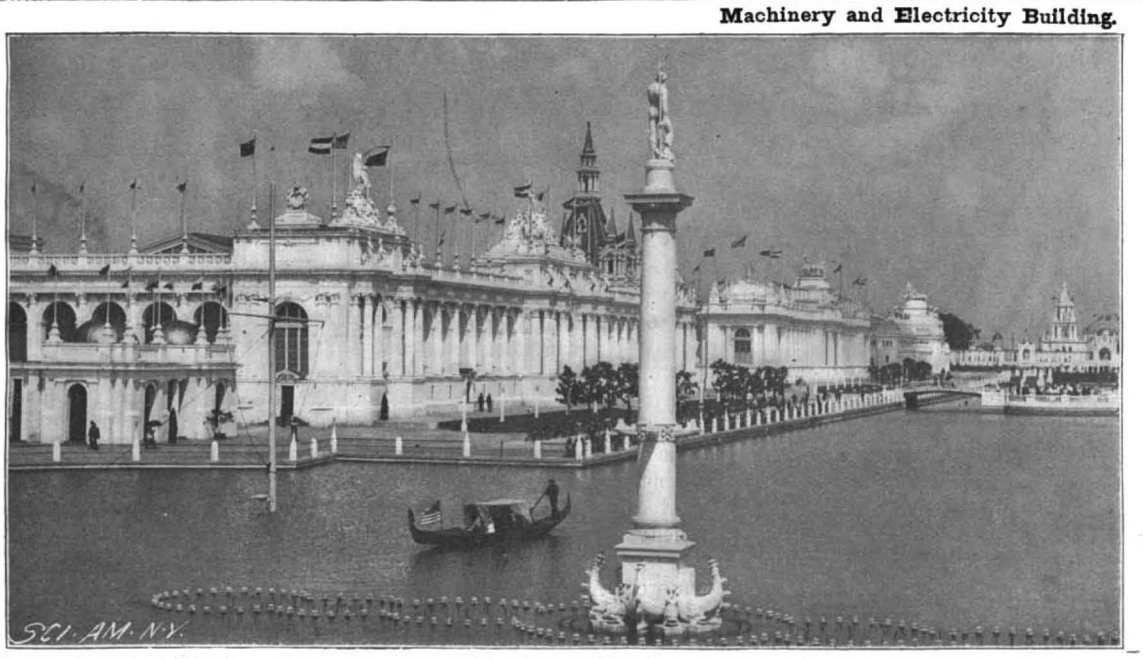
Main Entrance, Agricultural Building

Liberal Arts.

Machinery and Electricity Building.



The Grand Court.

Group in Streets of All Nations.

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THE TRANS-MISSISSIPPI AND INTERNATIONAL EXPOSITION.—[See page 138.]

fuel employed is alcohol. Each of the motors has four cylinders and operates by double expansion. The generator is tubular and the vaporization therein is, so to speak, instantaneous. When all the exits are closed to the steam, the pressure rises one atmosphere per second. The waste steam liquefies in an air condenser that is placed at the top of the apparatus, and that permits of recovering the water without the loss of a particle.

Each motor is of 20 horse power. All the parts were worked out of blocks of forged steel, just as a bust is carved out of marble by a sculptor. Everything has been hollowed out that could be, and the result is that the total weight of the generator, motor, and condenser is about 6½ pounds per nominal horse power. The motor alone does not exceed the weight of 2¼ pounds per horse power.

As each motor directly actuates one screw, the velocity of either can be diminished at will. The result is that, in the steering, the propellers concur with the independent rudder situated at the rear. The latter is maneuvered by the aeronaut by means of pedals. Three or four buttons or handles, placed within easy reach, suffice for all the other maneuvers.

Such, in its main features, is the arrangement of the Avion. The model that we were allowed to photograph in M. Ader's shop has a spread of wings of 48¾ feet. The total weight, exclusive of that of the aeronaut and the fuel, is 568 pounds. With a complete load, the weight will reach 1,100 pounds. The wings are charged with from half a pound to a pound to the square foot, according to the weight of the aeronaut, the fuel, and the accessories.

