low giving the interpretation of the sculpture in full. Meanwhile, time, as well as the profound studies made in Maya archæology by various scholars, has contributed to perfecting the work in hand.

Deficient though it may be in many minor parts, I am desirous of publishing my views on this subject without further delay and of thus at last redeeming the pledges given.

HUMBOLDT AND BRAZIL.

THE statement is often made, even by Brazilian writers, that not only were express orders given by the Portuguese government to prevent the entrance of Humboldt in Brazilian territory but that a price was set upon his head in case he was found within the limits of the colony. A recent interesting discussion in the columns of the *Jornal de Commercio*, of Rio de Janeiro, has brought to light the official documents relating to the case, which is thus seen to be less discreditable to the Portuguese government than is usually represented. It is to be remembered that prior to the removal of the Portuguese royal family to Brazil, in 1808, the colonial policy was an exceedingly narrow one, and that foreigners were jealously excluded from all the colonial possessions.

A official letter from the minister of the kingdom, Dom Rodrigo de Souza Coutinho, to the governor of Para, Dom Francisco de Souza Coutinho, with the date of June 2, 1800, states: "It being reported that a certain Baron Humboldt, native of Berlin, has travelled in the interior of America, has sent home geographical observations of the countries traversed, and a collection of 1500 new plants, and that he intends to direct his voyage to the upper parts of the captaincy of Maranham in order to examine desert regions up to the present time unknown, and as in the actual state of affairs this voyage without special orders of His Majesty is suspicious, you will cause to be determined with the greatest exactness and care if this or any other foreign traveller is travelling, or has travelled, in the territory of this captaincy, and in the affirmative case you will impede the continuation on such investigations, prohibited not only to foreigners but also to suspicious Portuguese not authorized by royal orders." The letter terminates recommending "the greatest circumspection, communicating at once to His Royal Highness, through this department of state, in order that he may take the steps required by faults of this nature."

In consequence of this order, Dom Diogo de Souza, governor of Maranham, sent a circular letter, under date of Oct. 12, 1800, to various local authorities, "recommending that if by chance the said Baron Humboldt, or any other foreign traveller, appears in your district, you will have him conveyed, with all his companions, to the capital, *without, however, failing to treat him with all decency, nor to give him good treatment and conveniences*, only accompanying him and impeding his means of transportation and the making of political and philosophic observations."

Concerning this matter an interesting letter from Baron Eschwege to Humboldt has appeared, in which he communicates that he learned from his friend, Antonio de Araujo e Azevedo, Count da Barca, who had been Portuguese minister at La Hague, Paris, St. Petersburg and perhaps, also, Berlin, where he had probably made the personal acquaintance of Humboldt, and who was afterwards prime minister in Brazil, that learning of this order, he wrote at once to the prince regent, begging not only its prompt revokement in order not to attract the reproval of all Europe, but that orders should be given to aid Humboldt in every way, and that such orders were actually given.

It thus appears that even the narrowest of Portuguese statesmen did not go to the length that is generally believed by their descendants and countrymen, and that enlightened men like Count da Barca were not lacking in Portugal at that time. Coming to power, a few years later, this statesman was the principal protector of Eschwege and the other foreign travellers that, after 1808, were allowed to penetrate freely in the interior of Brazil.

REMARKS ON THE TERNS OF LITTLE GREEN ISLAND, MAINE.

BY ARTHUR H. NORTON, WESTBROOK, ME.

THE Little Green Island is located to the southwest of Penobscot Bay, about 55° N. lat., 69° 2 W. lon. About a mile north the Northern or Eastern Triangles, a group of sunken ledges, some rising above the surface a little before and after high water, are scattered, noted as fishing grounds, as good gaming places, and as places to be especially avoided by mariners. The place is about seven or eight miles from the nearest mainland, a round rocky island inhabited only by sea birds and such organisms as find a suitable dwelling-place here—excepting the birds, probably nothing higher in the scale than insects. Throughout the year it is visited by gunners and fishermen, who often camp for a few days, or mayhap, throughout the summer season.

This was formerly one of the largest tern resorts in the vicinity, though to-day it is interesting only in a historical sense. It had for years been visited by fishermen, who came on picnics to gather the eggs of the "medericks," or terns, *Sterna hirundas* and *S. Paradisæa*. As they killed very few of the birds, and only took the eggs that were sufficiently fresh to sink in a dish of water, no serious reduction in the numbers of the "medericks" was evident, until they were slaughtered for their plumes or breasts.

