

HABITUAL ATTITUDES OF ANIMALS CONSIDERED AS A DEPARTMENT OF COMPARATIVE ZOOLOGY.

BY J. CARTER BEARD.

(Continued from page 107.)

One of the most remarkable discoveries in ornithology in late years is that of a feathered quadruped, the crested hoatzin, or *Opisthocomus cristatus*. This remarkable bird haunts the deepest recesses of the immense forests that extend from the northern seacoast of South America to the Amazon River. The hoatzin is remarkable for possessing, while a nestling, four legs, two of which resemble those of reptiles. The attitudes of the young birds as they leave the nest, which they do at a very early age, and climb over the adjoining limbs and twigs, are far more like those of tree toads than of birds. Mr. J. J. Welch, who saw them in British Guiana, writes that, soon after hatching, the well developed claws on the pollax and index are continually used for hooking and holding on surrounding objects, by means of which the nestlings clamber far away from the locality where they were born, following the parent bird at feeding time.

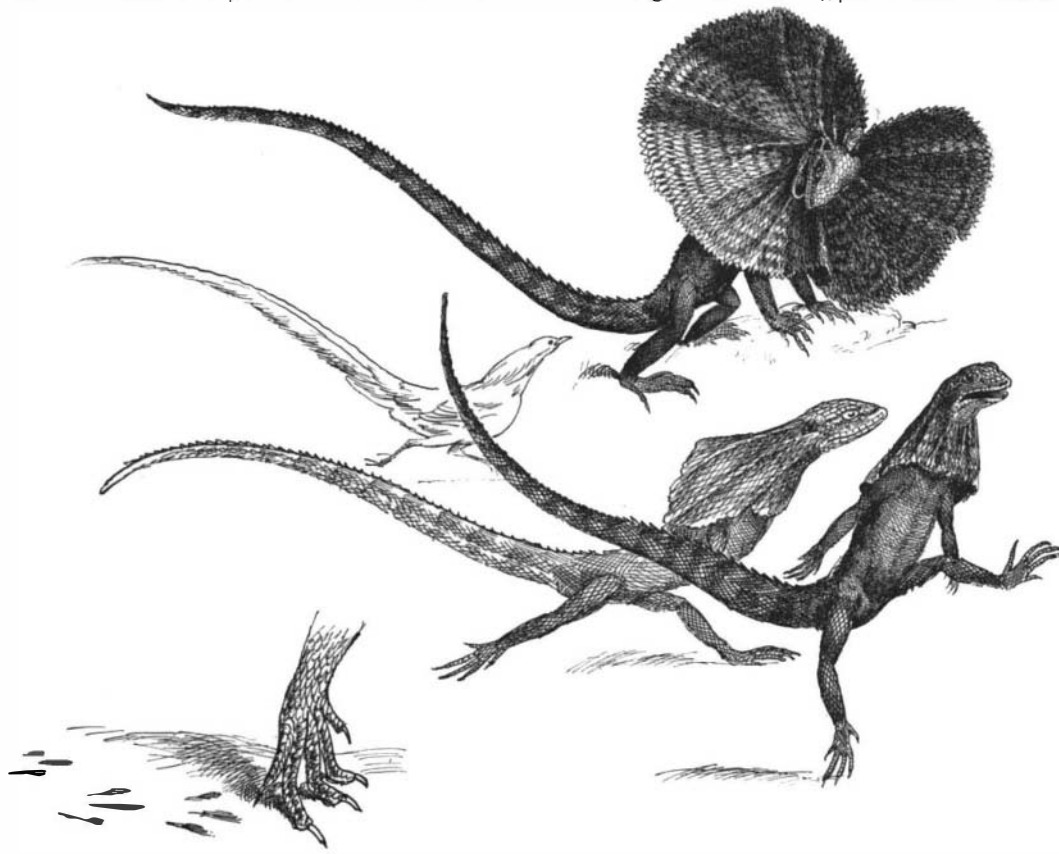
Prof. F. A. Lucas, in an excellent monograph on the subject, says: "The parent birds not only have no claws upon their wings, but their thumbs even are so poorly developed that one would hardly suspect that in the nestlings we have the nearest approach to quadrupeds found among existing birds. Here, then, we have an epitome of development extending elsewhere through uncounted ages compressed into the life history of a single bird, and graphically expressed in the habitual birdlike attitudes assumed by the adult and the unmistakable reptilian character of the clinging, climbing, sprawling quadrupedal postures of the young."

