SCIENTIFIC PROCEEDINGS.

ABSTRACTS OF COMMUNICATIONS.

Sixty-seventh meeting.

University and Bellevue Hospital Medical College, April 21, 1915.
President Lusk in the chair.

85 (1017)

The effect upon appetite of the chemical constituents of the air of occupied rooms.

By C.-E. A. WINSLOW and G. T. PALMER.

[*From the Laboratory of the New York State Commission on Ventilation.*]

It has been shown by many observers that the ordinary effects of the air of an unventilated occupied room are due to its high temperature rather than to its chemical composition. In the experiments carried out during the past two years by the New York State Commission on Ventilation, we have found that neither the pulse, blood pressure, body temperature, respiration nor metabolism are influenced to a measurable degree when human subjects are exposed for periods of from 4 to 7 hours to the air of a room in which all the chemical products due to human occupancy have been allowed to accumulate (so that the carbon dioxide averages over 30 parts per 10,000)—provided the temperature of the chamber be kept down by artificial means.

In the course of our investigation we have however, discovered a new measure of the influence of vitiated air which seems to indicate that there is after all an effect produced upon the body by the chemical constituents of the air of an occupied room. This effect is manifested in a diminished appetite for food.

The subjects in the first three of the five series of experiments reported which are tabulated below were young men, mostly

students at the College of the City of New York or at New York University, and in the last two series young women. For five days a week for a period of from two to six weeks, they were placed in the observation room of the experimental plant at the College of the City of New York (described *Proc. Soc. Exp. Biol.*, Vol. XII, p. 111). In each series of experiments the subjects were supplied with a fresh air supply of 45 cubic feet per minute on half the days while on the other days no air was supplied and (subject to unavoidable leakage through walls and ceiling) the carbon dioxide, organic matter, and whatever else was given off from mouths, bodies, and clothing accumulated in the room. Temperature and humidity however, were controlled so as to be the same on both ventilation and no-ventilation days. In the last three series of experiments, three desk fans were kept in motion at all times so as to prevent the introduction of an air movement factor by the current from the inlet duct on the ventilation days.

After the subjects had been in the room for from 2 to 3 hours, a luncheon made up of weighed portions of known calorific value, was served and the amount of food left uneaten was weighed to determine by difference the amount consumed. The diet was varied from day to day but with the exception of Series III was so arranged that each article of food appeared an equal number of times on the ventilation and no-ventilation days.

TABLE I.

Series.	Date.	No. of Subjects.	Sex.	No. of Days.	Hours in Chamber before Lunch.	Average CO_2 at End.		Average Calories Consumed.		Excess Favoring Ventil. Day.	
						Vent.	No Vent.	Vent.	No Vent.	Cal.	%
III.	June 8–July 27 '14	4	M	18	3–3½	7.5	29.5	1,308	1,151	157	13.6
VII.	Oct. 12–Nov. 6	4	M	20	3	9.0	50	1,620	1,492	128	8.6
X.	Dec. 8–Jan. 29 '15	7	M	28	2¼	9.5	36	2,057	1,971	86	4.4
XI.[1]	Feb. 1–19	8	F	12	2¼	7.0	37.5	1,313	1,381	—68	—4.9
XII.	Feb. 22–Mar. 19.	8	F	20	2¼	10.0	37.5	956	895	61	6.8

The carbon dioxide as indicated in the table above averaged between 29 and 50 parts on the no-ventilation days and there was usually a slight odor noticeable and sometimes a strong one.

In Series XII the opinions of the subject as to comfort were recorded and the average expression favored the no-ventilation condition.

[1] This series was vitiated by special conditions noted below.

In Series XI there was a slight excess of food consumed on the no-ventilation days. This series was however rendered practically valueless by the fact that after it was under way we discovered that religious dietary laws, observed but loosely at first, but gradually with more strictness, had prevented the use of certain articles of the diet. This influence was quite impossible to measure or to balance. The results however are included for completeness.

The other four series show a consistent excess of food consumption on the ventilation days. In view of the fact that these series represent averages of 71, 80, 196, and 160 meals respectively we believe them to be significant. In Series III and VII where the food left by each subject was separately weighed every one of the 8 different subjects ate more on the ventilation days.

The reliability of these figures based on the number of observations and their departure from the mean has been determined mathematically by Mr. W. A. McCall, psychologist on the staff of the Commission.

The chances that the differences in calories consumed between ventilation and no-ventilation days may be zero or may favor the other condition, are expressed in Table II.

TABLE II.

Series.	Chance of Different Result.	Interpretation.
III	0.38 chance in 100	Very reliable.
VII	1.0 " " "	Highly reliable.
X	9.0 " " "	Probable.
XI	18.0 " " "	"
XII	12.0 " " "	"

This effect on appetite of the absence of ventilation, though slight, is apparently a persistent one. At the beginning of an experiment there is but little difference noted on the two types of days. As the novelty of the environment and the meal wears off however, the effect of breathing the same air over and over again seems to exert an increasing influence. This action is illustrated in Series XII, where the average excess of food consumed on ventilation days was 6.8 per cent. During the first two weeks this excess was but 2.8 per cent. In the last two weeks it amounted to 10.8 per cent.

A separate computation of the bread and butter consumption at

each meal has been made and these results bear out the result for the entire meal as indicated in the table below. It was thought that this part of the meal might give a more exact measure of hunger, its attractiveness being less subject to variation than the meats and desserts.

TABLE III.

Series.	Per Cent. Excess Bread and Butter Eaten on Ventilation Days.
III.	5.2
VII.	5.7
X.	5.3
XI.	—2.2
XII.	6.1

These experiments seem to warrant the conclusion that there are substances present in the air of an unventilated occupied room (even when its temperature and humidity are controlled) which in some way, and without producing conscious discomfort or detectable physiological symptoms, diminish the appetite for food. The effect of such an influence might in time be very important and it seems possible that the observed beneficial effects of fresh air may to some extent be connected with this phenomenon.

86 (1018)

Protective inoculation against mumps.

By ALFRED F. HESS.

[*From the Research Laboratory, Board of Health, New York City.*]

In view of the fact that mumps confers a marked immunity on the person who has had the disease, that a second attack is rare, the blood of convalescents was used in a prophylactic way. Six to eight c.c. of blood was injected intramuscularly in 17 cases. These children were in wards where there had been cases of mumps for the past month and where it continued to appear for a month following these inoculations. In no case did one of the inoculated children develop mumps, whereas one third to one half of the non-inoculated cases developed the disease. The blood was taken from children who had just recovered or had been well for about ten days.