

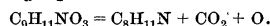
matter, Guareschi and Mosso followed the method of Stass-Otto, applying exactly the same procedure in the control search with fresh brain-tissue; and, on account of the negative results invariably obtained in the latter, the authors are able to guarantee the absence of pre-existing ptomaines in fresh flesh, or of any substances similar to those which are found after putrefaction, when pure ether or chloroform is used in the extractions. In the experiments, 36 kilograms of brain-tissue were placed in a glass balloon, and left at a temperature of  $10^{\circ}$ – $15^{\circ}$  C. for one to two months. The mass was then extracted with alcohol acidulated with tartaric acid, using, in all, 147 litres of alcohol. The final ether solution left an alkaline residue, which, dissolved in dilute hydrochloric acid, gave characteristic precipitates with the general alkaloid reagents, and several well-defined colored reactions; but, though present, the ptomaines (or alkaloids) were in far too small quantity to admit of determining their composition by analysis. Trimethylamine, coming, doubtless, from the lecithin present in the brain-matter, was likewise obtained, together with an abundance of basic and ammoniacal products.

Physiological experiments, made on frogs with both aqueous and ether extracts, of the putrid brain-matter, led to the conclusion that the ptomaines formed possessed an action analogous to that of curare, though less energetic. A few drops of the extract, applied directly to the detached heart of a frog immersed in a .7 % salt solution, exercised upon it an immediate effect, diminishing the frequency of the systole and diastole, but increasing the vigor of the pulsation. In studying the action of the extract on nerves and muscles, a frog was rendered motionless by destroying the spinal cord; after which the achilles tendon was prepared in the usual manner, the sciatic nerve being placed upon the electrodes, and excited every ten seconds. .3 cc. of the ptomaine containing extract was then injected under the skin of the back. After ten minutes, an irregularity appeared in the contraction of the gastrocnemius; and, since all the conditions of the experiment remained the same, the irregularity is to be ascribed to the poison. From this point the contractions were no longer regular: they gradually diminished little by little, and finally ceased altogether. On increasing the force of the irritation, there was still no further movement. The sciatic nerve of the other side, intact, had likewise lost its excitability, and the animal was in as complete a state of muscular relaxation as if it had been poisoned by curare. But the pupil was dilated, and the heart motionless.

In order to obtain the ptomaines in larger quantities, recourse was had to blood-fibrine. Large quantities of fibrine (140 kilos) were allowed to putrefy for five months; at the end of which time it was transformed into a thick fluid holding a small quantity of solid matters in suspension; the reaction being strongly acid, and the odor very intense at the commencement, but less strong later. For the extraction of the alkaloids, the method of Gautier and Étard was followed; the final slightly alkaline fluid being extracted successively with chloroform, in all, twelve times. By evaporation of the chloroform, an oily residue was left with an odor of scatol and of pyridine (or cicutine). This residue was purified by solution in tartaric acid, decolorized by extracting the acid solution with ether, and then reprecipitated by an excess of potassium hydroxide in the form of oily, brown droplets, which quickly rose to the top of the fluid. This precipitate was readily dissolved by ether, and, on evaporation, was left as an oily, brown resi-

