

CONIINE AND ITS COMPOUNDS.*

By Dr. J. SCHORM.

In consequence of the increased demand for coniine during the last few years it became necessary to devote more attention to this alkaloid, in order to obtain both a larger yield and a purer preparation, since by the ordinary known methods a coniine is obtained which darkens when exposed to air and light and only yields with difficulty permanent and well crystallizing salts. In the following paper the author describes the method adopted by him in the preparation of coniine and some of its salts.

One method for the preparation of coniine consists in first moistening the conium seeds with hot water, and after they have swelled treating them with sodium carbonate. The sodium carbonate might be added to the hot water, but it has been found that it is preferable to moisten the seeds with water. Caustic alkalis are excluded. Four kilogrammes of sodium carbonate dissolved in a corresponding quantity of water are used for 100 kilogrammes of seed.

The swollen seed is uniformly worked up together, and filled into an apparatus similar to those that are used in the preparation of essential oil. This holds about 400 kilogrammes and is fed with direct steam under about three atmospheres. The distillation is continued, after once emptying, as long as the condensation water running off has an alkaline reaction. The coniine distilling over with the steam separates partially as a kind of oil, while part remains dissolved in the condensed water. It should here be remarked that from the ripe seed the greater part of this crude alkaloid separates in the distillation as an oil, while when unripe green seeds are used, notwithstanding the larger total yield, less separates like an oil and a longer distillation is necessary.

The distillate obtained in this manner is neutralized with hydrochloric acid and evaporated to the consistency of a weak syrup. The cooled liquor frequently, especially in cold weather, yields a separation of sal ammoniac; it is shaken with two parts by volume of strong alcohol and filtered from the separated sal ammoniac. From the resulting hydrochlorate of coniine the alcohol is distilled off in a water-bath, a calculated quantity of soda lye added, and the coniine shaken out with ether; the residual liquor develops trimethylamine upon long standing, especially in summer.

From the ethereal solution of crude coniine, upon strongly cooling it, there separate crystals of conhydrine an inch long, which are rather difficultly soluble in ether; it also passes over with ether vapor during the distillation of the ether and can be collected in the receiver.

The second method of manufacture consists in extracting the ground seed in a vacuum extractor with water containing acetic acid, and evaporating in a vacuum to the consistency of a syrup. The syrup obtained is treated with magnesia and the coniine is shaken out with ether. This process gives a smaller yield but a decidedly purer preparation, more suitable for compounds.

The coniine remaining in the retort, after distilling off the ether in a water-bath, is dehydrated with dry potassium carbonate, and then distilled from the air-bath. It then yields three fractions: the first, from 110° to 168° C., amounts to nearly 10 per cent of the crude coniine; the second fraction, the pure coniine, from 168° to 169°, amounts to 60 per cent.; the third, from 169° to 180°, to 20 per cent. The dark thick fluid residue serves for obtaining conhydrin.

The coniine prepared in this way is described as a colorless oil-like liquid, which is volatile even at the ordinary temperature and has a specific gravity of 0.886. It takes up 25 per cent. of water, which is separated again upon heating. It dissolves in ninety parts of water. Exposed to light it remains quite unaltered.

The salts hitherto prepared from this coniine have not been, according to the author, deliquescent, and have not altered when exposed to the light.

Not long since only the hydrochlorate was closely known, but later the hydrobromate has been described.† The author has prepared the latter and some other pure salts, and describes them as follows:

Hydrobromate of Coniine ($C_8H_{15}NHBBr$).—From aqueous hydrobromic acid, exactly neutralized with coniine, in concentrated solution, acicular crystals separate quickly. From dilute solutions the salt crystallizes in large transparent glassy crystals, which are not altered by light or air. The crystals belong to the rhombic system.