The problem of aerial navigation is not only a scientific, but, just at present, a military one. Is it possible to think without terror of the day on which flying apparatus—mechanical birds—will rain down the most deadly and destructive explosives upon armies, squadrons, and hostile cities? To such torpedo throwers it will be possible to oppose only similar apparatus. So in all countries, in America as well as in Europe, eminent men are endeavoring to realize aerostation, which doubtless will soon appear ripe for practical applications, and especially for the terrible business of war, at several points at once.

It was under the auspices of and through subsidies granted by the French War Department that the Ader Avion was constructed (in the profoundest secrecy) between 1892 and 1897, under the surveillance of a commission composed of three generals and two members of the Institute.

In the month of October of last year, the apparatus having been finished, haste was made to experiment with it upon the Satory field of maneuvers. A great circular track, 1,475 feet in diameter and 130 in width (much preferable to a straight and necessarily limited one), was established by military authority. The earth was cleared of sod and then beaten and rolled perfectly smooth.

Gens. Mensier and Grillon, who are well versed in such matters, had been requested to be present at the experiments in an official capacity. The experiments were put off from day to day for nearly a week, on account of the wind being too violent. Finally, on the 14th of October, taking advantage of a calm, M. Ader got into his machine and set it running. Mounted upon wheels, and with the wings outspread like a huge bat, the apparatus first passed over the track at a moderate speed, while numerous sentinels prevented anybody whatever from approaching the field of experiment.

The speed of the Avion progressively increased, and M. Ader felt and the spectators perceived that the wheels were leaving the earth. The apparatus, free for an instant from any supporting point, veered slightly and directed itself against the wind. But at this moment a squall supervened, and the inventor, afraid of being carried along by it, diminished his velocity. The wheels then touched the ground again, but, having a fixed direction, and the apparatus having taken a position that was oblique with respect to the direction of its motion, they could no longer roll. There was a disaster. The extremity of one of the wings came into contact with the track and was broken; the machine upset, the propellers were shattered, and the motors alone remained intact. M. Ader, fortunately, got off safe and sound, but the experiments were, of course, interrupted.

Gen. Mensier addressed to Gen. Billot, then Minister of War, a report in which the recommendation was made that the researches be continued and the experiments be renewed, and in which the opinion was given that results so important ought not to be disregarded.

In spite of the unfortunate accident, it was ascertained, in fact: 1. That the motive apparatus, through its power, lightness, and ease of management, answered the requirements of aerostation; and, 2, that the wings were capable of carrying the entire mechanism, the accessories, and the aeronaut.

M. Ader's flying machine, now repaired, has been provided with loose wheels that will prevent the recurrence of such an accident as that which happened at Satory. They, in fact, permit the apparatus to direct itself upon land as well as in the air, obliquely with respect to its motion forward.

The resumption of the experiments with the Avion will depend upon the Minister of War. Such experiments are not to be reckless ones, but merely progressive and prudent tentatives, having an appropriate ground as a starting point and requiring favorable atmospheric conditions.

We shall, perhaps, see the Avion soar, neither very high nor very far. If it merely describes an arc of a circle of a hundred yards at a few feet above ground, that will suffice to allow the problem of aerial locomotion to be considered as solved.

For the above particulars and for the illustrations we are indebted to L'Illustration.

THE TRANS-MISSISSIPPI AND INTERNATIONAL EXPOSITION.

The success of the Trans-Mississippi and International Exposition, at Omaha, is no longer prospective. Since June 1 nearly 1,000,000 people have passed through its gates to enjoy this splendid creation of Western thrift and enterprise. Second only to the World's Fair in the multitude and excellence of its exhibits, it rivals it in harmony of architectural conception and scenic development. The promoters are certainly justified in their belief that the success of the enterprise gives promise of a broader prosperity for the great West.

