cance the author attaches to his paper, it is necessary to put the subject symbol in brackets when the investigator emphasizes the local interest of his paper and *vice versa.*

The Association of Scientific Institutions of the Mining Industry in the U. S. S. R. addresses the council of the congress with the following proposal:

Will the council of the congress find it possible to apply through its members or otherwise, to those scientific institutes which do not yet print separates for sale, with the request that they publish mineralogical, geological, petrological, and paleontological papers not solely in the periodicals published by them, but also as separates?

Will the council of the congress find it possible to apply through its members, or otherwise, to these mineralogical, geological, paleontological, and mining institutions with the proposal to organize such institutions for propagating and distributing scientific literature on geology, mineralogy, petrology, and related branches of science?

The association, for its part, will do its best to forward the carrying out of this proposal in the U. S. S. R.

(Signed)

President, PROF. N. FEDOROVSKY
Secretary, T. SALKIND

In the discussion it was pointed out that publishers, who are always willing to issue a given number of separates on request, might find it an expensive proposition to publish regularly separates of each paper, even though there might be little demand for many of them. In reply, it was suggested that it might be possible for publishers to maintain a subscription list for separates just as for the entire series.

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THE MECHANISM OF THE ANTIDOTAL ACTION OF METHYLENE BLUE IN CYANIDE POISONING

BROOKS[1] has recently published results of experiments which she believes prove conclusively that methylene blue does not act as antidote for cyanide in animals by converting hemoglobin to methemoglobin (known to combine rapidly and firmly with cyanide), as was suggested by Hug[2] and the writer.[3] Rather, Brooks contends that the dye antagonizes cyanide poisoning by acting in the tissues as a reversible oxidation-reduction system. Brooks bases this conclusion upon her failure to detect methemoglobin in the blood of animals following administration of the dye.

The papers and conclusion of Brooks are subject to criticism on two accounts. *First:* Brooks states that the system blood-methylene blue *in vitro* (the behavior of which originally suggested to the writer that methemoglobin formation might account for the dye's action *in vivo*) differs markedly as regards glucose concentration from the same system *in vivo. In vitro,* she says, the glucose is "quickly used up" and "methemoglobin heaps up." It should be pointed out that methylene blue does not remain in the blood in significant quantities longer than thirty minutes after intravenous injection, and that in so short a period normal blood does not show a greatly reduced glucose concentration when incubated *in vitro* (at 37°) with methylene blue. In fact, the rate of disappearance of glucose from blood thus incubated is only slightly greater than that due to glycolysis alone. Since space limitations prohibit complete discussion of the several factors involved the reader is referred to the papers of Barron and Harrop, Warburg and coworkers and the writer[4] for clarification.

There is a striking difference between the system *in vivo* and *in vitro;* it concerns, however, methylene blue concentration. This difference is determined by the rapid disappearance of the dye from the blood following injection. Fifteen to twenty minutes after intravenous injection of 15 mg of methylene blue per kilo into dogs extremely little of the dye remains in the blood; it has gone into the tissues. This fact accounts for failure of methemoglobin to accumulate in detectable quantities.

Second: Brooks does not deny the formation of methemoglobin by the action of methylene blue on blood *in vivo.* She denies its accumulation. She states that *in vivo* methemoglobin is reduced as fast as it is formed. The writer's experiments are in agreement with this statement. No methemoglobin (less than 3 or 4 per cent. of the total pigment) accumulates when the dye alone is administered in clinically recommended quantities. Brooks, however, fails to consider the difference between the behavior of the system blood-methylene blue and the same system plus cyanide. Cyanide, by combining with methemoglobin as it is formed, effectively blocks its reconversion to hemoglobin by leuco-methylene blue (Warburg and Reid) and by the enzyme systems in the red blood cells (Wendel), and thus causes methemoglobin to accumulate (as cyanmethemoglobin). This is readily demonstrable *in vitro.* Furthermore, the writer finds, on the average, something over one half of 2 M.L.D's. (6 mg of HCN per kilo) of subcutaneously administered cyanide bound as cyanmethemoglobin in the circulating erythrocytes of dogs saved from such quan-

[1] M. M. Brooks, *Proc. Soc. Exp. Biol. Med.,* 31: 1134, 1934; and SCIENCE, 80: 15, 1934.

[2] E. Hug, *Compt. rend. Soc. biol.,* 112: 511, 1933.