Hydriodate of Coniine ($C_8H_{15}NI$).—The iodine to be used should be resublimed in a water-bath, since it often contains small traces of iron, which would have an extremely deleterious action. The iodine thus purified is converted in the usual way into hydriodic acid and saturated with coniine. Upon slowly evaporating the salt crystallizes in large flat prisms, which are anhydrous, and do not alter when exposed to air or light. When slowly heated in a vacuum the compound sublimes similarly to sal ammoniac.

Acid Tartrate of Coniine ($C_8H_{15}NC_2H_4O_6 + H_2O$).—By saturation of the corresponding molecular quantities of coniine and tartaric acid this compound is obtained in handsome large crystals, belonging to the rhombic system.

Neutral Oxalate of Coniine ($C_8H_{15}N_2C_2H_4O_4$).—This compound was obtained in warty crystals by saturating coniine with sublimed oxalic acid.

The author states that he has prepared also a borate, carbonate, and picrate of coniine, and a double compound of coniine with aluminum sulphate and zinc chloride, but these he had not yet analyzed.—*Pharmaceutical Journal*.

MIGRATION OF BIRDS AT NIGHT.

THE vexed questions regarding the migrations of birds and whether they fly by night and at great elevations have been elucidated by Mr. W. E. D. Scott, in the Bulletin of the Nuttall Ornithological Club for April. While, with some friends, looking through the 9½ inch equatorial at Princeton, N. J., at the moon, his attention was arrested by numbers of small birds, more or less plainly seen, passing across the field of observation. Most of the birds were the smaller land birds, among which were plainly recognized warblers, finches, woodpeckers, and blackbirds, the relative numbers being in the order of kinds given. Among the finches Mr. Scott identified *Chrysomitris tristis*, and the blackbird was the *Quiscalus purpureus*. With rare exceptions, the birds were seen to be flying from north-west to south-east. By observing the height of the moon above the horizon in degrees and the two limits of the area of observation—that is, how near or how far the birds noted were from the glass—it was found, with the aid of Professor C. A. Young, that the birds flew at the great elevation of nearly 10,000 feet, and that the average number of birds passing through the field

of observation per minute was four and a half. In commenting on these facts, Mr. J. A. Allen remarks that Mr. Scott's novel and important observations definitely establish several points in relation to the migration of birds that have heretofore rested almost wholly on conjecture and probability. "We have, first, the fact that the nearest birds seen through the telescope must have been at least one mile above the earth, and may have ranged in elevation from one mile to four miles. It has been held that birds, when migrating, may fly at a sufficient height to be able to distinguish such prominent features of the landscape as coast-lines, the principal water-courses, and mountain-chains over a wide area. Of this, thanks to Mr. Scott, we now have proof. It, therefore, follows that during clear nights birds are not without guidance during their long migratory journeys, while the state of bewilderment they exhibit during dark nights and thick weather becomes explainable on the ground of their inability to discern their usual landmarks—points that have been assumed as probable, but heretofore not actually proven."—*American Naturalist*

A NEW SPECIES OF SHREWMOUSE.

DR. E. L. TROUESSART has recently made known in the *Annales des Sciences Naturelles* a new and very small species of shrewmouse, a figure of which is given herewith.

This species, the *Crociodura (Pachypura) coquerellii*, is remarkable, in the first place, for the absolute uniformity of the color of its hair—a character which distinguishes it from all other species. This is a very rare thing in wild mammals, and our little species merits, more than any other, the specific name of "unicolor" or "concolor."

The size and the proportions of the body, head, and tail are like those of *C. etrusca*, which is found in the vicinity of the Mediterranean. The distinctive characters of the species are as follows:

Head large, with nose ending in a naked, blackish snout; ears large, rounded, with two well-developed internal valves, blackish and covered with short red hairs which become longer and more abundant on the side of the conch and valves. Feet clothed as far as the toes with long hairs, which exceed the claws; the latter are yellowish, and the bottom of the hind feet is naked up to the claws, and blackish. Tail square, strong, but not thickened at the base, tapering to the extremity, which ends in a small pencil; covered above and beneath with short, close hairs of a uniform red, with other longer and more scattered hairs which start from each vertebra. Olfactory gland, none. Total length, from end of snout to end of tail, 2¾ inches.



