

ebra *viâ* San Juan) with very little added cost or trouble. No cable will be required, but only a mast and some sort of light motor. The operator could be improvised easily by one of the resident staff familiar with the Morse code. The greater comfort and convenience of life with this facility at hand would be cheaply purchased.

I am assured by the executive of the American De Forest Company—whose office is at 100 Broadway—that they would welcome the establishment of a science station near their field and cooperate in any reasonable way for the handling of any commercial business that might come that way.

Believing that this suggestion may have further weight in the deliberations, I forward this with the concurrence of Dr. De Forest's organization.

R. T. COLBURN.

ROOM C, 120 BROADWAY, NEW YORK.

SHORTER ARTICLES.

SOME OF THE DANGERS OF FORMAL.

So much use is being made of formal* in the conservation of anatomical and zoological specimens, as well as for purposes of disinfection, and it has become so readily accessible to persons unfamiliar with some of its dangerous properties, that it may not be amiss to point out some of these. Of course every one who works with formal has experienced the disagreeable coryza and coughing arising from the inhalation of the fumes of this drug, as well as the irritating effect upon the ocular conjunctivæ. Although no fatal case of poisoning by inhalation has been recorded, one may take warning from the experimental results of M. H. Fisher,† who found that the exposure of various animals (guinea-pigs, rats, cat and dog) to the fumes of formaldehyd for one or one and a half hours produced in them a fatal pneumonia, tracheitis and bronchitis, after only three grams of paraformaldehyd had been

* On the use of *formal* as a term more suitable than *formalin*, *formol* or *formalose*, cf. B. B. Stroud's papers in *The American Naturalist*, January 1 and May 1, 1897.

† M. H. Fischer, 'The Toxic Effects of Formaldehyd and Formalin,' *Jour. of the Boston Soc. of Med. Sci.*, Vol. 1, October 16, 1900.

volatilized in the room. Only recently, in this city (New York) a woman was overcome by formal fumes. Her younger child had had diphtheria; the disinfecting was done in the afternoon and the family moved in again about seven o'clock. The odor was still strong, but the woman thought it would pass away and went to bed. Later she awoke with her head ringing, and was just able to crawl to the hall and summon help. The children were not ill at all. The writer has noticed in himself, after working in an atmosphere fairly charged with formal fumes, a state of depression and dulness which does not wear off until after spending some time in fresh air. A long exposure might bring about a serious condition, though Kenyon* expresses it as his belief that the vapor does not endanger inhabitants of rooms, and cites an experiment on a calf kept in an atmosphere of two per cent. formaldehyd for five hours, which only produced a slight cough and some watering of the eyes, both symptoms disappearing on the animal's going into fresh air.

The effect of formal on the skin is well known.† The cuticle is killed; it hardens, cracks and desquamates; in some individuals this is attended by an eczematous rash. The nerve terminals in the skin are paralyzed, producing an annoying numbness. Where the skin is cracked, the entrance of formal becomes very painful.

The palpable influence of formal on the glandular action of the skin led Dr. E. C. Spitzka to recommend it in two instances where patients consulting him mentioned their being affected with the annoying condition of perspiring hands and feet. They began with a dilute solution used as a wash several times a day, and gradually increasing its strength, not exceeding one of ten per cent. of the commercial preparation. In both cases the effect was gratifying after two or three weeks, and in one of them the permanency of the cure seems guaranteed by the non-return of the trouble for three years thereafter.

To laboratory workers one of the great dangers is the accidental splashing of drops

* F. C. Kenyon, *SCIENCE*, VI., 1897, p. 737.

† W. H. Dall, *SCIENCE*, VI., 1897, p. 633.

of formal into the eye. This occurred once to the writer, and the experience was certainly the most intensely painful in his recollection. Fortunately, the affected eye could be bathed almost immediately with a stream of running water and the irritant had not hit the cornea, else this transparent portion of the external tunic of the eye would undoubtedly have been rendered more or less opaque. Where the irritant had come in direct contact with the ocular conjunctiva, an almost immediate and intense congestion appeared, accompanied for several hours by an exquisite pain. In Fischer's experimentation on animals it was determined that a single drop of the concentrated solution introduced into the conjunctival sac is sufficient permanently to injure the eye. A contraction of the pupil to pin-hole size follows, and atropine fails to dilate it again.

The toxic effects of formal which is accidentally swallowed are so profound that a timely word of warning may not be uncalled for. Medical literature contains quite a number of cases, of which the following brief accounts will convey some idea.

(a) Bock* reports the case of an inmate of the Indian School for Feeble-minded Youth, aged twenty-six, strong and healthy, who took, while unobserved, about two ounces of concentrated formal. There was early vomiting with traces of blood; collapse and unconsciousness ensued; heart-failure occurred after sixteen hours, and drugs failing to stimulate the depressed vital functions, the patient died in twenty-six hours. A post-mortem examination showed the stomach to be highly inflamed, necrotic and œdematous, and containing about four ounces of dark fluid.

(b) Klüber† had a patient who took a draught from a bottle labeled 'Apenta' water, which he afterwards described as 'tasting like gall.' The patient became unconscious, passing into a state resembling that of alcoholic intoxication or of a post-epileptic condition; the urine was suppressed for nineteen hours, and when it appeared was scant and gave the

reaction for formic acid. He recovered in a few days, owing to the prompt and careful treatment.