That characteristic Western energy that has made metropolitan cities of frontier trading posts within the memory of a living generation is again emphasized in the development of this exposition. In exactly thirteen months from the day on which the first shovelful of earth was lifted, the work was complete. This was accomplished in the face of the ever memorable financial and industrial depression of recent years, which had fallen with crushing force on the territory from which the inspiration and material resources of the enterprise were derived.

The project for an international exposition in Omaha originated with Edward Rosewater, editor of The Bee, who has since been one of its most active promoters. In the session of the Trans-Mississippi Congress in Omaha in November, 1895, he saw an opportunity to give substantial impetus to his plan, and after consultation with some of the leading business men of the city, it was outlined in a vigorous editorial in his paper. It was backed by arguments that won the immediate co-operation of the delegates to the congress. Two days later the resolution which declared in favor of the project and called on the United States government to support it was introduced by William J. Bryan and adopted unanimously amid the greatest enthusiasm. The congress adjourned and left to the citizens of Omaha the task of organizing the enterprise. This required thorough consideration, and it was nearly two months later when it was formally effected. The capital stock of the Trans-Mississippi and International Exposition Association was fixed at $1,000,000, payable in shares of $10 each. The association was authorized to transact business as soon as $10,000 was subscribed, and this was accomplished in five minutes. A board of eleven directors was elected, which was afterward increased to fifty, and twenty-five vice presidents, one from Omaha and one from each of the Trans-Mississippi States. The permanent officers elected were: Gurdon W. Wattles, president; Alvin Saunders, vice president; Herman Kountze, treasurer; John A. Wakefield, secretary. The active management of affairs was vested in an executive committee which consists of Z. T. Lindsey, manager department of ways and means; Edward Rosewater, manager department of publicity and promotion; F. P. Kirkendall, manager department of buildings and grounds; Edward E. Bruce, manager department of exhibits; A. L. Reed, manager department of concessions; and W. N. Babcock, manager department of transportation. These are all well known business men of Omaha.

To finance successfully such an ambitious enterprise and work out the many problems that occurred in connection with its construction was a discouraging task, in view of the conditions that prevailed. Nearly $2,000,000 was expended in the improvement of the grounds and the construction of the buildings, exclusive of the large investments made by exhibitors and concessionaires. The result is the best indication of the ability and industry that it involved.

The Omaha exposition was exceptionally fortunate in finding a location within ten minutes' ride of the business center of the city. The site includes about 200 acres of territory that was especially adapted to the general plan of improvement. It is divided into three nearly equal parts, each adjacent to the others, but characterized by some slight differences in decorative effects. The main court occupies a level tract 3,000 feet wide and 800 feet long, around which the main buildings have been united in an oblong circle that is completed by connecting colonnades.

The center is occupied by the lagoon, which is 150 feet wide, except at the west end, where it is drawn out in a trefoil design to a width of 400 feet. The walls of the lagoon are constructed to represent solid masonry relieved by occasional terraces of turf and flowers. It is surrounded by a broad expanse of brick pavement, which extends back to a similar belt of beautifully parked greensward that separates it from the colonnades and buildings. These surround the court in a solid circle of white architecture. While each building presents a different phase of architectural conception, they all blend in a wonderfully pleasing harmony of outline. The Government building stands at the west end of the lagoon facing the mirror, the Agricultural, Manufacturing and Machinery buildings and the Administration Arch occupy the north side, and the buildings devoted to fine arts, liberal arts, mines and mining and the Arch of States face them from the opposite side. The circle is completed by the handsome viaduct at the east end, which is flanked by two lofty casinos, which tower over the entrance.

The bluff tract, which lies on the Missouri bluff immediately east of the main court, contains the Horticultural building, the various State buildings, and the East Midway. Here the triumph of the landscape gardener is most apparent, and the sixty acres of rugged bluff has been invested with the charm and beauty of an oriental garden. Over twelve thousand trees and shrubs were planted in this portion of the grounds alone, and over one hundred thousand plants and flowers bloom in the midst of its luxuriant greensward.

