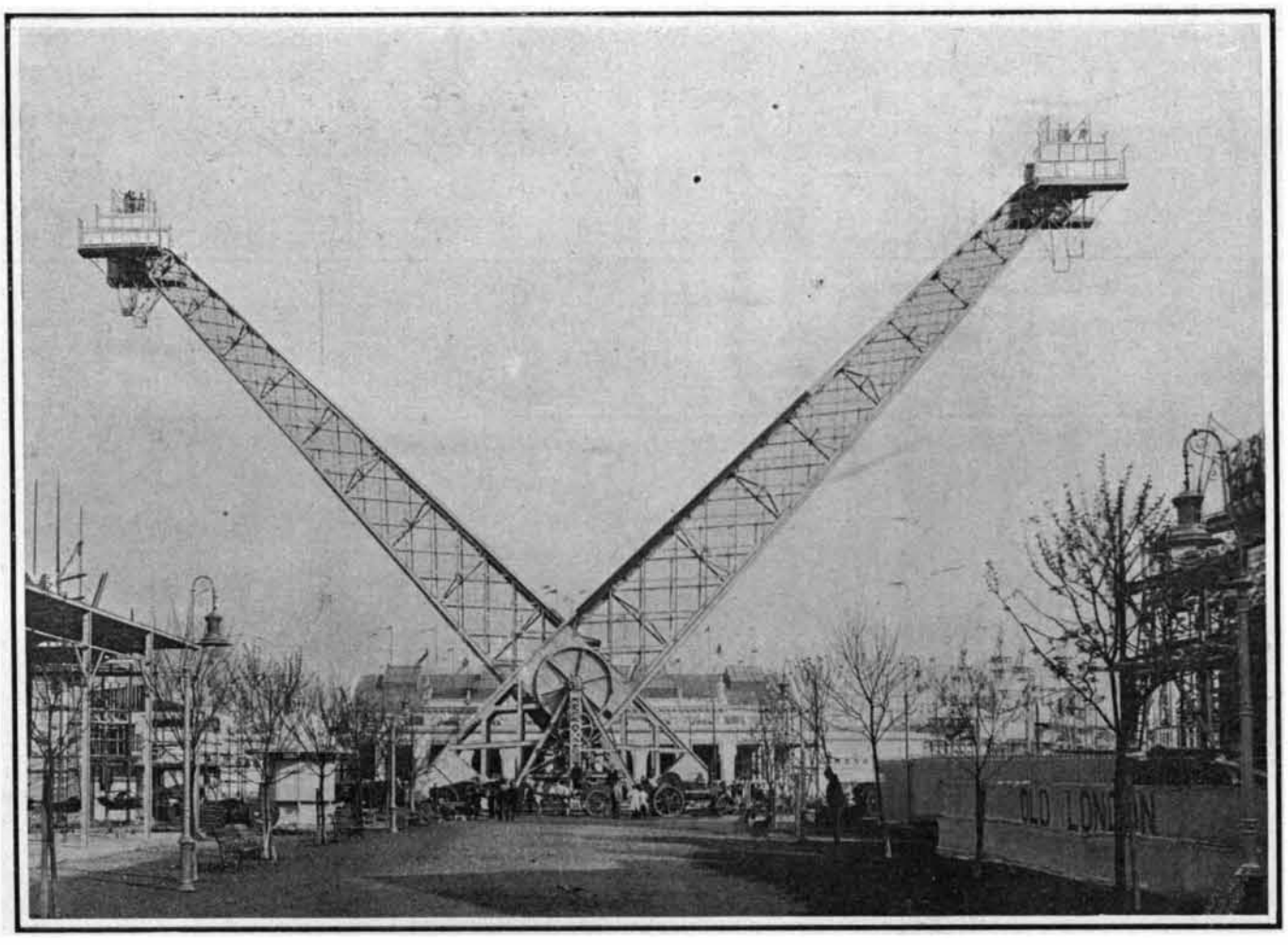
THE "FLIP-FLAP."