I first visited the place, and beheld the wondrous beauty and natural fascinations of this great population of birds, from June 16 to 18, 1885. It was a bright, fair day, and we arrived about noon, finding them in the midst of their daily labors. Our approach to the island aroused the solicitude of those nearest the sea, which rose from the ground in companies of considerable size, some to resettle on their eggs or resting places, while others were still rising; some struck out boldly to view us more closely and herald our approach in a strong, shrill voice, and were quickly joined by others coming from the sea, pausing for a moment, then hurrying to land or hanging overhead to vociferate angrily to the unabating numbers round us. Such was our reception, and from daylight until dark, of those days, every movement which we made was carefully guarded by those creatures. We found the nests all over the island, from the windrows of seaweed, left by early high tides, in the gravel and "popple stones" on the beaches, on the bald, jagged ridges of ledge, projecting seaward, back through the pasture land to the summit of the island.

That year the place afforded pasturage to a large flock of sheep, which kept the grass cropt short, furnishing unlimited nesting sites, as our terns dislike tall grass for breeding places. Some were mere depressions in the sand or grass, others contained a few feathers from the parent, straws, or pieces of seaweed, and occasionally they were quite well lined; and one found in July, which was placed about a foot from a wisp of drift hay, was lined with it to a remarkable degree, being compact and strong, truly a pretty specimen of bird weaving.

While wandering over the island we were accompanied by a restless, pleading throng, seeming like a dome of animated white flakes within the great, impassive dome of outer blue. Those that were more distant were settling

to incubate their eggs or to rest, and others rising to join the troop. While walking on opposite sides of the island we were made aware of each other's position and course by the vigilant birds surrounding.

The nests contained one, two or three eggs, usually fairly well advanced in incubation. One nest contained four eggs, the only case which we noted, and we probaply examined hundreds of nests. Mr. Rackliff, my companion, who had visited the place for quite a term of years previous, and had probably examined thousands of nests in all, remarked that this was the second time that he had seen more than three eggs in a nest.[1]

While fishing at the Triangles and shoals around the island, the terns were our constant companions, approaching closely to our boat, hoping to secure refuse from the bait, or dressings from the fish. With fishermen, it is an unpardonable display of slackness "to dress down on the ground," and the small-boat fishermen usually dress on the beach or in harbor, or mayhap, on the trip to shore. Hence the terns were accustomed to gather in compact companies at these dressing stands, and at the Green Island beach I have seen them so closely crowded that it seemed wonderful that they could move without coming in contact at every sweep—a sight that prompted the "salts" to relate tales of slaying several at a single stone's throw through the mass, or of greater gatherings at other times.

Of this matter they seemed to feed but very little to their young, though the adults would become gorged with it and drop out from shore to alight on the water, drifting whither the wind and tide listed, occasionally rising to flap a short distance and resettle. During the heat of the day they were fond of basking in the sun, and at low water the Triangles and rocky points of the island were rendered especially attractive to the sight by the flocks of terns and Bonaparte's gulls reposing on their dark and treacherous brows; the whiteness of their plumages being suggestive of the soft white sea foam wont to settle there in the fury of the violent storms, whose sighs and groans have proven to be the funeral dirge of the mariners and their vessels which lie mouldering here.

The higher parts of the island and its beaches, especially the rocky ridges near the shore, were always adorned by their elegant forms, resting with stoical gravity. It required but a slight disturbance to send the whole gathering scurrying lightly through the air to a short distance, when they would return with inquisitive glances and impatient cries. They evidently incubated at intervals, at least, throughout the heat of the fairest days, and some were constantly going from or returning to their nests. Thus, when we were seated quietly on the beach, we viewed them in constant motion, their voices never quiet during daylight, and occasionally at midnight the wandering sheep provoked them to peals of solicitude or rage. Several times we found eggs trampled by the sheep, and it was a common sight to see a tern diving fiercely at one of these animals, to utter a prolonged syllable and rise for another dash, thus annoying it to make it move to another place. They often made similar dashes at us, coming within a few feet of our heads, and stories of their having pierced hats with their beaks were related by the fishermen. After the young hatched this boldness was more frequently displayed.

Raptorial birds were objects of intense hatred, and very seldom through the breeding season, it was claimed, ventured near the island. I had the good fortune to observe an osprey passing along the shore one day, and close behind followed a train of indignant terns vociferating wildly; and his hurried flight proved that it was an unpleasant company.