The north tract is situated immediately north of the main court, with which it is connected by a broad boulevard. It contains the Transportation, Dairy, Apiary, and Poultry buildings, the West Midway, the Indian encampment, and various other features for which less imposing architecture is required. Aside from these principal buildings, the architectural features include a large auditorium, an International hall, where the exhibits of France, Italy, Mexico, Canada, and other foreign countries are displayed, a Boys' and Girls' building, erected with the contributions of the school children of Nebraska and Iowa, and service, jail, hospital and various other structures essential to the active operation of the show.

The main exhibit buildings afford an aggregate floor space of 500,000 square feet, exclusive of the galleries. The exact distribution of space and the dimensions of the buildings are indicated as follows:

	Width. Feet.	Length. Feet.	Floor Space. Feet.
Administration Arch	50	50	2,500
Agriculture	143	400	58,449
Fine Arts	125	246	31,762
Liberal Arts	130	241	33,018
Machinery	144	304	49,197
Manufactures	152	400	56,898
Mines	140	304	49,224
Transportation	249	432	107,568
Government	100	424	47,515

The Horticultural building consists of a central dome 108 × 120 feet and two wings each 74 × 97 feet, with a floor space of 26,732 square feet.

The amusement features of the Trans-Mississippi show comprise all the novelties that have become popular at previous expositions, and a number of newer features that represent a distinct advance in Midway attractions. The district occupies two streets, one on the bluff tract and the other on the north tract, which are united by a handsome viaduct. The Streets of Cairo and the Streets of all Nations represent the oriental features that have been the peculiar characteristic of Midway amusements. At Omaha they are installed on a broader and improved scale, as suggested by the experience of previous expositions. The Chinese village is the abiding place of nearly two hundred Chinese, representing all classes of Chinese life, and here are illustrated their customs, amusements, industries, and religious ceremonies. The Moorish village contains a number of striking features, including a palace of wax figures valued at fifty thousand dollars, and a variety of illusions and mechanical effects. The Japanese village and the German village illustrate other phases of foreign life, and the cosmopolitan features of the Midway include types of nearly fifty different nationalities.

Aside from these, the Midways contain nearly fifty novel mechanical and scenic features, which have been carefully culled from hundreds of applications. Hagenbeck's, the ostrich farm, an excellent Wild West show, cycloramas, and illusions of various types afford a wide variety of entertainment. The shoot the chutes, scenic railway, miniature railroad, and other novelties are entirely new, and the giant seesaw is a feature that is inherited from the Nashville exposition.

The north tract is also the home of nearly one thousand Indians, representing thirty distinct tribes, who have been mobilized by the United States government to illustrate the customs and amusements of an almost extinct race. Here the red men live in their characteristic habitations and wear their native attire of paint, blanket, and feathers. Exhibitions of their sports, dances, and amusements are given daily, and these constitute one of the most instructive and fascinating features of the exposition.

Manchuria.

Away on the extremely opposite end to ours of the great Eurasian continent is a country to which only too little attention has as yet been paid, and which, on account of its wealth, its favorable natural position, and the intelligence of its inhabitants, will attract to itself a yearly increasing notice from Europe, and play no insignificant part in the history of the next few decades. The recent march of events has shown two rising powers pressing round Manchuria, and threatening to contest its possession with the seemingly dormant Chinese. . . . If Manchuria were such a wretchedly poor country as, for instance, Khiva, Merv, and Turkestan, and others which have fallen to the lot of the Russians, comparatively little attention need be paid to the progress of events in that distant quarter of the world. It would matter but little to other European nations whether the Russians or Japanese did or did not take the country. But Manchuria is no such desert country. It is, on the contrary, a country of exceeding richness, and of promise scarcely less than that of the Transvaal itself, and compared to which the whole of Central Africa, from Uganda to Khartoum, is of paltry insignificance. . . . The timber alone in the vast virgin forests which clothe the hill-sides over thousands of square miles must be worth many millions: for this timber is of the most valuable kind, and besides the ordinary pines, which are common all over the world, and which, being fast growing, are easily replaced when cut down, there are immense quantities of hard timber—of oak, and elm, and walnut—to replace which a century is required, and the quantity of which in the world is rapidly diminishing. . . . Manchuria is equally rich in its production of cereals and in the southern portion of such crops as indigo and tobacco. . . .

