TABLE I.

Maximum Functional Changes during One Hour's Observation Following Oral Administration of Morphine Sulphate in Normal Humans.

Subject	Sex	Age	Wgt. kg.	Dose mgm/kg.	Resp. per min.	Pulse per min.	Pulse Pressure mm. Hg.	Tactile Discrim.	Basal Metabolic Rate
D. C.	M	40	70.5	0.1	—2	0	—8	Decrease	0
H. P.	F	28	61.0	0.1	+3	—4	—8	No change	—5
R. M.	M	22	65.0	0.1	0	+6	+8	Decrease	0
D. C.	M	40	70.5	0.2	—3	—12	+4	Decrease	—15
H. P.	F	28	61.0	0.2	0	+12	+6	Decrease	—7
R. M.	M	22	65.0	0.2	0	+6	—10	—	+3
A. C.	F	23	60.0	0.25	0	+6	0	—	—11
H. P.	F	28	61.0	0.3	—2	+12	+8	Decrease	—3
A. H.	M	25	72.0	0.3	—2	+6	+12	Decrease	—8
H. P.	F	28	61.0	0.4	0	+8	+8	Decrease	—5
R. M.	M	22	65.0	0.4	0	+14	+14	Decrease	—4
R. M.	M	22	65.0	0.5	0	+6	—16	Decrease	—5

creased quite markedly. Pulse pressure usually increased during this period. Tactile discrimination was generally diminished, and, in the higher dosages, to a considerable extent. The basal metabolic rate was generally depressed but not to the same degree as noted by Miss Stark. This may be a reflection of the presumed difference of administration and also of the fact that our experiments did not run longer than an hour. In this time there seemed to be no significant relation between the effect on oxygen consumption and the dosage employed which was in the ordinary therapeutic range. It is probable that longer observation would show a diminution in the pulse rate below normal and a greater fall in the basal metabolic rate after the oral administration of morphine sulphate in the higher dosages here employed. None of the subjects here noted had any symptoms of nausea or sleepiness following the drug.

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Effect of Amytal Anesthesia on Glucose Tolerance.

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That amytal may have an effect on carbohydrate metabolism is indicated by the finding that dogs under amytal anesthesia exhibit a decreased capacity to assimilate injected glucose.[1, 2] This problem

[1] Hines, H. M., Boyd, J. D., and Leese, C. E., *Am. J. Physiol.*, 1926, lxxvi, 293.

[2] Hines, H. M., Leese, C. E., and Baker, A. P., PROC. SOC. EXP. BIOL. AND MED., 1928, xxv, 736.

can perhaps be more readily investigated by employing the "glucose tolerance test." In our experiments this consisted in administering 2 gm. Pfanstiehl glucose per kilo body weight dissolved in 50 cc. water, followed by 100 cc. water. The changes in arterial (femoral) blood sugar were then followed at half hour intervals for 3 hours. In unanesthetized dogs the blood sugar rose to a maximum of some 300 mgm. within about one hour, and at the end of 3 hours had fallen to about 180 mgm.

Out of 5 dogs under amytal which were given sugar by means of a stomach tube, 3 showed no rise in blood sugar, and the other 2 showed a rise of only 10 mgm. In our experiments amytal *per se* produced no change in blood sugar (*cf.* Page,[3] Weiss[4] and others). One of these dogs was killed at the close of the test and the pyloric sphincter was found tightly closed, all the sugar still remaining in the stomach.

The abdomen of another amytalized dog was opened and sugar injected by syringe directly into the stomach. Again there was no rise in blood sugar during the following 3 hours, and again the sphincter was seen to be tightly closed. The stomach was emptied, washed out, and sugar now injected directly into the duodenum. This time there was a distinct rise in blood sugar, but the maximum reached was less than 2/3 the maximum when the test was tried on this same dog unanesthetized, and the blood sugar fell to normal before the end of the 3 hours. This finding was fully confirmed in 18 tolerance tests taken on 5 different dogs, 8 unanesthetized and 10 under amytal, the sugar being introduced through a tube into the duodenum (*cf.* Fig. 1). No sugar was found in the urine of the dogs under amytal at the end of the test and in the stomach there was not more than 5 cc. of liquid, which in 2 cases proved to be free from sugar and in 2 others contained a trace only. Two dogs were killed at the end of the 3 hour period and, as in the other cases, the pyloric sphincter was found tightly closed, the stomach and intestines almost toneless and intestinal movements feeble. The oesophagus and rectum were tied off and the entire alimentary tract removed, washed externally, then slit open, the contents washed out, and the amount of reducing substances estimated. In one dog this was equivalent to 5.28 gm. of sugar, and in the other 7.5 gm., although the amount of sugar which had been administered was less than 1/3 the amount a normal dog should be able to absorb in 3

[3] Page, I. H., *J. Lab. and Clin. Med.*, 1923, ix, 194.