Another instance of the kind must close the article, though it is far enough from exhausting the record. Although the frilled lizard (*Chlamydosaurus kingii*) yields no indication of the peculiar birdlike modification of the pelvic bones so characteristic of the extinct group of the great reptiles called dinosaurs, which, according to the generally accepted interpretation of their anatomy and the evidence of their fossilized tracks, walked upon two legs, as do birds, it gives a lively realization of what a lizard walking upon two legs looks like and helps immensely in conjecturing the appearance of the bipedal saurians when alive.

Mr. W. Saville Kent, in a very interesting communication to Nature, says: "The most remarkable feature exhibited by the specimens I kept in captivity was their peculiar method of running. My last specimens brought from the bush were in vigorous health, and at first trial, when left at liberty, save a light retaining cord, ran along the ground almost perfectly erect, with both their fore limbs and long tails elevated clear of the ground." Attempts were made by means of a Kodak camera to permanently register the absurdly grotesque positions exhibited by these lizards in running, which after several trials were successful. "Although," says Mr. Saville Kent, "these pictures

partake much of the character of silhouettes, they will serve to indicate the more characteristic attitudes this lizard may assume in running. The profile of the running reptile is peculiarly interesting, it possesses so much in common with that of a long-tailed running

impressible soil, would be three-toed like that of a bird and would also correspond with such as are left in Mesozoic strata by various typical dinosauria. Whether or not this method of running has been transmitted from a lizardlike dinosaurian, or has been developed independently among its family group, is a question concerning which it would be difficult to pronounce. The phenomenon, while frequent among the reptilia of bygone ages, is, with the exception of *Chlamydosaurus*, extinct among living types;" and the bipedal attitude it assumes is, on that account alone, of unique interest. As may be conjectured from what has gone before, the habitual attitude of animals is a science, in itself as well worthy consideration as any connected with natural history. It has fixed principles and many phases, as the attitudes of animals moved by love or anger, in health and sickness, in action and repose; attitudes common to genera, to families, to classes and those peculiar to species; attitudes of the young as compared with adults, besides many other branches of the subject, all important and doubtless fertile and fruitful upon cultivation, and at the present stage of progress in biological investigation, certainly seeming to demand attention.



FOOT SHOWING HOW THREE-TOED TRACKS ARE MADE BY A FIVE-TOED FOOT.—ATTITUDES OF FRILLED LIZARD AND RESEMBLANCE TO A RUNNING PHEASANT.

bird, such as a pheasant. One point in particular in the erect running gait of *Chlamydosaurus* invites brief attention. Such is the conformation of the hind foot and its component digits that when thus running only the three central digits rest upon the ground. On account of this peculiarity the track made by this lizard, when passing erect over damp sand or other

patent swindlers. Confirming that report is a letter written to the Commissioner of Patents on January 27 by the Hon. Harrison J. Barrett, Acting Assistant Attorney-General of the Post Office Department, in which the following language is used: "These parties were extensively engaged in swindling patentees in the middle West. Their scheme was, in brief, to address patentees, offering to exploit and sell their patents. Money was first obtained for an abstract of title, and then for commissions, then for journeys here and there to make terms with prospective purchasers, and for any other purpose they chose to name. The abstracts of title were never furnished, the long journeys were never taken, and the prospective purchasers were myths."

Concerning Patent Swindlers.