Such being the climate, the nature of the country, its soil and productions, the inhabitants, as might be expected, are a strong, hardy, vigorous race, and from the glens of Manchuria have issued three successive waves of conquest which have overrun the whole of China. The number of the original inhabitants has been augmented by streams of immigrants from China proper, and these, though slightly less robust than the original Manchus, are yet of good and sound physique. They are the very reverse of impulsive—cool, calculating, provident, and so economical that not even the manure from off the roads is allowed to be wasted, and the heat of the fire required for cooking purposes is carefully utilized by means of flues to warm the whole house. Their industry is apparent in the care bestowed upon their fields. In the summer they work from dawn till sunset, with a brief interval for the midday meal, and in the winter they start hours before daybreak on their long carrying journeys. They are grave and little given to mirth; on the whole, law abiding, amenable to control and to the restraints of social life; if not particularly warm in their devotion to their children and to their parents, at any rate not absolutely callous; and though any active benevolence is not very apparent, there are, on the other hand, few symptoms of active malevolence. But the most important trait to notice is their strong conservatism. What was good enough for their fathers the present-day inhabitants think must be good enough for them. They are intelligent and quick to grasp simple ideas, but superstitious and ignorant of natural causation; very lacking in imagination, with high powers of imitation, but no capacity for invention. They all dress alike, and in the same way in which they have dressed for centuries past; there is no difference between one house and another, and even their carts are all of the same pattern. The rigid fixity of ideas is a concomitant of their strong conservative proclivities. They have, as a rule, little regard for truth, but, in business matters, once their word is given, it may be relied on. Honesty is not a pronounced trait in their characters, nor are they remarkable for morality. And these defects must, therefore, be set against their striking industry and thrift. Their religion seldom shows itself, and has little effect upon their practical conduct. It produces in them none of that fanaticism which impels other races of Asia to deeds of war, and it imposes upon the people of Manchuria few of those restrictions as to what they may or may not eat or do with which the people of India are so fettered.—Capt. F. Younghusband, in The Nineteenth Century.

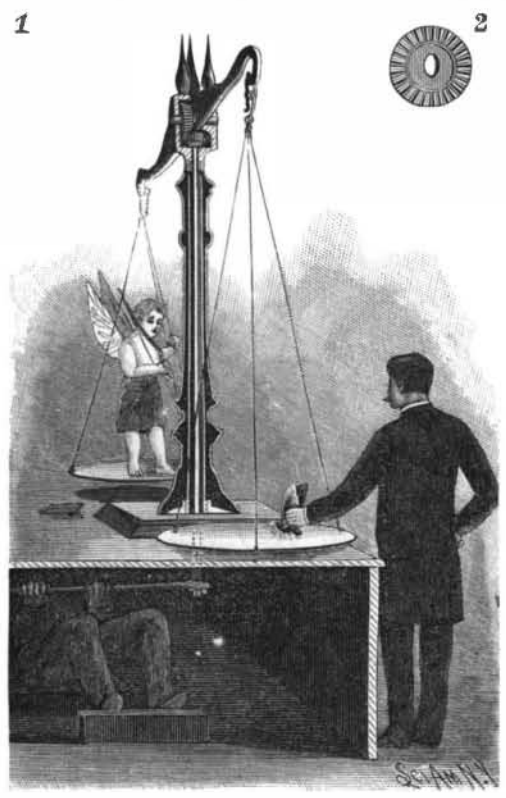
Coal Output of Natal.