NEW SPECIES OF SHREWMOUSE.

(Crociodura Coquerellii.)

Natural Size.

The habitat of this new species is the Isle of Mayotte, off the northwest coast of Madagascar, where it was found in 1863 by Messrs. Pollen and Van Dam, who deposited it in the Museum of Leyden without describing it. The species is very easily distinguished from all others known.

THE AMERICAN HORSE.

By E. L. BERTHOUD, Golden, Colorado.

It is generally understood, and the fact (if it is a fact) has been almost universally accepted, that the Horse was unknown in the New World previous to the advent of Spaniards in North and South America. Late discoveries and investigations, extending from Behring's Straits to Patagonia, have revealed the fact (see Prof. Marsh in Encyclopedia), that in North and South America we have twelve fossil species of the genus *Equus*, and thirty more species allied to them.

Prof. Marsh has proved conclusively the filiation of equine ancestry from the Quaternary to the Eocene, and the progressive evolution of the Horse from a many-toed ancestry. His deductions have been accepted as conclusive and as an irrefutable proof of the evolution theory founded upon the close study of ancient fossil remains. Prof. Marsh has named a species of fossil horse found in North America, which is closely allied to the present living animal, *Equus fraternus*—a brotherly horse, thus indicating its close resemblance to our useful assistant and companion.

Having had occasion to send to Paris to purchase some rare maps of the fifteenth and sixteenth centuries, I received among them the map of Sebastian Cabot, "Piloto Mayor" of Charles the Fifth, King of Spain. This map, drawn in a circular projection by Cabot himself, on which he has delineated his own and the discoveries of John Cabot, is of singular value as representing the true state of geography and discovery in the early portion of the sixteenth century, and was drawn up prior to the year 1546-47. Sebastian Cabot having left for England, to take service there in 1547, this map was drawn by him while he was in the Spanish service previous to that date.

Now it is an incontestable fact that Cabot went in 1527 to the east coast of South America on an exploring voyage, that he discovered the rivers La Plata and Parana, and explored them some distance inland, returning to Spain in 1530.

Upon examining that map I find that the Rio La Plata was explored up to the 25th parallel of North Latitude, and Spanish names given to its branches and all prominent

points; and in addition he has marked on the map pictures of the natives, prominent animals, and some trees, and that at the head of the La Plata, with the Puma and Parrot, or perhaps the Condor, he has given the horse as apparently a quadruped that existed then in those vast plains of the *Gran Chaco*, where to day they roam in countless herds. It may be claimed that this is not proof of their native origin; but we claim that it is a fair presumption, for neither Spaniards in Peru or other parts of America, nor even Portuguese, had been long enough in South America for the few Spanish horses introduced to have roamed wild from Peru to the head of the Paraguay and Parana rivers, and increased in numbers sufficiently to have attracted the attention of the Spanish explorers. The period was too short, and the distance too great from the Spanish possessions in Peru across the vast forests of the Andes, for such a rapid increase. We can reconcile this discrepancy only by believing that the paternity of the vast herds of the Argentine Republic and of Paraguay was a native breed of American horses; mixing afterward with the Spanish breed introduced by the conquerors. Not twenty years had passed between the discovery of Peru and the discovery of the Rio La Plata.—*Kansas City Review*.

A DEFENSE OF HORSE CLIPPING.

HORSES with their long winter coats perspire overfreely when at work, and become soaked with sweat. When the condition is low and the circulation feeble, the drying process is protracted, and frequently requires hours to complete it. In such cases the long continued evaporation maintains a cold surface, and not only conduces to obstinate skin disorders, but likewise to internal congestions and inflammations of the most important organs.