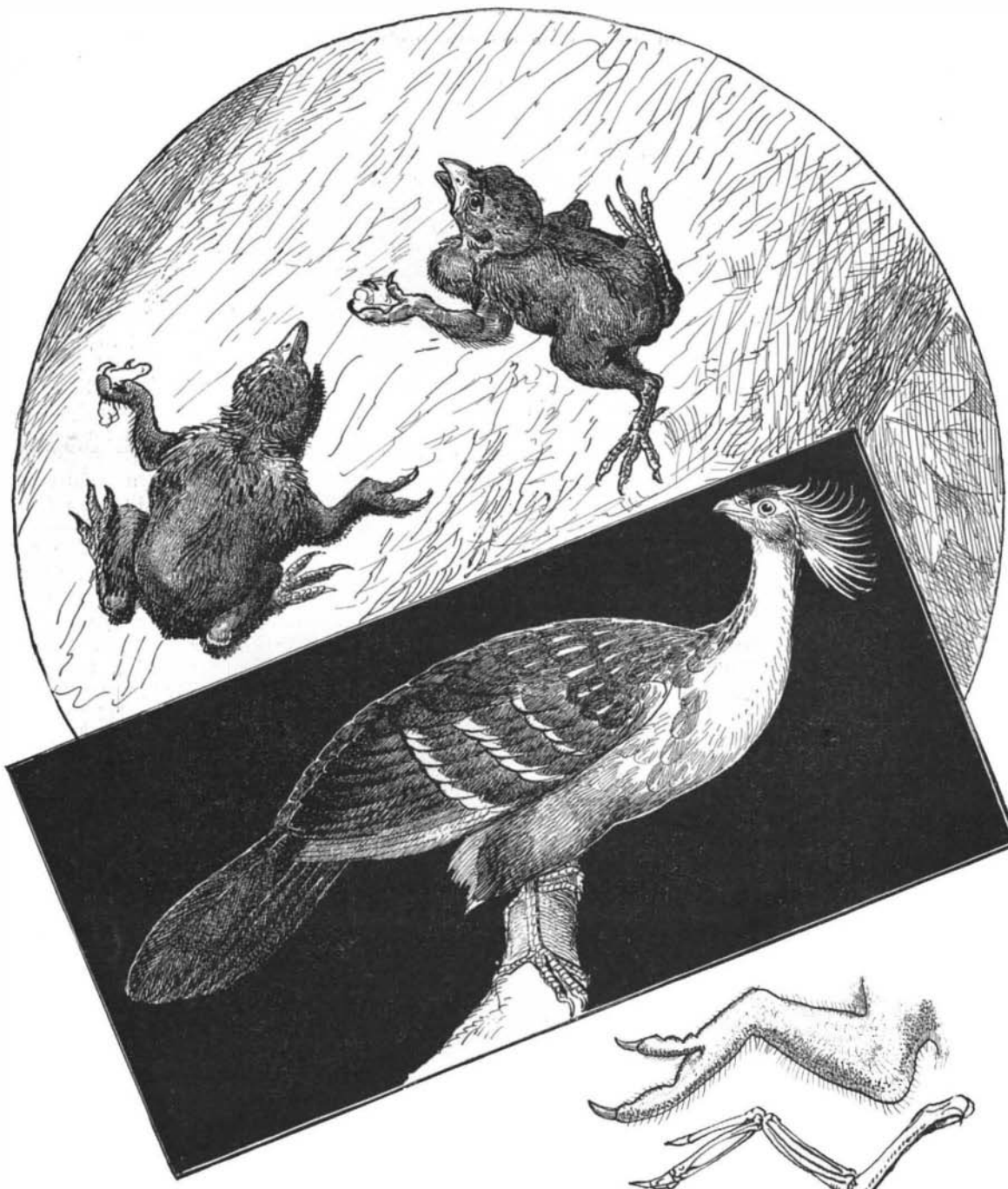
In our issue of January 29 we alluded to the arrest of a set of patent swindlers. Confirming that report is a letter written to the Commissioner of Patents on January 27 by the Hon. Harrison J. Barrett, Acting Assistant Attorney-General of the Post Office Department, in which the following language is used: "These parties were extensively engaged in swindling patentees in the middle West. Their scheme was, in brief, to address patentees, offering to exploit and sell their patents. Money was first obtained for an abstract of title, and then for commissions, then for journeys here and there to make terms with prospective purchasers, and for any other purpose they chose to name. The abstracts of title were never furnished, the long journeys were never taken, and the prospective purchasers were myths."

"The parties are under indictment at Cincinnati, Ohio, and will be tried for their offense at the March term of the Grand Jury."

It is to be hoped the verdict in this case will be of such a nature as to prevent the continuation of such open frauds on inventors and frighten others from using the United States mails for such purposes.

Ink for Labeling Bottles.

