

there was definite evidence of a drop in the general nutrition of the patient. In 8 of the cases deliberate or starvation from poverty preceded the development of the cancers by 1 to 25 years. The cancer developed in 8 cases with the recurrence of an active tertiary syphilis. Starvation from worry associated with gastric disturbance lasting over 2 years preceded the development of the cancers in 2 cases. Poor dietary in the treatment of diabetes preceded the development of the cancer in another case. Chronic proctitis with arthritis and chronic tonsillitis with arthritis and a kidney lesion were present in 2 cases. In the other 22 cases abscessed teeth preceded the development of cancers.

A few of the earlier cases had suffered recurrence of their cancers after careful operations. Removal of the focal infections together with the cancers and a good dietary has been followed by no recurrences for a period of 10 months in 4 of these cases. Where the general condition of the patient could not be improved in 2 of the earlier cases the cancers recurred quickly after most careful operations and x-ray treatment.

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Duration of Sleep and the Insensible Perspiration.*

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Sanctorius¹ has an aphorism, No. XV in his Sect. IV on Sleep and Vigilance, which reads as follows: "If the night's rest be less than usual, there is a diminution in the exhalation of the concocted perspirable matter, but the perspiration of crudities is augmented." On the first point I have seen no actual data. Benedict and Root² state that the insensible loss is less with quiet sleeping and more with restlessness. A hot uncomfortable night increases the weight loss per hour. These authors give a good review of the literature on the subject of insensible perspiration. The papers like the work of

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¹ Sinclair, "Code of Health and Longevity," Edinburgh, 1807, vol. iii, p. 167.

² Benedict and Root, "Insensible perspiration: Its relation to human physiology and pathology," *Arch. Int. Med.*, 1926, xxxviii, 21; also Benedict and Joslin, "A Study of Metabolism in Severe Diabetes," Carnegie Inst. Pub. No. 176, Washington, 1912, p. 91.

Sanctorius in 1614 have mostly been self-studies. Dr. F. G. Benedict has done more than anyone else or probably than all others combined to point out the importance of research in this field and to set the facts in array.

The data given herewith represent self-observation and cover 40 nights, nearly consecutive, beginning April 24th and ending June 24, 1928. So far as climatic conditions are concerned the data are representative for Stanford University, California. During this period the relative humidity of outdoor air at night ranged from 90 to 100% while in the middle of the day it was usually around 30%. The mean noon day temperature for April, May and June in this locality was 63°, 68° and 73° F. respectively. The night temperature in May for example is close to 53°, dropping about one degree for every 2 hours as follows:

May 10 P. M.	12 P. M.	2 A. M.	4 A. M.	6 A. M.	8 A. M.	N
55°	54°	53°	52°	51°	58°	68° ^a

The sleeping was indoors with windows wide open. The nude weights were taken on platform scales ("silk scales") such as are recommended by Benedict. Our scales were provided with a pillar 36 inches high which made self weighing quite convenient and accurate. The beam was graduated in 5 gm. divisions but the scales had a sensitivity of 10 gm. The data are given in Table I. In place of giving the time in bed as hours and minutes, it is recorded in the table as hours and decimals of hours. The range is from 5.33 to 8.75 with an average of 7.31, A. D. .63. Therefore the coefficient of variability for the time spent in bed, which is practically equal to the time between weighings, is 8.7%. The total weight loss recorded for the different nights ranged from 195 to 395 with an average of 288 gm. The A.D. is 47 gm. which amounts to 16.3% of the mean. The product-moments correlation between time in bed and loss in weight was $.81 \pm .03$. The column giving the derived values of loss per hour exhibits a range from 29.0 to 49.0 gm. The average is 39.1 gm., A.D. 4.1 gm. C. of V. 10.5%. The gross body weight for this subject was 78 kilos and during the progress of the experiment there was a gradual change of body weight from 79 kilos on April 24th to 77 kilos on June 24th. The subject was working rather strenuously throughout this period which represents the spring quarter of the academic year, but there was no routine that absolutely forced him to rise at a certain time in the morning. The longer sleeping periods were

^a Data supplied by Professor J. G. Brown, Physics Department, Stanford University.

TABLE I.

