A SELF-ACTING MAIL ELEVATOR.

BY THE BERLIN CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

The present methods of mail delivery in hotels, apartments, and office buildings are defective in many respects. The letters and parcels are delivered to each lodger of an apartment house by hand, which obviously means waste of time and energy. The system prevalent in some countries of handing all the mail matter to the doorkeeper or porter, to whom is left the care of distributing it to the various addresses, is also objectionable. Nor can the letter boxes installed at the house door be called practical in all respects.

The idea of using the elevator principle for doing away with these drawbacks seems so simple, as to make one wonder that it should not have been long ago carried into practice. As it is, a Berlin engineer, Mr. E. F. Ostrowsky, has been the first to utilize it for the delivery of mail matter. His system is of remarkable ingenuity and simplicity.

One of our views shows a perspective of the mail elevator as designed for three stories of two tenants each. Another view is a lateral section of the elevator. A letter box installed on each staircase landing, and a façade, with a built-in elevator, are also illustrated.

The construction of the apparatus is based on a very simple mechanical principle.

In a narrow vertical shaft moves a frame *A* suspended by a wire rope, one end of which is fastened to the top of the frame *A*, whereas the other end passes over rollers *L*, and sideways, downward, around the drums *G* and over another roller and opening in a board above the drum. The end of the rope is fastened to a coiled spring which is connected with the lower part *B* of the frame *A* and imparting resiliency to the rope.

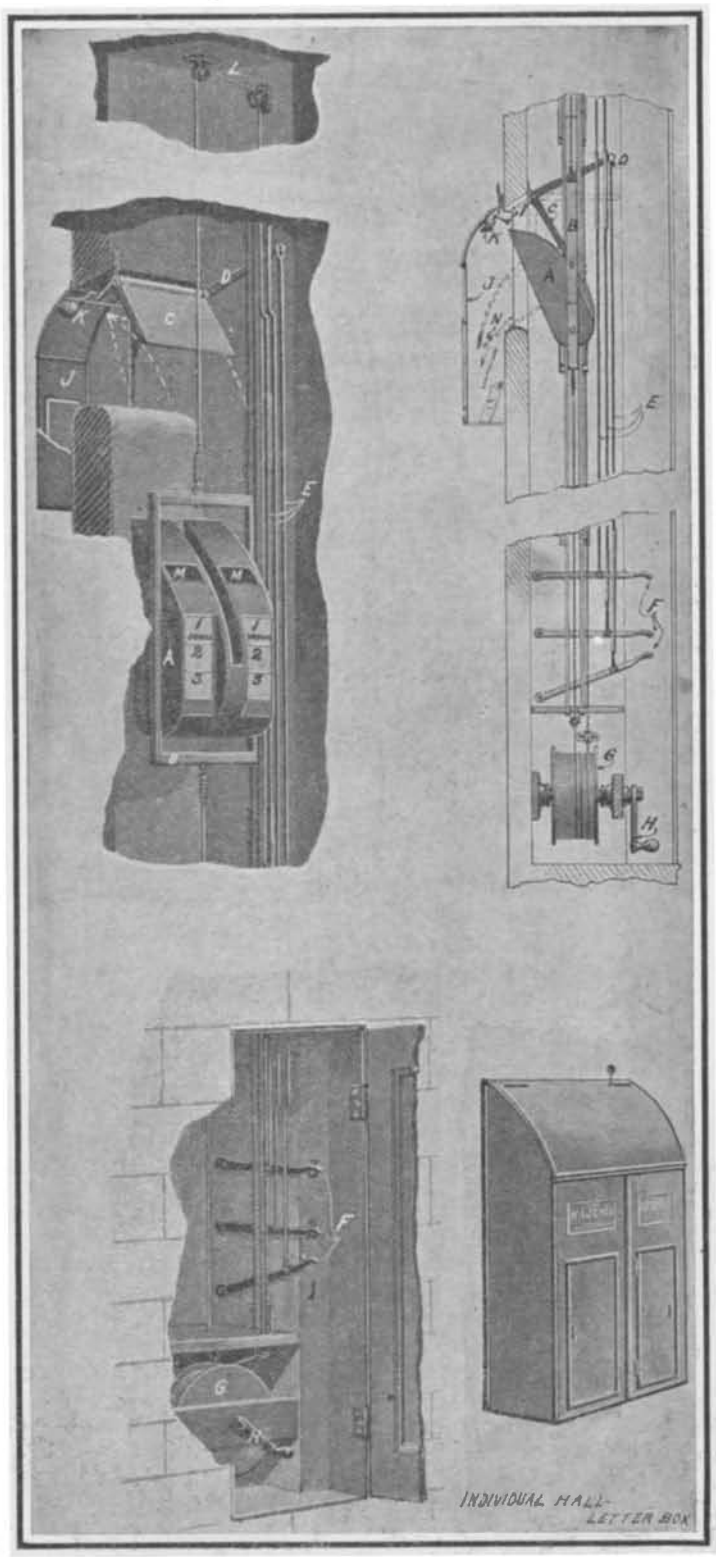
Because of this arrangement, the frame *A* can obviously be moved upward and downward, by means of the crank *H* and the drum *G*.