[3] W. B. Wendel, *Jour. Amer. Med. Assoc.,* 100: 1054, 1933.

[4] For references of the large number of papers by Barron and coworkers and Warburg and coworkers, the reader is directed to the bibliographies in the writer's papers: *Jour. Biol. Chem.,* 102: 373 and 385, 1933.

tities of the poison by methylene blue. Since it seems probable that a not inconsiderable fraction of administered cyanide is also bound by tissue methemoglobin and since the animals, in spite of administration of large quantities of the dye, show a considerable degree of cyanide poisoning, it appears probable that the binding of cyanide by methemoglobin accounts for the greater part of the dye's action.

Details of the writer's experiments will be published elsewhere.

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TWO RATTLESNAKES KILLED BY A COTTONMOUTH

AT least three recent papers[1] have commented upon the susceptibility of certain North American Crotalid snakes to the venoms of their own or related species. In these it is shown that the widely circulated statement that poisonous snakes are immune to their own and each other's venoms is not infallibly true; cases are cited in which specimens bitten or injected with venom died with marked symptoms of snake bite poisoning. Two additional fatal cases have recently been noted in the collection of the Toledo Zoological Park.

Two Pacific rattlesnakes, *Crotalus confluentus oreganus* (Holbrook), were placed temporarily in a cage containing several cottonmouth moccasins, *Agkistrodon piscivorus* (Lacépède). At 8:00 A. M. on June 7, 1934, one of the moccasins was found grasping a rattler in its jaws and with its fangs apparently imbedded two or three inches anterior to the base of the tail. When the snakes were separated the rattlesnake crawled slowly away, dragging its tail as if the latter were paralyzed. When viewed from a little distance neither swelling nor fang marks were evident. Three hours later the area which had been held by the moccasin was considerably swollen and gradually increased in size until the snake died at 1:15 P. M. An autopsy showed a marked edema, extending three or four inches forward from the anus. The muscular tissue was soft and purplish red and the skin was beginning to slough away from the body. The left kidney was swollen and deep purple in color. The rattlesnake measured twenty-six inches in length; the moccasin about thirty.

Four days later the same moccasin was discovered swallowing the second rattlesnake head first. When the cottonmouth had been forced to disgorge, the victim showed marked distress and moved with considerable difficulty. Two hours later it seemed dead, but feeble movements were noted until a short time before the snake died about nine and a quarter hours after the first observation. Its head and about four inches of the neck were swollen enormously and resembled a snake in the act of swallowing a sizable object. There was a marked edema and a deep purplish coloration in this area, the tissue surrounding the right fang being most intensely affected. This rattlesnake measured twenty-nine and five-eighths inches in length.

While the actual bites were not observed in either case, the symptoms, typical of snake poisoning, indicated that each rattlesnake received an appreciable amount of venom. The same moccasin also killed and ate a smaller snake of its own species, but the incident was not noted in time to permit detailed observations.

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[1] Gloyd, SCIENCE, 78: 2010; Wooster, SCIENCE, 78: 2030, and Nichol, Douglas and Peck, *Copeia* 4, 1933.

DIARIES OF EARLIER GENERATIONS IN THE STUDY OF SLEEP

MANY clinicians and other competent observers have called attention to the changed pace of life which they believe may be a factor in causing that vague condition peculiar to civilization and which is sometimes called "Americanitis." Whether or not a wide-spread curtailment of the amount of sleep exists may throw light on one of the possible causes, both direct and indirect, of this observed condition. We are trying, from a study of diaries, to discover if the hours of sleep to-day are in fact significantly shorter than those of our fathers and grandfathers.

The diaries which are available to the workers in the laboratory are, unfortunately, not numerous. Hence an appeal to the readers of SCIENCE to scan any diaries from twenty-five to seventy-five years old which may be in their possession in order that we may have an adequate sample of records for study.

The data which a diary reveals, and which we should appreciate having forwarded to us, are: (1) Hour of retiring, (2) hour of rising, (3) the date of the original entries, (4) residence at the time of the entries, and (5) age of the diarist at the time of the entries.

We have secured several diaries which record these data intermittently over a life span; in such instances we are abstracting a sample of hours of retiring and of rising in the early twenties, in the early forties and again in the early sixties of the individual's life. We should esteem the cooperation of any readers who would abstract such data from diaries they have, including the sex and name of the diarist with the other data.

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