At a recent South African banquet, Sir Walter Hely-Hutchinson mentioned that the monthly output of coal in Natal had increased from 12,000 tons in 1893 to 30,000 tons in 1898. He added as a notable fact that on April 16 last the ships in Durban Harbor loaded 1,000 tons of coal in the day.

"CUPID LIGHTER THAN A BUTTERFLY."

BY W. E. ROBINSON.

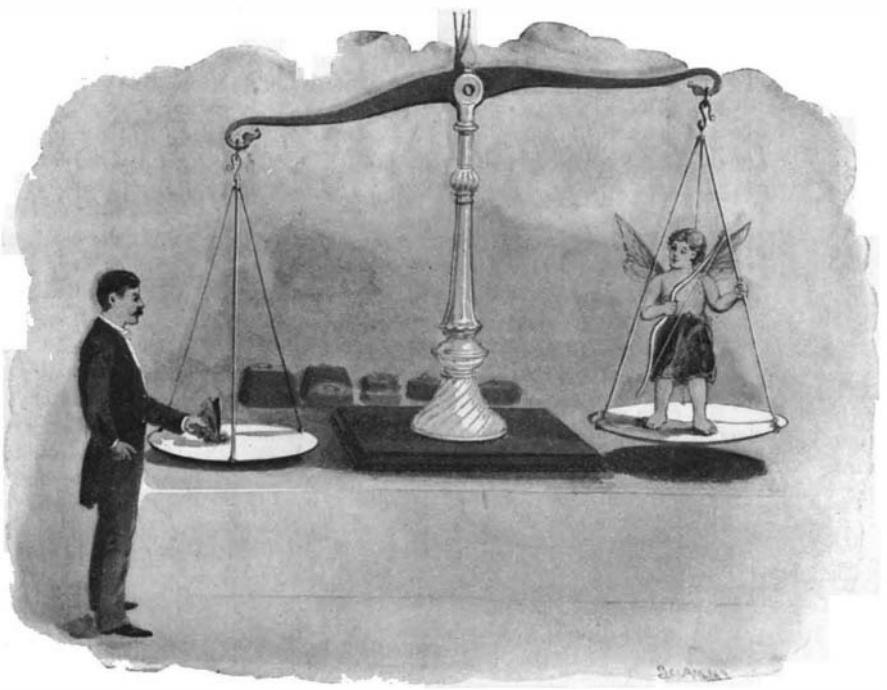
The pleasing trick which forms the subject of our engravings owes its success to the ingenious application of mechanical principles. The magician presents for inspection to the audience a large pair of balance scales. The audience is allowed to examine the various parts of the balance before it is erected on the stage. It consists of a central column and a beam resting on a knife edge and two pans suspended by cords or chains. After the column has been put in position,



THE ILLUSION EXPLAINED.

the beam is put on and a pin inserted, thus making a center for the beam to work on. A gentleman is asked to stand in one of the scale pans and then weights are gradually placed in the other pan until his exact weight is ascertained. The weights are removed and the gentleman steps down off the stage. The audience is now convinced that the scale is to all intents and purposes like the ordinary balance which is so much used in groceries for weighing tea, coffee, etc., although, of course, in the present instance it is built on a mammoth scale.

The magician now goes on to say that he will prove the old assertion that "love is lighter than a butterfly" to be absolutely true. He introduces a little boy dressed as Cupid, with wings and a bow and a quiver of arrows. When the child steps on the scale pan, it immediately sinks to the floor by his weight. The conjurer now takes a butterfly, and, asking all to direct their attention to the scale, drops it on the opposite pan, which immediately descends to the floor, at the same time raising the pan with the Cupid high in the air. If he takes the butterfly off, the Cupid descends, and every time the prestidigitator replaces the butterfly, Cupid is raised off the floor.



"CUPID LIGHTER THAN A BUTTERFLY."