In the frame *A* a letter box *M* divided into two equal parts is swiveled. The box has two apertures in both the front and back.

The rear wall of the elevator shaft is provided with openings communicating with the backs of letter boxes at the several stories. The openings are provided each with a hinged cover *C* opened by means of the levers F^1, F^2, F^3, connected with vertical rods.

The entire elevator shaft can be built directly into the vestibule floor in the case of new buildings as shown. Its external appearance can be made to resemble a column, in the case of existing houses. After dropping the mail matter into the proper compartment of the letter box *M* provided with special labels for each of the lodgers, according as the addressee lives in the left-hand or right-hand wing of the house, the postman will lift the lever *F*, corresponding to the story in question, thus opening, through the medium of the lever *D*, the gate *C*. When the letter box *M* is lifted by turning the crank *H* at the high speed resulting from the considerable diameter of the pulley, it strikes against the open gate *C*, and, being tilted, pours out its contents automatically into the letter box, arranged on the staircase landing.

As the gate *C* is opened, it strikes against the bell *K*, thus announcing the arrival of the mail. An indicator on the receiving box is employed for the same purpose, the indicator remaining in a visible position until the letter box *M* has been emptied. As the crank is turned backward the letter box is brought down to its original position.



A MAIL DELIVERY SYSTEM FOR APARTMENT HOUSES AND OFFICE BUILDINGS.

At the Fifth International Geographical Congress, held at Bern in 1891, Prof. Albrecht Penck, the well-known geographer, proposed that the enlightened nations who were engaged in making maps of their own territory and of other countries should unite upon a common plan for the preparation of a general map of the world. He suggested that the scale of the map should be 1:1,000,000, or about 16 miles to the inch, and that the separate sheets of the map should be so bounded by meridians and parallels that any two sheets representing adjacent areas should match, except for distortion of projection, no matter by what country either sheet might be made. This proposal led to resolutions and discussions at subsequent geographic congresses and to the preparation of several tentative maps by Germany, France, England, and the United States, in conformity with the general plan proposed by Prof. Penck.

The Russian Minister of War has undertaken to establish, by a succession of wireless telegraph stations, telegraphic communication between St. Petersburg and the far East.

Treatment of Diseases of the Eye by Means of Intermittent X-Rays.

BY DR. A. LEPBINCE.

It is to Cook of New York that we owe a new method of utilizing the Roentgen rays. The field for the usage of these rays seems to be unlimited; apparently, they will eventually prove to be of great therapeutic value for the various diseases of the eye. Possibly, even, if these rays are judiciously applied at the inception of infections which are supposed to be incurable we may thereby avert total loss of eyesight.

Let us first consider the production of intermittent X-rays, or, as they have been called by Dr. David H. Coover, of Denver, U. S. A., "the sparks of Roentgen rays." The apparatus specially in mind consists of a small motor, a condenser, and a movable scale.

My arrangement differs a little from that of Coover. It consists of a clockwork movement actuating a graduated rod provided with a movable screen. The rod is placed behind the localizer, and according to the position of the screen upon the rod, the interruptions follow one another more or less rapidly at the rate of from 50 to 200 per minute.

With the aid of a regulator, one is able to obtain from 40 to 600 sparks per minute. The amperage and the distance of the tube are likewise carefully regulated. Experience has demonstrated that the best results are obtained in ocular affections by a somewhat restricted number of sparks, 75 to 150 per minute, and by removing the eye to a distance of about 37 centimeters from the focus.

