paralytic keratitis in rabbits. A second group of 3 rabbits was inoculated with pneumococcus type III. These animals also showed no apparent variation in the course of the neuroparalytic keratitis. Likewise positive cultures for pneumococcus were secured only 24-36 hours after inoculation, while from normal eye the microorganism was eliminated within few hours. A third group of 6 rabbits received the inoculations of *B. diphtheriae*. Two rabbits developed marked pseudo-membranes upon the conjunctiva of both eyelids. One of these rabbits died in a few days of apparently general toxemia, another animal recovered. In both cases the cultures gave rich growth to *B. diphtheriae*. In those instances in which no formation of pseudo-membranes was noticed, the cultures made within 24 hours after inoculation usually showed no growth of *B. diphtheriae*.

From the data presented above, it follows that the development of experimental neuroparalytic keratitis in rabbits following retrobulbar injection of alcohol is not determined by pathogenic bacterial activity. Though such injections result in a severe reaction manifested by various pathological processes in the eye tissue, no evidence has been found to support the hypothesis that trophoneurotic changes in the eye may alter the normal resistance of this organ.

5535

The Toxicity of Gelsemium.

T. Q. CHOU.

From the Department of Pharmacology, Peiping Union Medical College.

The rhizome and root of *Gelsemium sempervirens*, Linne, indigenous to North America, have long been used in medicine for their analgesic and antispasmodic properties and are actively poisonous. It is recorded that 0.8 cc. of the fluid extract proved fatal to a child of 3 years and many other cases of gelsemium poisoning are studied by Wormley,[1] Witthaus,[2] and others. Gelsemine, the principal alkaloid of gelsemium, was first investigated by Wormley,[3] Sonnenschein,[4] and Gerrard,[5] and by Moore,[6] who isolated it in its pure state. Thompson, in 1887,[7] obtained from the plant a second amorphous alkaloid, gelseminine, which was found by Cushny[8] to

[1] Wormley, *Am. J. Pharm.*, 1882, **54**, 337.

[2] Witthaus, *Medical Jurisprudence, Forensic Med. and Toxicology*, 1911, **4**, 937.

be highly poisonous, 1 mgm. of its hydrochloride being fatal to a rabbit weighing 2850 gm., while gelsemine was inactive to mammals, but produced strychnine-like effects in frogs. Sayre and colleagues[9] showed that gelseminine was not a single substance, but a mixture of 3 alkaloids, to which the names, sempervirine, gelsemidine and gelsemoidine were given; sempervirine being crystalline and the other 2 amorphous, but none of them were as potent as gelseminine itself. In reinvestigating this important drug of American origin, the writer[10] isolated 2 crystalline alkaloids, gelsemine and a new alkaloid, gelsemicine, which has a formula $C_{20}H_{25}O_4N_2$, a melting point 171°C. and a specific rotation —140°. Gelsemicine is highly potent and produces the usual toxic effects in mammals. A 0.1% solution of its hydrochloride dilates the pupil of rabbits for more than 4 hours. M.L.D. of gelsemicine hydrochloride was recently found by Hou[11] to be 0.05 mg. per kilo. A third crystalline alkaloid, to which the writer gives the name sempervine has now been isolated from the rhizome and root of gelsemium. It is very similar to Sayre's sempervirine in its general chemical behavior but differs from the latter in its melting point. It crystallizes out from chloroform in blood red prismatic needles, melting at 223°C., and from alcohol in red orthorhombic crystals melting at 254°C.; both of them, however, give rise to the formation of the same nitrate melting at 283°C. with decomposition. Sempervine is not so toxic as gelsemicine. Hou[11] found that 5 mgm. of sempervine hydrochloride per kilo body weight proved fatal to rabbits and 0.1 mgm. per gram body weight to frogs. It produced convulsion and other gelsemium poisoning effects in mammals, but no dilatation of the pupil was observed. Taken together, the highly poisonous nature of gelsemium may be attributed to the presence of gelsemicine, sempervine and possibly other amorphous bases which are under investigation.

---

[3] Wormley, *Am. J. Pharm.*, 1870, **41**, 1.

[4] Sonnenschein, *Ber. Deutsch. Chem. Gessell.*, 1876, **9**, 1182.

[5] Gerrard, *Pharm. J.*, 1883, **13**, 641.

[6] Moore, *J. Chem. Soc.*, 1910, **97**, 2223.

[7] Thompson, *Pharm. J.*, 1887, **17**, 803.

[8] Cushny, *Arch. exp. Path. Pharm.*, 1893, **31**, 49.

[9] Sayre, *J. Am. Pharm. Assn.*, 1912, **1**, 458; 1914, **3**, 314. Stevenson and Sayre, *Ibid.*, 1915, **4**, 60. Sayre and Watson, *Ibid.*, 1919, **8**, 708.

[10] Chou, *Chin. J. Physiol.*, 1931, **5**, in press.

[11] Hou, private communication.