due with strong alkaline reaction, only slowly soluble in water, and then rapidly transformed into a resin. A hydrochlorate was readily obtained, crystallizing in fine lamellae, sometimes rectangular, resembling somewhat the crystals of cholesterin. With a solution of the hydrochlorate, auric chloride gave a yellow crystalline precipitate, followed by the reduction of the gold; platinic chloride, an abundant pale-yellow crystalline precipitate; iodine in potassium iodide, a kermes-brown precipitate; phosphotungstic acid, a pale-yellowish precipitate, etc. Chloroplatinates from seven different chloroform extractions were prepared for analysis by treating a solution of the hydrochlorate with an excess of platinic chloride. An immediate deposition of a flesh-colored precipitate, light and crystalline, insoluble in water, alcohol, and ether, took place. Dried at  $100^{\circ}$  C., the analyses of the various products showed essentially the same composition, pointing to the presence of only one ptomaine in this putrefaction. The results correspond more or less closely with the formula  $(C_{10}H_{15}N \cdot HCl)_2PtCl_4$ , the ptomaine itself being probably  $C_{10}H_{15}N$ . Bodies having the same apparent or closely related composition have been previously discovered: coridine, a homologue of pyridine, found in the oil of coal-tar by Thenius; a base,  $C_{10}H_{15}N$ , discovered by Vohl and Eulenberg in the fumes of tobacco, also termed coridine; a base obtained by Neucki<sup>1</sup> in the putrefaction of gelatine with pancreas, and which he deemed an isomer of collidine.

He<sup>2</sup> considered its constitution to be expressed by  $C_6H_5 - CH \begin{smallmatrix} \diagup CH_3 \\ \diagdown NH_2 \end{smallmatrix}$ , that is, isophenylethylamine, and that it is derived from the putrefaction of tyrosin, a normal product of pancreatic digestion, according to the following equation:—



Gautier and Étard,<sup>3</sup> while studying the alkaloid-like bodies produced by putrefaction, isolated two bases, which, from the analyses of the platinum salts, corresponded to parvolin and hydrocollidin. Sonnenschein and Zuelzer<sup>4</sup> obtained from flesh extracts, which had become putrid by standing at  $25^{\circ}$  C. for several weeks, a small quantity of a crystalline substance, which behaved similar to atropin, dilating the pupil of the eye, and increasing the pulsation of the heart, etc. There is also a noticeable similarity between the ptomaine obtained by Guareschi and Mosso, and the tetrahydromethylquinoline of Jackson. The physiological action of the alkaloid from putrefied fibrine is analogous to that of the ptomaine from putrid brain-matter. Guareschi and Mosso propose to experiment further in the hopes of better establishing the nature of the ptomaine in question, and to make clear its origin and constitution.

R. H. CHITTENDEN.

## LETTERS TO THE EDITOR.

### Precocity in a chicken.

A BRAHMA chicken—now five weeks old, and raised by my boy—was brought into the house two weeks ago with a broken leg. On the same day a weak chicken, just out of the egg, was also brought in; and after two or three days both chickens were

<sup>1</sup> Ueber die zersetzung der gelatine und des eiweisses bei der faulnis mit pankreas. Bern, 1876.

<sup>2</sup> Journ. prakt. chem., xxvi. 51.

<sup>3</sup> Comptes rendus, xciv. 1298.

<sup>4</sup> Berliner klinische wochenschrift, 1869, No. 2.

kept in a box together. The older chicken soon assumed the care of the little one, brooding it after its fashion, and pecking any disturbing hand. But the strangest feature is, that when a dainty morsel, such as a fly, is brought, it will call the little one like a mother-hen, and give it the fly to eat. This has been done repeatedly within the past week, the sound made being unmistakably the food-call, though, of course, pitched on a higher key. Yet it cannot have heard that sound for at least two weeks, and, in the ordinary course of events, should not make it for eight months.

REDDUCS.

Cambridge, June 6.

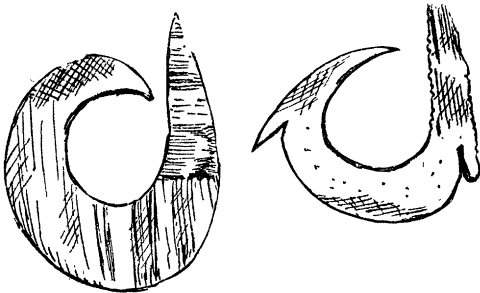
#### Lake Superior geology.