July 16 and 18 I revisited the place accompanied by my father, when many of the young were hatched out, and a very few were able to fly; still quite a large number of nests contained eggs. The downy young were very beautiful, their colors were pure, and their down faultlessly clean. The little creatures were weak, and cuddled among the pepples on the shore or in the grass on the uplands, and by the anxious clamor of the birds overhead were made conscious of a supposed danger, and without moving directed the gaze of their large black eyes at us, seeming to bear an expression of fear and pain for their helpless condition, which could not fail to move the feelings of the naturalist with pitying love.

Those that were partly feathered ran freely, as was indicated by numerous paths in the grass that now was several inches high and seeded, in places that had escaped the sheep. I "trailed" out several of these, and on being handled they maintained a rigidness of the body so perfectly that at first I wondered whether I had not found a dead bird; but the cautious expression of the eye quickly dispelled the presumption, and on my turning the little creature on its back, it quickly sought to recover itself, and as I retired a few feet, it waddled slowly for a few yards and settled snugly in the grass.

During this visit we spent considerable time fishing at the Triangles, and for the benefit of the birds threw the fish livers overboard. This never failed to gather a large company of birds, and they grew to expect this attention, and after a short time the birds that were near would come to look for food at a swing of the arm above the head. At first they were very cautious, often dipping down to the water, but instead of seizing the food would raise their heads to look for danger, and, as they never lighted, passed onward and up bearing the liver; or in some cases the flight was so hasty that the grasp could not be effected. Soon, however, they became perfectly fearless of us, scaling across the boat to secure pieces within three feet of the side, and on several occasions they brushed my hat with their wings. While thus feeding they swooped down, pausing and frequently touching the tail and toes into the water, bowed the head, and took the article in the bill to be swallowed in the air or rarely to be borne shoreward.

Viewed thus in their active, vigorous conditon, they exhibit their gracefulness and beauty in a most pleasing way, the pearly blue mouth, lustrous black cap reaching to their large eyes, which in their closeness seem glowing with excitement, the carmine bills and tiny red feet, long slender wings and undulatory tail-feathers, are especially noticeable, as they glide with arrowy swiftness, their slight bodies and close-set plumage being perfectly adapted to the aerial path which they pursue. Nature must have labored long and skilfully to produce a beautiful, active creature to inhabit these lonely and often desolate sea-isles through the pleasant summer season.

By sunset most of the great number had come ashore and settled for the night. A gun fired after they had become quiet seemed to have the effect of a dynamite blast, as the colony of birds shot upward like so many thousands of snowy fragments hurled to the darkening sky. One evening after dark, in my father's company, I sauntered out over the island where few nests were placed. As we gazed upward we could just discern the birds gliding in the dusky starlight overhead, having risen from their resting places on the ground.

Near noon of the 18th we sailed away, losing this colony of terns from view, not for a season, but forever. During the next year, 1886, the Little Green Island, through the magnitude of its tern population, attracted

[1] It is now not uncommon to find four, five and occasionally six eggs in a nest in Maine and Nova Scotia.

the attention of plumers, through whose depredations it became wholly depopulated in this single season, none breeding here in 1887 nor 1888, as I learned through a letter from Mr. Rackliff.

AN ANALCITE COPPER BOWLDER FROM THE KEWEENAW RANGE, MICHIGAN.

BY E. O. HOVEY, PH. D., NEW HAVEN.

In the Michigan exhibit in the mining building at the Columbian exposition there is a curious bowlder, or rounded mass, which deserves more than a passing glance from the visiting mineralogist. The bowlder was originally about four feet in diameter and approximately spherical in shape. It came from the Central Mine, Keweenaw County, and occurred near the contact between the ore body and the country rock. Possibly it was one of the contact phenomena of the region, and there may be other masses like it.

The bowlder is composed for the greater part of granular pink analcite with granular calcite and quartz quite evenly disseminated through it. It shows a tendency to spherical parting throughout the mass, which causes it to separate into concentric shells from one to two inches thick when broken into. Permeating the granular mass and holding it together, is an intricit net-work of arborescent native copper radiating outward from the centre of the bowlder. The action of dilute hydrochloric acid dissolves out the analcite and calcite, leaving the net-work of wire copper intact, with small grains of quartz caught here and there in it. The wires making up the arborescent growth are about 0.01 inch in diameter, but means for accurate measurement were not at hand. Under the microscope the net-work is seen to be made up of minute crystalline growths developed along axes inclined 60° to the direction of growth. The planes recognized were only the most common of those occurring on native copper; viz., the cubic, octahedral and dodecahedral. The terminations of the little branches are usually acute, and formed by the acute solid angle of the dodecahedron; but an occasional blunt point occurs made up of what seem to be cubic planes. The vertical axes of the crystals are approximately the radii of the spherical mass, and the extremities of the little branches all point outward. A low estimate places the amount of native copper in the bowlder at from 35 to 40 per cent. The crevices in the mass are stained green by the decomposition products of the copper.