[4] Weiss, S., PROC. SOC. EXP. BIOL. AND MED., 1926, xxiii, 363.

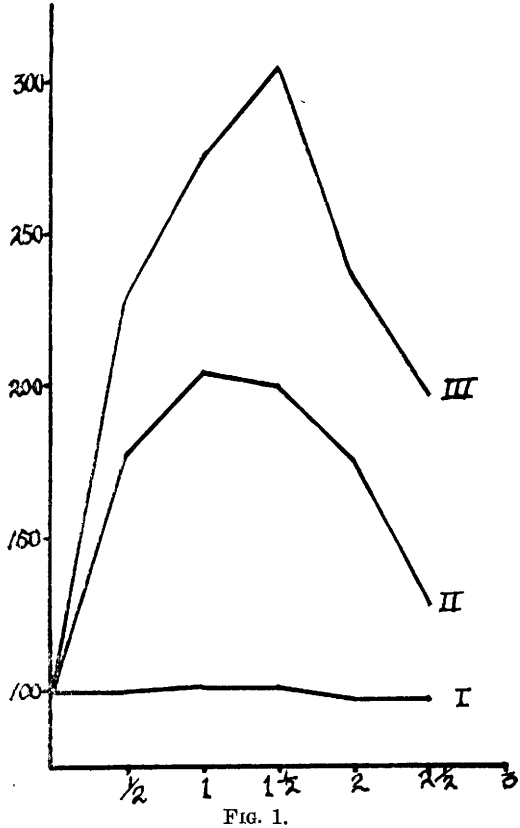

FIG. 1.

Ordinates = blood sugar. Abscissae = time in hours. Curve I = dog under amytal, sugar in stomach. Curve II = dog under amytal, sugar in duodenum. Curve III = dog unanesthetized, sugar in duodenum.

hours.[5, 6] A small fraction of this reducing substance was doubtless not sugar, but the reducing substance always found in the intestine; however, it can be safely said that 1/5 of the sugar remained unabsorbed in spite of the fact that the blood sugar had fallen to normal half an hour previously.

These experiments show that under amytal the pyloric sphincter is maintained so tightly closed that sugar introduced into the stomach can not pass into the duodenum, and if the sugar is placed directly into the duodenum absorption is diminished to a marked degree. This latter effect may, however, be merely a matter of diminished intestinal motility.[8] The closed sphincter and decreased intestinal

[5] Fisher, G., and Wishart, M. B., *J. Biol. Chem.*, 1912, xiii, 49.

[6] Woodyatt, R. T., Sansum, W. D., and Wilder, R. M., *J. Am. Med. Assn.*, 1915, lxv, 2067.

[7] Cori, C., *J. Biol. Chem.*, 1925, lxvi, 691.

[8] Pottinger, Symptoms of Visceral Disease, 1922.

motility suggest paralysis of the parasympathetic autonomic nervous system, and is in line with the observation that vagus stimulation in dogs under amytal fails to lower blood pressure.[9]

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Skin Infection in Salmon Fishermen in Alaska.

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The occurrence of various types of skin infection among commercial fishermen has frequently been noted. Minute abrasions from the teeth or the spines of fish open the way frequently to infection. Fellers[1] has isolated a pyogenic streptococcus associated with fish and Klauder and his associates[2, 3] have noted on the east coast a specific skin infection due to the bacillus of swine erysipelas.

While giving medical assistance to the commercial fishermen at Bristol Bay, a part of the Bering Sea, one of us (H.N.M.) noted a type of skin infection which was typical and had uniformly constant symptoms. Although the fishermen do not distinguish between this and other infections, the disease has apparently been known to them for some time.

The disease appears to have a short incubation period. Pain, swelling, and a dark red discoloration develop simultaneously. If, at this stage, the area is examined closely, a tiny break in the skin may be noted from which a drop or two of clear or slightly cloudy serum can be expressed. There is general malaise, often a slight headache, and a temperature between 99 and 100. Swelling, or pain, or both may become quite marked, so that a lesion starting on a finger produces edema of the whole hand and sometimes of the wrist. Epitrochlear and axillary lymph nodes are commonly enlarged or tender. Lymphangitis is rarely visible. The infection spreads locally between the epidermis and the dermis, separating the two layers to form a lesion resembling a collapsed blister, containing a few drops of turbid serum. Improvement usually begins in 2 or 3 days, but

[9] Lieb, C., and Mulinos, M., PROC. SOC. EXP. BIOL. AND MED., 1929, xxvi, 709.

[1] Fellers, C. R., *J. Bact.*, 1926, xii, 181.

[2] Klauder, J. V., *J. Am. Med. Assn.*, 1926, lxxxvi, 536.

[3] Klauder, J. V., Righter, L. L., and Harkins, M. J., *Arch. Derm. and Syph.*, 1926, xiv, 662.