Ink which adheres to glass and takes the place of the paper labels on bottles, etc., is prepared as follows, according to the *Werkstatt*: Take 20 grammes of brown shellac, which is dissolved in 150 cubic centimeters of lamp spirit; then prepare a solution of 35 grammes of borax in 250 cubic centimeters of distilled water and pour the first solution slowly into the second. Now a dyestuff has to be added to the product received; for this 1 gramme of methyl violet is well suited. The ink prepared in this manner is said to be indestructible.



YOUNG OF HOATZIN (*OPISTHOCOMUS CRISTATUS*) SHOWING REPTILIAN ATTITUDES.—ADULT HOATZIN. FORE LIMB OF YOUNG HOATZIN.

Indigo.

BY DR. R. IN TECHNISCHE RUNDSCHAU.

A few weeks ago the German chemical industry was able to record another great success in which science and industry take equal shares. The Aniline and Soda Manufactory of Baden, at Ludwigshafen on the Rhine, has, after years of strenuous endeavors and hard labor, succeeded in discovering a process to produce indigo—the most beautiful and most important of all dyestuffs—from coal tar, in any quantity and at such a low price that it can enter into competition in the world's markets with the natural product. Two figures will suffice to indicate the importance of this invention. Into Germany alone close on to 2,000,000 kilos of indigo were imported in 1896, for which more than 20,000,000 marks were paid to other countries. These figures will explain why chemists have toiled for decades to invent an artificial production of this precious substance, not allowing themselves to become disheartened by the great difficulties or any of the many failures in their work. These statements will justify a closer description of the characteristics of this substance and the conditions under which it is afforded us in nature.

Contained in the sap of various plants is a body called "glycoside," which splits into two others under the action of various agents, such as diluted acids, or by fermentation, viz., into a sugar and into indigo white, which in its turn passes into indigo blue, through absorption of oxygen from the air. While indigo white is rather readily soluble in alkaline fluids, the indigo proper is totally insoluble therein, as well as in most other liquids. On these facts its production as well as its employment are based. Of the plants which contain indigo, only woad is indigenous in our latitudes, whose dried leaves were of great importance in former centuries for blue dyeing. But when in the sixteenth century the importation of indigo from the Orient commenced, it was slowly crowded out, in spite of the resistance of the woad farmers, and even imperial edicts could not save the German woad plantations from decay.

The largest amount of indigo is furnished by East India, where the most important indigo plant, *Indigofera tinctoria*, is indigenous, but to-day it is also grown in certain parts of Africa and America. In East India the production of indigo and its use in dyeing has been known since the oldest times, and up to the present both have only been changed very little.

Indigofera tinctoria is a herbaceous plant which is annually grown from seed. Before flowering the plant is cut off and steeped, fresh or dried, in water to which a certain amount of lime is added. After some time the liquid starts to ferment; the indigo white, after the splitting of the glycoside, passes into solution, and under the action of the air the insoluble indigo separates from the decanted liquid in the form of a fine blue powder and settles to the bottom. After discharging the supernatant liquid, the moist mass is pressed in moulds, mostly die-shaped, and dried and is thus placed on the market. It is obvious that no pure product can be obtained in this manner, as the impurities of the original liquid get into the precipitate. These impurities are not even always accidental, but are frequently added for adulteration. A further curtailment of the percentage of indigo in the mass is occasioned by the fact that other dyestuffs are contained in the plant, besides the indigo, which precipitate in a like manner. These will cause an alteration of the shade in dyeing, thus causing more difficulties for the dyer. As a matter of fact, a product is frequently found on the market which contains more impurities than dyestuff. Only an accurate chemical analysis can decide the value of a commercial variety, but since a reliable method was lacking up to a short time ago, and as such an examination is even to-day very laborious, and consequently expensive, dyers have become accustomed to judge, in buying, by the outward looks and certain marks, only to become frequently convinced afterward, to their great detriment, that such marks are very deceptive. In order to avoid this uncertainty, one has begun to refine the crude indigo by passing it back into solution as indigo white and precipitating it, after the impurities have settled from the decanted clear solution, by a supply of oxygen. By this process it is possible to remove the larger part of the admixtures and to obtain a pretty uniform product; but by this refinement the price of the dyestuff is considerably raised, and therefore it has not gained much favor.