The chief component of the bowlder and the one which gives it its color is pink analcite, recognized by its faint cubic cleavage, its vitreous lustre, inclining a little to pearly, and its gelatinizing with dilute HCl. The granular structure is so pronounced that the mass would crumble to pieces between the fingers, if it were not for the retaining net-work of copper. Disseminated through the analcite are small aggregations of granular white quartz, while associated with both analcite and quartz are minute particles of calcite, which occur in sufficient quantity to produce marked effervescence when the rock is placed in acid. The copper penetrates all components of the rock alike.

The peculiar structure of this mass was noted by Mr. Samuel Brady, M. E., of Detroit, superintendent of the Michigan mineral exhibit, and the bowlder secured for the display at the exposition. A more detailed account of the mass and its occurrence will appear in Mr. Brady's report on the exhibit, but he kindly gave me permission to prepare this preliminary notice for the readers of *Science.*

LOEW'S NATURAL SYSTEM OF THE ACTIONS OF POISONS.

BY J. CHRISTIAN BAY, MISSOURI BOTANICAL GARDEN, ST. LOUIS, MO.

Hitherto, the actions of poisonous substances were regarded mainly in connection with medical science or, when submitted to a general view, were mainly considered in their relation to certain physiological conditions of the mammals, or with reference to pathology. A review of poisonous actions was extended only as far as we could go with regard to the chemical composition of the matter acting, and with the pathological state of the whole organization upon which it exerted its influence. Thus, in 1862, Taylor established a classification of poisonous substances into mineral, vegetable, neurotic, spinal, and cerebro-spinal poisons. But this division did not, in the first place, cover all instances of which we had a record. Further, it was not, for logical reasons, really satisfactory.

The grand development of bacteriology, and much ingenious work in investigating the structure and physiological properties of the living matter, have extended our positive knowledge as well as our views, and special attention has been paid to the physiological unit of the cell. In this journal the writer[1] called attention to Sachs'[2] theory of the energids, in the *Botanical. Gasette*[3] he called attention to Wiesner's magnificent work[4] in similar direction, and Detmer's[5] recent contribution, which, though they go in different directions, can very well extend and be supported by each other.

Through many special papers and occasional notes, our knowledge of the actions of poisons has been extended, since the old school of physiologists saw other systems of knowledge come forth. In this connection, attention should be called to the work of Pereira and Buchheim[6]. Now, however, the facts are arranged in a totally new, very logical and natural way, by Dr. O. Loew,[7] of Munich, who has established a natural system of the actions of poisons, corresponding with our present knowledge and views of the elementary units of the animal and vegetable body.

Loew arranges poisonous actions according to their way of action upon the organization, thus establishing a physiological system. This is to be preferred to any other, because many of these actions open views into the chemical and physiological properties of the protoplasm and its constituents. The support of this system is Pflüger's theory from 1875[8] that the properties of living and dead matter (or matter in the living and dead state) are intimately connected with the properties of the organic proteid combinations in the protoplasm. This question was, in 1882 and later, subject to exceedingly careful and important experimental studies by Loew and Bokorny,[9] the result of which being that the albuminoid matter of the protoplasm of plant cells in the living state differs greatly from that in the dead state. Much opposition against the conclusions from the many important facts herewith connected results mainly from lack of understanding of these questions, while, on the other hand, there are good reasons for opposing. The *facts*, however, cannot be rejected.

1 Science, XXI., p. 162, 1892.
2 Flora, Regensburg, 1892, pp. 57-64.
3 Bot. Gaz., XVII., 1892.
4 Die Elementarstruktur und das Wachsthum der lebenden Substanz. Wien, 1892.
5 Berichte der Deutschen Bot. Gesellschaft, X., p. 433-441, 1892.
6 Pereira: Handbuch der Heilmittellehre, übersetzt von R. Buchheim. Vol. I-II.
7 Loew, Dr. Oscar: Ein naturliches System der Giftwirkungen, Munchen, 1893. The work is dedicated to Professor von Pettenkofer on his 50 years' doctor-jubilee.
8 Pfluger's Archiv f. d. ges. Physiol. des Menschen und der Thiere, Vol. X., 1875, p. 300. See also Detmer: Pringsh. Jahrb. XII., and his Pflanzenphysiologie, 1883, p. 149-153.
9 Die chemische Kraftquelle des lebenden Protoplasmas, 1882. See also Biol. Centralbl.