It develops that radiant energy possesses four distinct therapeutic properties, namely, sedative, stimulating, irritating, and sloughing functions, each of which corresponds to an electrical, mechanical, chemical, and calorific effect.

With the intermittent rays it has been possible to separate the purely stimulating action from the irritative action, and experience has demonstrated that by thus proceeding, the regenerative action is enhanced.

Cook has established that "the degenerative action of the regenerative and continuous action of the intermittent rays found its demonstration in the treatment of affections of the eye." If a cataract which is almost mature is exposed to *continuous* rays and ephermal stimulations, an improvement of the eyesight is sooner or later followed by a maturation of the cataract, as a consequence of hyper-stimulation or irritation. This fact permits the establishment of a technical rule for the maturation of incomplete cataract. With the "sparks," especially when higher amperage is used, the irritation and the maturation are avoided; and with an incipient cataract the stimulations and regenerating effect are not only invariably obtained with more or less improvement in eyesight, but may be maintained during the entire treatment.

Dr. Coover may not have experimented with incipient cataract, but he has at least observed the regenerative action in other affections of the eye. In a case of serpiginous ulcer of the cornea new cells were rapidly formed, and a cure was effected only by application of the intermittent rays.

In the opaque portions of the cornea, the process of absorption results in a hyperæmia of the blood vessels of the eye, as has been found in all cases which have undergone treatment.

The vessels of the conjunctiva are more congested after each treatment. The hyperæmia persists for several minutes, and if there was previously a peri-corneous injection, it is always enhanced. Examination, by means of the ophthalmoscope, of the ball of the eye, after having been exposed to the rays, always shows an increase in the size of the vessel of the retina, particularly after a case of optical atrophy.

The regeneration is accompanied by diminution of the tension, improvement of the circulation, and increase of the leucocytes. These modifications are noticeable in the muscular, nervous, osseous, vascular, epithelial, and glandular tissues.

The action manifests itself in the eye on the optic nerve, the cornea, the crystalline lens, the charoid, the retina, and the iris. In addition to the local effect, there is found another of a more particularly tonic nature. The cellular metabolism increases, and all the vital processes are stimulated, a condition which is necessary for the treatment of all local degenerations.

This effect, evidently, is totally different from that produced by continuous rays, which have a regenerative effect only during the early stages of their application. This effect is particularly noticeable in the blood. At the start there is an increase in the number of red and white corpuscles, particularly the latter, and later, degeneration sets in, as is indicated by a diminution in the number of these corpuscles.

Some observations have been published regarding the cure of blindness and deafness by prolonged treatment with continuous rays employed for the treatment of cancer having its seat near the eye or the ear.

Prof. Birch-Hirschfeld of Leipzig has reported the anatomical modifications of an eyeball exposed to prolonged radiations during the treatment of a carcinoma (cancer) of the temple by the X-rays. The principal troubles were due to the endothelium and to the vacuolization of the structures of the iris and of the retina. The maeular region was the one most affected, and the seat of a cellular degeneration. There were no symptoms of inflammation. Experiments upon an animal led to the same conclusions. By his experiments with rabbits, Selenkordsky has likewise demonstrated the danger of immoderate or untimely use of continuous X-rays. This degenerative action of X-rays was likewise observed by me some years ago, and treatment of various cases led me to the same results as those of Cook. Having treated with the X-rays a woman forty-five years of age for a leucoma of the cornea complicated by incipient cataract, I was surprised to obtain a very appreciable improvement in the condition of the cornea, and likewise in the condition of the crystalline lens; but, in the measure in which the clearing up of the cornea was effected, an equally rapid development of the cataract occurred, so that it was soon complete and operable. Enlightened by this experience regarding the peculiar effects of continuous rays, I have used more restraint in treating cases by this method, and have never subjected my patients to a repeated treatment with X-rays. The technical details of the process of Cook and Dr. Coover seem to be rational enough, and the observations of the latter lead me to look confidently into the future regarding affections as serious even as optical atrophy.