Horses, when clipped, become altogether changed in character. The appetite improves, their spirits are heightened, the action, before sluggish, becomes free and jaunty, the general tone of the body is improved, and feats of strength and endurance are performed without fatigue. When and under what circumstances horses should be clipped or singed are at this season of the year interesting questions. The time for removing the coat is too frequently governed by the temperature and character of the weather. Where the month of October is mild and open, many horses are allowed to run in their coats until November, and to completely develop a new jacket before the clipper is used. There are reasons, we think, for questioning the policy of such a practice. If the hair is to be removed, it should be done while the weather is yet mild, before the new coat has become fully developed. The effects of clipping are then less severely felt, and the increasing cold is better tolerated than if the hair be removed later in the season. Some persons who eschew singeing clip two or three times in the course of the winter, and so long as it is not done closely, there is nothing to be said against it; but where close clipping is adopted a second and a third time, ill consequences can only be avoided by the most scrupulous after care.

To say that all horses should be clipped would be a little absurd, but when the work is quick and the general health good, both old and young are equally benefited by the operation, notwithstanding our very mutable climate. When there exists any morbid sensibility of skin and tendency to disease, both clipping and singeing should be avoided, as either may awaken a dormant eruptive malady, and thus lead to considerable inconvenience and trouble.—*London Agricultural Gazette*.

[NATURE.]

MR. DARWIN ON THE WORK OF WORMS.*

IF the world were not already accustomed to the unprecedented fertility of Mr. Darwin's genius, it might well be disposed to marvel at the appearance of yet another work, now added to the magnificent array of those which bear his name. But feelings of wonder at Mr. Darwin's activity have long ago been sated, and most of us have grown to regard his powers of research as belonging to a class *sui generis*, to which the ordinary measures of working capacity do not apply. Be our feelings of wonder, however, what they may, it is most gratifying to find that this latest work from the hand of our illustrious countryman is in every way worthy of its predecessors. Everywhere throughout the book we meet with the distinctive attributes of Mr. Darwin's mind. Beginning with matters of the most common knowledge, which at first sight appear to furnish the most unpromising material, he proceeds by close observation of details and sagacious manipulation of facts to establish general truths of the most far-reaching importance in directions where we should least have expected any such truths to lie.

But to avoid the presumption of seeming to commend the work of so great a master, we shall proceed at once to render an epitome of the work itself. This, as its title is sufficient to denote, is an extension of the celebrated paper, "On the Formation of Mould," read before the Geological Society in 1837 (See Trans. Geol. Soc., vol. v., p. 505); but the extension is so considerable that the present volume is really a new work. The subject, of course, is the same; but the later observations, while tending to confirm, and in fact to demonstrate, the conclusions based upon the former, have served to swell a short paper into a book of over 300 pages. Alluding to this paper, Mr. Darwin writes:

"It was there shown that small fragments of burnt marl, cinders, etc., which had been thickly strewn over the surface of several meadows, were found after a few years lying at a depth of some inches beneath the turf, but still forming a layer. This apparent sinking of superficial bodies is due, as was first suggested to me by Mr. Wedgwood of Maer Hall, in Staffordshire, to the large quantity of fine earth continually brought up to the surface by worms in the form of castings. These castings are sooner or later spread out, and cover up any object left on the surface. I was thus led to conclude that all the vegetable mould over the whole country has passed many times through the intestinal canal of worms. Hence the term 'animal mould' would be more appropriate than that commonly used of 'vegetable mould.'"

Dealing next with criticisms which from time to time have been made upon his original paper, Mr. Darwin quotes one from Mr. Fish, which we may here quote on account of its instructive character. "Considering their weakness and their size, the work they are represented to have accomplished is stupendous." On which Mr. Darwin observes:

"Here we have an instance of that inability to sum up the effects of a continually recurring cause which has often retarded the progress of science, as formerly in the case of

* *Berichte*, xiv., 1765.† *Petit, Pharm. Journ.* [8], viii., 649.

* "The Formation of Vegetable Mould through the Action of Worms, with Observations on their Habits." By Charles Darwin, LL. D., F.R.S. London. John Murray, 1881.