Like the production of indigo, the process of dyeing with it has remained unchanged in its main points for centuries. The indigo is ground to a dustlike powder in special mills and passed into solution as indigo white by reducing admixtures in a large vat of metal or cement. The solutions of the indigo white are called "vats." Besides the "green vitriol vats" there are still others, according to the reducing agent employed, for the conversion of indigo blue into indigo white. The most suitable is the "hydrosulphite vat," used only of late, which is founded on the action of sodium hydrosulphite and dissolves the indigo promptly after a little stirring.

For cotton, green vitriol is used, which reduces the dyestuff in the cold, i. e., absorbs its oxygen; for wool,

the reduction by fermentation, which is obtained by bran and sirup, etc., and by maintaining a uniform temperature of about 30° (C.?), has been found more suitable. In both cases an addition of lime is necessary to keep the indigo white formed in solution. In this solution the loose material, yarn or fabric is moved about until it is completely saturated with it. On being taken out it is, of course, little dyed, but it becomes blue as soon as exposed to the air. The saturation and exposure to air are repeated until the desired shade is obtained. When the vat is exhausted it is refreshed by new additions of dyestuff and lime, etc. It is discharged only when it has become so muddy that sufficiently clear shades can no longer be obtained with it.

This, of course, entails a certain loss of indigo each time, and the dyer strives to defer the discharging as long as possible, which is more practicable the purer the added materials are. The above will explain why a uniform, warranted pure product must be the ardent desire of all dyers. But it has taken a long time till this end was reached.

Above all, it was necessary to throw light upon the intimate structure of this dyestuff. This problem was already solved by the Munich chemist, Prof. Bayer, and in 1881 he succeeded in producing the first artificial indigo. A little later Haumann reached the same result, but in a different manner. From there, however, to a wholesale production in industry was still a wide step. It is true several German manufacturers, in union with the said scientist, were successful in inventing methods which admitted, at least in a limited degree, the use of an artificial indigo in industry. In 1881 the Aniline and Soda Manufactory of Baden placed upon the market a product, the so-called propiolic acid, from which indigo was produced on the fiber in calico printing. A similar product is the indigo salt of the firm of Kalle & Company, at Bieberich on the Rhine. But, outside of the expensiveness, the prints produced with it showed such defects—one of the substances employed had a very unpleasant odor, which could not be removed from the ready product—that a further dissemination was excluded. These drawbacks were finally overcome, in 1895, after a stupendous amount of labor, by the Aniline and Soda Manufactory in their "Indophor," and also by the Hoechst Dye Works, but the improved product was confined to calico printing. An artificial indigo which could compete on the foreign markets with the natural product in all its uses still remained uninvented. As late as 1896 the factory admitted, in one of its pamphlets, that although considerable progress had been made, the end of the laborious path was not yet in sight. As said before, the Aniline and Soda Manufactory has been the first to reach the hotly contested goal. The "How?" is, of course, a deep secret, guarded by the concern, and it is only known that the new indigo is a tar product, and that the success is chiefly based upon the happy choice of the material produced from it, which is at disposal in any quantity. But the manner in which the new product is obtained is immaterial to the dyeing industry, as long as a product is furnished which is always uniform and entirely pure, and the gratification with which this invention is greeted everywhere is sincere.

A Bill to Suppress Fraudulent Advertising.

Another attempt is being made in New York to pass a bill aimed at fraudulent advertising. We reprint the sections of the measure, which are as follows:

"Section 1. Any firm, person or partnership of persons, or any employee of a firm, person or partnership of persons, who, either in the newspapers or other periodicals of this State, or in public advertisements, or in communications intended for a large number of persons, willfully makes or disseminates any statements or assertions of facts with respect to his, her or their business affairs, especially concerning the quantity, the quality, the value, the price, the method of production or manufacture, or the fixing of the prices of his or her or their merchandise or professional work; or the manner or source of purchase of such merchandise, or the possession of awards, prizes or distinctions; or the motive or purpose of a sale, intended to have the appearance of a particularly advantageous offer, which are untrue or calculated to mislead, shall be guilty of a misdemeanor.