On reading Professor Chamberlain's paper in *SCIENCE*, No. 16, and afterwards referring to his statement in the third volume *Wisc. geol. reports* (p. 423), I see that I was mistaken regarding the Taylor's Falls locality being fifteen miles away from other traps (*SCIENCE*, No. 9). I now see that his language was not intended to be taken as it was understood by me.

M. E. WADSWORTH.

#### Fish-hooks from southern California.

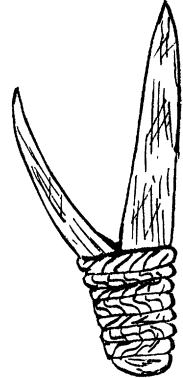
In plates xi. and xii. of Lieut. Wheeler's Report on archeology there are several drawings of ornaments found near Santa Barbara, Cal., and on the adjacent islands, by Mr. Paul Schumaker and myself, which the editors are pleased to call fish-hooks. A writer in the *Century magazine* for April presents drawings of other specimens of like character, found by myself in the same locality, and now deposited in the Smithsonian institution. I also have in my possession a series of these ornaments, but it would require a broad stretch of the imagination to believe that they were intended for fish-hooks.



SHELL ORNAMENT. BONE ORNAMENT, SIZE OF ORIGINAL.

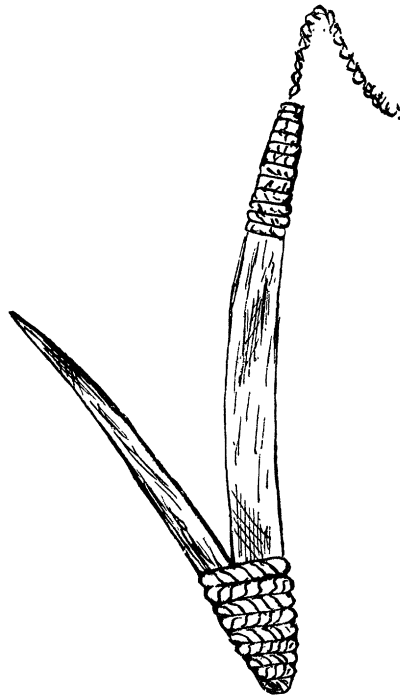
The point, which in many instances curves downward, comes so near the stem that it would be next to impossible for them to become hooked in a fish's mouth. The point of one of my best specimens, manufactured from the shell of the *Haliotis*, comes within the sixteenth of an inch of the stem or shank; and were a line to be looped on the stem, and cemented with asphaltum, as was practised by the California Indians, the space would be completely filled (see the annexed drawing). My specimens range in size from one-half inch to two and a half inches in diameter, and were manufactured from *Haliotis* shells and from bone. The first of these ornaments of which I have any knowledge, I found in a rancheria at Rincon, on the line between Santa Barbara and Ventura counties; and during five years' subsequent residence at Santa Barbara, and

the exploration of the mainland and islands, I had an opportunity to study them in every stage of development. I am convinced, that, with few exceptions, they were designed for ornaments, as their shape precludes the idea of their use as fish-hooks. They were probably suspended from the ears, and possibly worn on other portions of the body. The true fish-hook of what may be termed the Santa Barbara Indians has never, to my knowledge, been figured; yet they are more commonly met with in the rancherias and 'cementerias' in Santa Barbara and Ventura counties than the curved specimens we have been considering. I send you drawings of two specimens belonging to my cabinet. These hooks were made of two slightly curved pieces of bone pointed at each end, and firmly tied together at the lower end and cemented with asphaltum.



FISH-HOOK, SIZE OF ORIGINAL.

They are somewhat similar to those still in use by the South Sea Islanders. The larger specimen I found with a skeleton at Point Dume, Ventura county. There were several others similar to the



FISH-HOOK, SIZE OF ORIGINAL.

one figured still retaining the thong and cement that bound the parts together. The smaller specimen I found on the surface in a rancheria one mile west of the town of Ventura.

STEPHEN BOWERS.

Falls City, Neb., June 4, 1883.