(c) Zorn* describes the case of a porter, aged forty-four, who swallowed about half the contents of a medicinal glass of 30 c.c. capacity, in the belief that he was taking 'Hoffmannstropfen.' The burning taste made him aware of his mistake and he swallowed some milk. This was followed by terrible retching and vomiting, then unconsciousness. The pulse and respiration rose rapidly in frequency, the temperature fell, and the urine was suppressed for twenty-four hours. Other symptoms pointed to a parenchymatous irritation of the kidneys and of the gastro-intestinal tract.

(d) Gerlach‡ had a patient, a servant girl, aged twenty-one, for whom he had prescribed (a) formal mouth-washes and (b) a solution of potassium iodide, in the treatment of thrush (stomatitis). The two bottles stood near each other, and the girl, on retiring, mistaking one for the other, took nearly 60 to 70 c.c. of the concentrated formal. Unconsciousness, collapse, etc., ensued, and only the prompt emptying of her stomach by the physician averted a fatal ending of the case. Anuria persisted for twelve hours.

(e) Testi‡ reports the case of a man who by mistake swallowed a mouthful of a forty per cent. solution of formaldehyd. The chief symptoms were intense pain after swallowing, followed by vomiting, intense congestion of the face, conjunctivæ, fauces and tonsils. For two or three days his condition remained unchanged; he was unable to swallow anything but the smallest quantity of liquid. Two large eschars formed on the fauces and tonsils. Unlike most of the cases cited above, there was no general stupor, anuria or the modifications of pulse, temperature and respiration, which may be accounted for upon the ground that the prompt vomiting prevented absorption of the poison into the system, its effect being purely local.

* Zorn, *Munch. med. Wochnschr.*, 1900, p. 1588.

* C. Bock, *Indiana Medical Jour.*, XVIII, 1899-1900, p. 122.

† Gerlach, *Munch. med. Wochnschr.*, 1902, p. 1503.

† Klüber, *Munch. med. Wochnschr.*, 1900, p. 1416.

‡ Testi, *Il Policlinico*, IX., 8, December 20, 1902.

The effect of even minute quantities, such as the dairymen began to employ in the preservation of milk (1:20,000), has been shown to be a harmful one, in the long run, at all events. Whether this is due to its influence on the proteids of the milk or upon the enzymes of the digestive tract, is not rendered quite clear as yet, but that digestion is interfered with, particularly the pancreatic digestion of albumen, is determined with certainty.

The above enumeration of some of the dangers of formal shows that the accidental swallowing of the drug is perhaps the greatest, particularly as the outcome of any case differs very much in different individuals and under different circumstances. Even the prompt medical aid given in the first case cited above failed to avert death, and the careful guarding of this drug from coming into the hands of the inexperienced or the irresponsible devolves upon every one in charge of laboratories, factories, farms, hospitals and other places where formal is used. Every bottle or other receptacle containing formal should be distinctly labelled 'Poison.' A few words, in conclusion, on the initial treatment of a case of acute formal poisoning may be found useful. The strong affinity of formaldehyd for ammonia gives a hint of therapeutic value.* The aromatic spirits of ammonia in doses of from one half to two fluid drachms, or even somewhat more, according to the amount of formal swallowed; or the liquor ammonii acetatis (spirit of Mindererus) in half-ounce doses, should be taken immediately as an antidote for the local effects. A physician should, of course, be sent for. Vomiting should be promoted, and the stomach washed out several times through a tube. The constitutional symptoms of depression of the vital functions must be met by the use of stimulants such as strychnine or caffeine. The patient must remain in the recumbent position, and external heat, by means of hot-water bottles, or by frequent lukewarm baths, should be applied. Demulcent drinks in small quantities frequently given allay the

irritation. Food can not be taken for some time.
E. A. SPITZKA.

QUOTATIONS.

THE AMERICAN METHOD OF APPOINTING UNIVERSITY PROFESSORS.*

I AM wrestling at the moment with a mass of correspondence which has accumulated during an eighteen weeks' absence in America. Among the letters demanding my immediate attention are several from friends requesting 'testimonials' regarding their fitness to fill professorships which are now vacant. These applications bring into sharp relief important differences between the old country and the new, in point of academic etiquette or custom. I think that the principle involved is a matter of public concern. The superiority of the new country's practice in the matter of appointing academic officers is, to my mind, so manifest that I am sanguine enough to believe that dissemination of knowledge about the newer system will lead at no distant date to the abrogation of the older.

In America I visited a score of the leading universities, including such veteran foundations as Harvard, Yale and Princeton, and such modern institutions as Johns Hopkins, Cornell and Chicago. Among many other topics which I discussed with university presidents and professors of standing was the mode in which vacancies in the various faculties were supplied. The method in universal vogue on the other side of the Atlantic is entirely unlike the usage familiar on this side, though there are resemblances between the American method and that employed by ministers of the crown in nominating regius professors.

Appointments to all vacant offices in an American university are made by the president, on what may be regarded for practical purposes as his sole authority or responsibility. (At the same time the president's action is always liable to control or check by boards of trustees or regents, who are usually sagacious men of position in the professions or in commerce.) As soon as a vacancy arises in

* Bastedo, article, 'Formaldehyd,' in 'Buck's Ref. Handbook of the Medical Sciences,' 1902.

* From the *London Times*.