"Section 2. Any firm, person or partnership of persons, or any employee of a firm, person or partnership of persons, who, either in the newspapers or other periodicals of this State, or in public advertisements, or in communications intended for a large number of persons, willfully makes or disseminates any statements or assertions of facts with respect to the proprietor or proprietors, manager or managers, practitioner or practitioners of a business or profession; or with respect to the business affairs or professional work of such proprietor or proprietors, manager or managers, practitioner or practitioners, especially concerning the quantity, the quality, the value, the price, the method of production or manufacture, or the fixing of the prices of such merchandise or professional work; or the manner or source of purchase of such merchandise; or the posses-

sion by him, her or them of awards, prizes or distinctions; or the motive or purpose of sales, calculated to divert his, her or their trade, or to disturb the carrying on of said business or professional work, or to injure the credit and standing of the proprietor or proprietors, manager or managers, practitioner or practitioners of such business or professional work, which are untrue or calculated to mislead, shall be guilty of a misdemeanor.

"Section 3. This act shall take effect immediately."

Science Notes.

In the fight in the Saran Sar pass in northwest India, a rifle bullet fired by the enemy entered the muzzle of a Sepoy's rifle, penetrating nine inches down the barrel. The Lee-Metford rifle is of 0.303 caliber.

Queen Victoria has decided to convert the old palace at Kew near the Botanic Gardens into a public museum. The state rooms of Kensington Palace, including the famous banqueting hall decorated by Sir Christopher Wren, all of which have been closed and unoccupied since 1760, are to be restored and thrown open to the public.

The following is the reply given by Frederick the Great on January 1, 1786, to the petition of a Silesian factory asking for a monopoly for steel goods: "It is very good that iron and steel should be manufactured in our country; but I should not be willing to have a monopoly, for this always has bad results. The owner of a monopoly does not apply proper attention and diligence to the business, because he has no competitor beside him; the consequence is that he will neglect his work and produce poor goods."—*Stahl und Eisen*.

In Spain the phonograph is used as a receiver for telephonic messages. One advantage of this arrangement is the facility it offers for repeating messages, since the operator at the transmitting station can hear the message spoken by the phonograph at the same time the operator at the receiving station takes it down. Also messages may be transmitted as fast as desired, and the operator at the receiving station can reproduce them at any time and at lower speed, so that the messages can be readily taken down.—*Uhl- and's Wochenschrift*.

A python twenty feet in length, that died in the reptile house of the London Zoological Society recently, was the largest reptile ever confined there. There is a general impression that pythons reach a length of forty feet or more, an absurdity made manifest when the authorities assert that the female Indian python still in the gardens, and but a trifle over eighteen feet long, is the longest snake in captivity of which there is any record. General impressions as to the length of these great reptiles are due to the absurd pictures that formerly decorated geographies and other works used sometimes as text books, showing a picture of a python in the act of crushing and swallowing an Indian buffalo. That was a ridiculous picture that was the father of many of the "freak journalism" pictures of the present day. The London python, which was a real instead of a fabulous reptile, was just over twenty feet in length. It was obtained in Malacca, and was presented to the society by Dr. Hampshire on August 29, 1876, and had, therefore, lived rather more than twenty years in England. During that period it had been fed principally with ducks, of which it sometimes swallowed four or five at one meal. Its food was offered to it once a week, but it sometimes refused to eat for a month together. The specimen will be mounted for the Tring Museum.

The Current Supplement.

The current SUPPLEMENT, No. 1155, contains a number of articles of more than usual interest. The article on "Our Fur Seals" supplements that published in the SCIENTIFIC AMERICAN for January 22 and treats the subject from another point of view and is profusely illustrated. An illustrated article on "Hayti" gives timely information concerning the black republic. "The Progress of Astronomy in 1897" and "Electrical Industry in France During 1897" give an important resumé of the sciences referred to for the last year. Photography is represented by "Hints on the Brush Development of Platinum Prints," and "Bromide Printing," and "A New Basis for Photo-Mechanical Processes," by R. E. Liesegang. Science is represented by a new article on the microphonograph of M. Dussaud and "Visits to Scientific Institutions in Europe," by Prof. Ed. Morley, Ph.D., LL.D., in which he describes visits to various institutions which concern themselves with weights and measures.

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