BY THE ENGLISH CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

Successive expositions have in turn contributed an individual sensational side-show, and in the Franco-British Exhibition the requirements in this direction are fulfilled with the "Flip-Flap." Since it has been in operation this amusement has proved remarkably successful, and the efforts to comply with the demands of the curious to experience a whisk through the air have severely taxed the resources of the apparatus.

The sensation comprises a slow passage in a semi-circle through the air in a car suspended at the extremity of either of two tapering arms, which normally rest in a horizontal plane, the cars being so suspended as to maintain constantly a vertical position. The general idea of the apparatus, which has been designed by Mr. Claude W. Hill, A. M. Inst. C. E., of Westminster, London, may be gathered from the accompanying illustration, which shows the arms after completing about a quarter of their travel.

The two arms or masts are each 150 feet in length, built up of latticed steel and tapering toward their outer extremities. These masts swing upon a pivot or shaft placed near the lower end, as shown in the illustration, and carried on steel trestles placed 20 feet above the ground. The over-all length of each arm is 186 feet, and it is pivoted about 36 feet from the lower end, which forms the tail. This latter section carries a balance weight composed of concrete rammed into an iron box, and by its provision not only is the minimum of power required in moving the arms, but it also acts as a safety device, overcoming any liability for an arm to drop suddenly. In the event of an accident or breakdown to the driving mechanism, the arms simply revert to a vertical position, whence they can be easily hauled down by ropes. The cars swing on a center pivot, and the constant vertical position is assured by counterweights carried in the body of the car below the pivot.



THE "FLIP-FLAP" AT THE FRANCO-BRITISH EXPOSITION.

The arms, which oscillate in opposite directions, are electrically driven by a shunt-wound motor developing 100 brake horsepower at a speed of 500 revolutions per minute. This motor is placed on the driving platform, which is arranged between the two arms, while the operator's cabin, in which is placed the main switchboard controller and signaling arrangements, is situated also between the arms above the axle, so as to secure a clear view of the working of the masts.

The power from the motor is transmitted first through worm and worm gearing to central bevel wheels by means of a vertical shaft, these bevel wheels being used in order to balance the wind pressure on the arms. Should this be equal, no load attributable to wind pressure is imposed upon the motor; while on the other hand, should the wind pressure be unequal, then the difference only is taken by the motor. From these bevel wheels the power is taken through differential gearing to four driving chains, which drive the set of gearing on either side of each arm.

By means of the differential gearing the wind-pressure stresses on the gearing on each side of the arms is equalized, thereby obviating any twisting strains on the arm itself; also it serves to distribute equally the driving power of the motor.

On either side, at the point where the cars rest when the arms are horizontal, is an anchorage and landing station. The cars carry locking bolts, which firmly secure the ends of the arms during the time passengers are embarking or disembarking, while a signal system is also adopted, coinciding with those in the operator's cabin. Emergency switches are also provided which enable the arms to be stopped at any point in their travel in case of accident without communicating with the engineer's cabin, while moreover limit switches are available for applying brakes should the engineer inadvertently allow the arms to travel beyond the landing stages, in which event also the arms come into contact with hydraulic buffer stops, which bring them gently to rest without any violent vibration or shock.

The arms are mounted upon wheels 16 feet in diameter, there being two to each mast, to which each is secured by 146 bolts, so that absolute rigidity is secured. The four driving chains have a maximum pull on each of 1,520 pounds. The brake wheels of the electro-magnetic brake gear are 34 inches in diameter by 4½ inches wide between flanges, with shoes of poplar wood. The solenoid plunger magnets give a pull of 60 pounds with 125 volts on the terminals of the coil, and with the plunger in the outer position. There are four of these solenoids in series in a 500-volt circuit, and the dashpots, though permitting the weights to be lifted quickly, only allow them to go down slowly.