It seems that in the acute, ulcerous, and irido-

(*Continued on page 401.*)

meters (one degree F. per 182 feet). Because of the constant upheavals to which the air is subject in its lower levels, this average rate of temperature reduction as we ascend is not always observed. Sometimes it even happens that for a short distance the thermometer rises instead of falls, but ultimately the temperature drops at a uniform rate until it reaches a point lower than that recorded by any North Pole explorer.

The three layers of air which have been discovered by kites and balloons intermingle but slightly; one floats upon the other as oil floats upon water. Of the great ocean of air at the bottom of which we move and live, three-fourths lies below the permanent inversion layer. All our storms, our clouds or dust are phenomena of the lower two layers.

Treatment of the Eye by X-Rays.

(*Continued from page 394.*)

cyclitous stages, a very moderate application of X-rays does not have an injurious effect upon the ocular tissues and is able, with the aid of local medication, to overcome the disease. In this connection I may cite a personal experience, in which one of my patients was afflicted with a serious ocular traumatism, perforation of the cornea, traumatic cataract, and plastic iridocyclite of fifteen days' standing. The case was brought to me for consultation on the 2d of February, 1907.

The eye was hypotonous, vision was extinct, hardly a sensation of light being preserved. The case seemed to be hopeless, and in despair I made, in the course of one week, four applications of X-rays, extending from the 2nd to the 14th of February, and simply prescribed atropine.

On the 3d of April improvement was apparent, the eye resumed the normal tension, although there still remained perikeratic inflammation and only a very weak luminous perception.

A new radio-therapeutic treatment was effected the same day, and on the 5th of June all traces of the inflammation having completely disappeared a month previously, I was able to extract the cataract with complete success.

It is certain that one single case is not as safe to base conclusions on as is a series of observations on analogous cases. I have always thought, however, as a result of my experience in this case, that I would never have been able to obtain such a rapid improvement and radical cure without X-rays.

Since 1907 I have treated in this manner six cases of iridocyclite and a case of optic neurosis by the continuous rays. In the four initial treatments I have never applied irradiation too strongly, since the very first case (cataract and leucoma) revealed to me the danger of repeated treatments. The treatment has been considerably diminished in duration, and the cure is effected more rapidly than by ordinary medication. Irradiation of neurosis six times in the course of two months did not result in any improvement, but was terminated by optical atrophy.

This personal experience corroborates the conclusions of Cook and of Coover regarding the discontinuous effects of X-rays. The observations reported by the latter apply to *intermittent* X-rays, which seem, in those cases where they have been utilized, to have a particular efficacy upon processes of cellular regeneration.

The cases treated by Coover related to four ulcerous corneas, two iridocyclites, and three optical atrophies. The ulcers and the iridocyclites were cured in a few treatments; and as for the atrophies of the optic nerve, an improvement was achieved in one case after four treatments, in another after three treatments, and in the last case after seven treatments.

These really striking results, especially in cases as grave as optic atrophy, lead

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us to hope that in a not far distant time we shall be able to cure this redoubtable affection, or may at least be able to prevent its evolution from the moment that the diagnosis has been made.

Time alone will assure that the cures related by Coover are permanent. The results so far achieved, however, deserve, in my estimation, our serious consideration.—Cosmos.

Test of an American Helicopter.

In the recent Berliner-Williams helicopter trials at Washington, D. C., on the farm of Mr. Emile Berliner, the two revolving-cylinder motors of Mr. Berliner rested upon the platform of the machine, each being connected by its own countershaft to the main gear-wheels of the oppositely revolving propeller shafts, which are tubular and concentric. Mr. Williams also stood upon the platform, on the opposite side of the shaft from the motors. The total weight lifted in this trial, including Mr. Williams, was 610 pounds. The weight of the complete helicopter without him was 460 pounds; and the two motors, with countershafts, pinions, connections, etc., weighed 248 pounds.

In previous trials each of the motors, installed singly, had lifted the machine, with a little added weight upon an outrigger, for balance; the thrust, or lift, being about 350 pounds, which compares favorably with previous experiments made by Mr. Berliner last fall, when, with a single propeller of somewhat greater diameter and area, he got about the same results.

The two motors, which are duplicates, are of the star-shaped, 5-cylinder, revolving type of 36 rated horse-power. They were built specially for Mr. Berliner, and they had been overhauled, tested, and worked into good running shape at Mr. Berliner's laboratory.