Weight loss by insensible perspiration during sleep. Observations on W. R. M. for 40 nights. Net body-weight 78 kg., height 178 cm.

Month	Night	Time in bed.	Loss in weight	Loss per hour	Average for 5 day periods
1928		hrs.	gm.	gm.	gm.
April	24-25	6.90	235	34.0	
"	25-26	8.17	320	39.2	
"	26-27	8.08	350	43.3	
"	27-28	6.92	280	40.5	
"	28-29	8.50	380	44.7	40.6
"	29-30	7.25	295	40.7	
May	1-2	8.25	380	46.1	
"	2-3	7.42	290	39.0	
"	3-4	7.83	385	49.2	
"	4-5	6.00	210	35.0	42.4
"	5-6	5.33	220	41.3	
"	6-7	6.25	195	31.2	
"	7-8	7.83	280	35.8	
"	8-9	5.92	245	41.4	
"	10-11	7.58	330	43.6	38.6
"	11-12	7.25	275	38.0	
"	12-13	8.00	335	41.9	
"	13-14	7.00	250	35.7	
"	14-15	7.00	310	44.4	
"	15-16	7.75	290	37.4	39.4
"	16-17	8.50	300	35.3	
"	17-18	7.50	315	42.0	
"	18-19	7.92	250	31.6	
"	19-20	8.00	350	43.7	
"	20-21	8.75	360	41.1	38.7
"	21-22	7.00	255	36.4	
"	22-23	6.92	325	47.0	
"	23-24	7.00	290	41.5	
"	24-25	7.08	205	29.0	
"	26-27	8.17	375	46.0	39.8
"	27-28	7.25	215	29.7	
"	28-29	7.25	245	33.8	
"	29-30	6.33	225	35.5	
"	30-31	6.50	260	37.7	
June	31-1	7.25	285	39.4	35.6
"	1-2	7.83	320	40.9	
"	2-3	6.00	200	33.4	
"	3-4	7.50	285	38.0	
"	11-12	8.08	395	49.0	
"	24-25	6.50	210	32.3	39.2
Ave.		7.31	288	39.1	
A.D.		.63	47	4.1	

sometimes but not always associated with the week-end. In general the length of the rest period varied quite irregularly throughout the entire group of days. It was not varied according to any prearranged plan.

The 8 successive groups of 5 days show mean losses per hour that are not very far different but average a little less in the last half of the period covered. Our total average of 39.1 gm. equals 0.5 gm. in-

sensible loss per kilo body weight per hour. The data cited by Benedict and Root as well as their own data show about this value except that for their heavier subjects, above 70 kg., it tends to be less. At present we cannot say whether our greater loss than their heavier subjects is climatic or individual difference.

If we classify our data in reference to duration of time in bed, which is here about synonymous with duration of sleep, we find the following:

8 nights of 6.5 hrs. or less, ave. loss per hr.-----	36.2 gm.
16 nights of 6.55-7.5 hrs., ave. loss per hr. -----	38.0 gm.
16 nights of 7.55 hrs. or more, ave. loss per hr.-----	41.8 gm.

The differences are consistent but they are not large and fail of statistical significance. However, they tend to verify Sanctorius' aphorism quoted above and probably indicate that with the sounder or fore part of the sleep period there is a slower loss. In the longer normal sleep the latter portion approaches more to the waking condition and has a higher rate of loss.

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Classification of "Fibroblasts" According to Their Physiological Properties.

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Years ago it was stated that epithelial cells cultivated *in vitro* dedifferentiated or returned to an indifferent cell type which could not be distinguished from fibroblasts.¹ However, the conclusions drawn at that time were mainly due to an inefficient technique which resulted in impure strains of tissue cells. Since we are now able to cultivate pure strains of tissue cells indefinitely, we know that the cells, under the conditions of the experiment, remain typical and retain their morphological characteristics throughout the entire period of cultivation. In the case of fibroblasts and epithelial cells, it has become a relatively simple matter to distinguish between the 2 cell types. One is aided not only by marked morphological differ-

¹ Champy, C., *Compt. rend. Soc. biol.*, 1912, lxxii, 987; Uhlenhuth, E., *J. Exp. Med.*, 1916, xxiv, 689.