the standard error of difference for the patellae and 2.4 times that for the malleoli, it probably is significant.

Our finding of increased vibratory acuity threshold with age is in accord with the work of Corbin and Gardner,[2] who found a decrease in the number of myelinated fibers in the spinal roots in man with age and with similar findings of Duncan[3] in the rat. This would seem to imply that arthritic patients have a greater loss of proprioceptive fibers than a similar age group of normals. The possible implication of this finding in the etiology of this type of arthritis must be borne in mind.

8937 P

Effect of Benzedrine Sulfate on Basal Metabolic Rate.*

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The use of benzedrine in narcolepsy has been advocated by several workers.[1, 2, 3] The results have been uniformly excellent, the drug affording complete relief from symptoms; no patients have failed to respond to adequate dosage. In the case-records reported, the basal metabolic rates recorded have averaged well below the normal range. It has been stated that the drug can awaken experimental animals from anesthesia produced by barbital given intraperitoneally.[4, 5] In humans, besides its profound effect in narcolepsy, it has produced also marked cerebral stimulation, insomnia, and rise in blood-pressure; this occurs in normal individuals, likewise. One would expect, therefore, that benzedrine would markedly increase metabolism, most probably indirectly through its stimulative action.

The following study was undertaken to determine the metabolic

2 Corbin, K. B., and Gardner, E., Personal communication.

3 Duncan, D., *J. Comp. Neurol.*, 1934, **59**, 47.

* Assisted by a grant from the Christine Breon Fund.

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1 Prinzmetal, M., and Bloomberg, W., *J. A. M. A.*, 1935, **105**, 2051.

2 Ulrich, H., Trapp, C. E., and Vidgoff, B., *Ann. Int. Med.*, 1936, **9**, 1213.

3 Peoples, S. A., and Guttmann, E., *Lancet*, 1936, **230**, 1107.

4 Alles, G. A., *J. Pharm. and Exp. Therap.*, 1933, **47**, 339.

5 Alles, G. A., and Prinzmetal, M., *J. Pharm. and Exp. Therap.*, 1933, **48**, 161.

activity of benzedrine as shown by the basal metabolic rate. Three subjects were used: T.B.L., a normal white female, aet 28; M.H.S., a normal white male, aet 29; and J.B.L., a normal white male, aet 30. Basal metabolic rates of 2 subjects were determined for 3 successive days, and of the third, for 2 days in order to obtain the true basal levels. Benzedrine sulfate, 20 mg. (2 tablets), was then given for 5 successive days each morning at 9:00 o'clock, following the basal metabolic rate determinations. Therefore, the basal metabolic rate obtained on any given day during the experimental period showed the effect of the benzedrine taken 24 hours previously. The basal rates were not determined on each day of the experimental period, but at the end of the first, second and fifth days of medication. A post-experimental control-rate was determined on the third day (72 hours) after the last dose.

The apparatus used was a Benedict-Roth basal machine (new model). The rates were calculated by the Aub-Dubois standards (body surface). The oral temperature of the subject and the pulse-rate for the second and sixth minutes of the test, were taken—as is the usual routine in the test. Blood-pressures were taken with a mercury manometer by the auscultatory method until 3 comparable systolic pressures were obtained. This was done under the basal conditions mentioned above.

TABLE I.

Date	T.B.L. BMR	Temp.	Pulse	J.B.L. BMR	Temp.	Pulse	M.H.S. BMR	Temp.	Pulse
Sept. 1936	%			%			%		
21	— 8.0	36.8	68-66	—16.0	36.5	70-66	—29.0	36.4	60-62
22	— 7.5	36.7	76-74	—22.0	36.4	58-60	—22.0	36.2	60-60
23*	—	—	—	—24.2	36.4	64-	—35.5	36.2	60-58
24*	—11.0	37.0	68-66	— 6.4	36.4	66-68	+ 0.6	36.5	64-64
25*	—12.6	36.7	70-76	— 7.0	36.4	72-70	— 3.0	—	62-64
26*	—	—	—	—	—	—	—	—	—
27*	—	—	—	—	—	—	—	—	—
28	—13.5	36.7	66-62	—21.0	36.2	68-66	—29.0	36.2	64-64
29	—	—	—	—	—	—	—	—	—
30	—24.0	36.6	88-66	—24.5	36.1	62-66	—44.0	36.1	60-62

*Benzedrine was given on these days after the basal metabolic rate was determined.

Table I gives the basal metabolic rates for the normal and experimental periods, and shows the relationship to the benzedrine dosage. T.B.L. is accustomed to having a basal metabolic rate taken every 5 or 6 months, which had shown a basal level of 13.0% (± 2%) minus. This subject had a slight cold, but without fever, during the test, which may account for the slightly higher level.

It is important that each subject rested from 45 to 60 minutes

before each determination, and that each one felt that no disturbing factors influenced the test, as complete physical and mental repose had been attained.

The results in 2 of the subjects (M.H.S. and J.B.L.) are similar. The first dose produced a definite rise which was maintained after the second dose. Determinations were not made after the third and fourth doses, but the basal rate had dropped to the pre-experimental level after the fifth and last dose. In one (J.B.L.), this basal level was maintained in the post-experimental control determination; in the other (M.H.S.), this determination had dropped sufficiently below the supposed basal level to be significantly beyond the limit of experimental error. The rates of the third subject (T.B.L.) show no significant change except a tendency to drop, though hardly beyond the limit of possible error; in the control determination, however, there was a marked drop, as had occurred in M.H.S. The significance of this drop is not apparent.

There was no significant change in the basal temperature, pulse-rate or blood-pressure of any of the subjects. Although the general effects varied somewhat in the different individuals, they were, on the whole, the same as has previously been reported.[1, 2, 3]

It was not expected that the basal level would be as low as was found. Whether this influenced the rise in rate and whether it accounted for the failure of this rise to be maintained, is not known. It seems reasonable to expect individuals with a normal level (from 10.0% minus to 10.0% plus) to show the same degree of rise; whether the rate would drop to the previous level under continued medication or maintain its level as long as the drug was ingested, is difficult to prophesy. This is the next problem planned for investigation.

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Clostridium Botulinum Type E.

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Two cultures of *Clostridium botulinum* were sent to this laboratory in March, 1936, by Dr. L. Bier of the Bacteriologic Institute at Dniepropetrowsk, Ukraina, U.S.S.R. Toxin-neutralization tests had suggested a new type. The original cultures were toxic for