The helicopter, built by Mr. J. Newton Williams, of Darby, Conn., about two years ago, was first tried with a motor that proved to be too small for the work. It was then connected by flexible shafting to the factory power, to test the thrust of the propellers, which in a series of trials with from 13 to 19 measured B. H. P. lifted from 250 to 430 pounds, and in a final trial, in which the horse-power was not measured, a thrust was obtained of 560 pounds. The machine was later taken to Hammondsport, N. Y., where an 8-cylinder 40 horse-power Curtiss motor was installed, and a number of trials made, the motor lifting the machine with added weight, totaling from 410 to 485 pounds, but not being equal to lifting the weight of an average-sized man.

In this last trial at Washington the blades of the propellers had been enlarged, increasing their diameter from 16 feet 8 inches to 18 feet 8 inches, and increasing their area from 64 to 80 square feet. This increase of superficial area of the propellers increased the general efficiency of the machine, as the greater lifting surface gave a greater resultant lift per unit of horse-power, and the reduced revolution speed of the propellers, due to increased resistance, gave a reduced revolution speed to the motors, which, with the transmission used, seemed to give them greater efficiency.

The propeller speed was 120 R. P. M., while the speed of the motor was 900 R. P. M.

Mr. Williams expects to have a 7-cylinder motor built of the same revolving type, and of 50 per cent more power, and will also build a helicopter on about the same lines, but of larger size and lighter construction.

The completed machine will have a parachute to retard the fall in an emergency, and its dirigibility is assured by very simple controlling devices, which are now being patented.

It is regrettable that the Lighthouse Board has changed the name of the buoy marking the historic spot where the ironclad "Merrimac" went down after her defeat by the "Monitor." "Merrimac wreck buoy 28" will now be called "Channel buoy 28."

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The Middle West Number of the SCIENTIFIC AMERICAN

On December 11th, 1909, the Scientific American will issue a number devoted entirely to the wonderful Middle West region of the United States, a number which will set forth broadly and lucidly not only the agricultural interests of that region, but also those larger engineering undertakings which are destined to transform the Middle West, in part at least, into a manufacturing territory.

With that object in view the Middle West Number will publish articles on the following subjects:

I. The Chicago and Gulf Waterway.—An illustrated description of Chicago's drainage canal, an engineering work which stands without a parallel in the world.

II. Chicago as a Railroad Center.—Chicago is the greatest railroad center in the world.

III. The Wonderful Grain Trade of Chicago.—Chicago is an enormous wheat bin, into which much of the grain raised in the middle West is poured.

IV. Shipping on the Great Lakes.—Most of the iron ore that is now smelted in Pennsylvania is mined in the middle West. To transport it to the blast furnaces of the East at a cost which will enable American steel makers to compete with foreign steel makers, it has been necessary to devise a new kind of lake transportation. Ships of 10,000 and 12,000 tons burden have been constructed which convey ore at small cost through the Great Lakes, and which are without a counterpart anywhere in the world.

V. The Handling and Shipment of Iron Ore.—The above-mentioned fact that iron ore is mined in the middle West and smelted in the East has necessitated not only the construction of special freight-carrying steamers, but also the designing of special machinery for loading and unloading the ore from the steamers.

VI. Freighting on the Mississippi.—Freighting on the Mississippi is a more important industry than most of us may realize.

VII. The Steel Industry.—One of the greatest steel plants in the world is that which has been built at Gary.

VIII. The Freight Subway System of Chicago.—Chicago can boast of a rational system of handling freight by means of subways.

IX. The Water Supply of Chicago.—Chicago's source of water is Lake Michigan. The city is supplied with water by means of a tunnel which extends two miles out into the lake.

X. Reclaiming Arid Lands.—The United States Government has under way many irrigation projects for the purpose of reclaiming lands which are arid, but which will blossom if properly watered.

XI. Harvesting the Grain of the Middle West.—Farms that cover not acres but square miles, crops that aggregate not simply bushels, but car-loads, have rendered it necessary to plant and harvest on an unprecedented scale in the middle West. The ingenious agricultural machinery which has been designed to cope with these peculiar conditions is described and illustrated.

The Middle West Number will be more than twice the size of the regular SCIENTIFIC AMERICAN. It will be lavishly illustrated. It will be contained in a colored cover which strikingly depicts Chicago's grain elevators at work. Order from your newsdealer or from

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