The trick depends for success upon a carefully devised and concealed mechanism. The balance beam is devoid of any preparation, but the mechanism is cleverly concealed in the column, and motion is imparted to the beam by means of a shaft and bevel gears. The hole in the beam is not perfectly round; it is slightly oval, but not enough so to be easily seen by a casual glance. The pin is also oval, instead of round, and it is made to fit tightly. It will be seen that, when this pin is rocked or tilted, the beam is moved, carrying one scale pan up and the other down. The top of the column is of considerable size, and one side of it is cut away to admit of a bevel gear, which also has an oval hole the same as the beam. When the balance is put together and the beam is placed in position, the oval pin passes through the bevel gear and the beam, forming a horizontal shaft. This vertical wheel meshes with a horizontal gear wheel, which is also secured in the head of the pedestal. A shaft runs through it to the space below the floor, where it terminates in a lever secured at right angles. The magician's assistant, under the stage, grasps the lever, and, pulling it back and forth, transmits a seesaw motion to the beam through the medium of the shaft, the two bevel gears, and the oval pin.

The trick depends very largely for success upon the apparent willingness of the prestidigitator to allow all parts of the apparatus to be examined, and, as the gear wheels are very cleverly concealed, there is almost no chance of the trick being discovered.

The Desolation of Cromer.

The recent landslip at Cromer, England, is only the last of a long series of catastrophes which during the past thousand years have buried more than a mile of land in the sea. One looks in vain for any mention of Cromer in Doomsday Book. It was then but a hamlet of the town of Shipden. But Shipden has lain now for many years at the bottom of the sea. At the beginning of this century it was still possible to discern the masonry of its church at low water. In those days Cromer was an inland town. But in 1837 an extraordinary gale drove the sea to such a height that the very existence of the town was in peril for many hours. Since then a breakwater has been constructed to protect the town. The neighborhood, however, is gradually disappearing. At Sheringham a frigate drawing 20 feet of water can now ride at anchor where forty years ago there was a cliff 50 feet high. It has been found necessary to move various buildings inland. A lighthouse was built in 1719 several hundred yards inland, but in little more than a century this lighthouse had to be abandoned, owing to encroachment, and a new one built still farther away. The Cromer cliffs are very sandy, and are especially exposed to the action of the sea, as they encounter the full force of the drift from the northeast.—Westminster Gazette.

Russia in Central Asia.

A Russian vice-consulate has been established at Seistan, in the frontier sphere which Great Britain created between her protectorates of Afghanistan, Baluchistan, and Persia, something like a quarter of a century since, which leads the National Zeitung (Berlin) to give expression, editorially, to the following:

"Russia, which already has her claws around the Afghan city of Herat, is now stretching out her feelers further south against the outposts of the Anglo-Indian dominion. The Czar is preparing to send out a 'scientific' exploring expedition under Prof. Soroki, of Kazan, to Lake Lob Nor, in Chinese Turkestan, which, owing to the insecurity of the country, will require a by no means inconsiderable escort of Cossacks. This will probably turn out to be another of those numerous 'scientific' expeditions which Russia has been in the habit of sending to Central Asia of late years, to pave the way for annexation. The speech made the other day by the new governor-general of Turkestan to the Mohammedan notables of Tashkend, after the suppression of the revolt in Ferghana, ran as follows:

"'Be assured that all the Mohammedans here, taken together, form but an unimportant and imperceptible part of the millions of Russia. The great Czar has such a number of faithful servants, and his brave army is so large, that, if necessary, he can within a week or two bring men enough here to quarter a whole battalion in every village. The people must, therefore, remain peaceful and quiet. And what would you gain by hostility? The Czar has bestowed full liberty and the possibility of living according to their religion on all his faithful subjects, including the Mussulmans here.'"

Ivory Veneers.

Veneer cutting has reached such perfection that a single elephant's tusk 30 inches long is now cut in London into a sheet of ivory 150 inches long and 20 inches wide, and some sheets of rosewood and mahogany are only about a fiftieth of an inch thick.