The system of working the apparatus is very simple, passengers embarking simultaneously at either end, each car having accommodation for 48 persons, the internal arrangements of the car being in tiers, to allow everyone to secure an uninterrupted view from his point of vantage. When one car is full the attendant withdraws his locking or anchoring bolt, which automatically indicates by the signal system that he is ready to start to the attendant of the opposite car, and also warns the engineer in his cabin. A similar cycle of operations follows upon the second car being filled with passengers, and the coincidence of the signals informs the engineer that the driving mechanism can be set in motion. Sighting facilities are provided, to enable the latter to bring the arms to rest at their precise positions upon the conclusion of the journey.

During the trip, should an attendant accidentally or purposely close one of the bolts by which the arms are anchored to the landing stage, the mechanism is instantly stopped. But the withdrawal of the bolt will not re-start the machinery. This can only be effected by the engineer, who has to return his controller handle to the "off" position and make a fresh start. No matter by what means the progress of the arms is arrested, once the journey has commenced this return has to be made. It will thus be realized that every precaution is observed to prevent an accident, and similar measures are observed in regard to the propelling mechanism itself.

The journey made by the car is a complete semi-circle through the air which is about 470 feet in length. The traveling speed is about 160 feet per minute, so that the trip occupies about three minutes. When the journey is half completed the cars stand side by side, and the passengers being at an altitude of about 170 feet off the ground, have a magnificent view over the exhibition. Between the trestles supporting the axle a pit is provided in which the tails of the arm swing, since in the perpendicular position the ends of the arms are about 16 feet below ground level. Travel is perfectly smooth and without the slightest vibration, the passengers having no sensation of movement. Indeed, the feeling is very similar to that experienced in a balloon ascent. The total cost of the apparatus was approximately $150,000.

New Telephotographic Process.

While the processes of Korn, Carbonelli, "Grühn" (Grzanna), Cerebotòni, and others which have been made known up to date, transmit to a distance pictures of photographs already made, Sivelli has produced an apparatus for photographing at a distance any object at the transmitting station.

The transmitter consists of an ordinary photographic camera, the sensitive plate of which is replaced by one consisting of small isolated selenium squares, and in electric connection with one pole of the source of current. Leading from the other pole is an insulated wire, which dips in a small vessel of mercury on a horizontal plane. There are as many such mercury cups as there are selenium squares. They lie in the circumference of a circle, about the center of which a hand rotates, driven by clockwork, and provided on its free end with wire, touching all the mercury vessels one after the other. This hand is in electric connection with the wire which leads to the receiving apparatus, and which is fully insulated from the other portions of the apparatus.

The device operates as follows: After the camera lens is directed on the object to be photographed at a distance, an interrupter at the sending station is set in action. The rotating hand is then set in motion, so that it touches in rapid succession the mercury cups connected with the various selenium squares. In its first position this hand lies near the cup which corresponds with the first selenium square in the upper horizontal row. The electric current passes through that selenium square which is in connection with the hand, and is strengthened or weakened according to the intensity of the light on the square. These variations of current strength, corresponding with the illumination of the selenium square, are transmitted in regular order to the receiving station, where they are translated into light rays.

The receiving apparatus may have any one of several forms. That preferred by Sivelli is based on the following principle:

A cylinder with rotating and also axial movement is covered with a sheet of white paper, in the neighborhood of which there is a pencil in connection with an electromagnet. When all is so adjusted that the current strength remains unvaried (as long as the intensity of the light is the same on all the selenium squares) every closing of the circuit causes the pencil to make a stroke, the strength of which corresponds with the stronger or weaker action on the selenium square. The paper is thus covered with a series of strokes of varying strength, which reproduce with considerable approximation the optical image of the object before the camera.

Lime and gypsum in contact with feldspar increase the solubility of potassium. This effect has not been detected when ordinary clay soils are treated in a similar way. This difference is probably due to the absorbing action of the clays which causes the removal of potassium from solutions.