the mammary tissue can not be attributed to a general foreign substance reaction.

A beginning attempt at fractionation of the desiccated mammary tissue of rabbits 26 days pregnant has yielded a strong tumor-inhibiting ether-insoluble fraction and an equally potent tumor-stimulating ether-soluble fraction. The desiccated mammary gland was first thoroughly extracted with ether and the soluble material, after evaporation of the ether, was suspended in 1 per cent. phosphate buffer. The insoluble portion of the powder was extracted with sterile distilled water. The pH of each test solution was 7.0–7.2.

The results of the tests are shown in Table I and include only those in which all the solutions were tested concurrently on grafts from the same tumor substrate and on mice from the same cage lot. A tumor growth was considered inhibited when the control in the same animal was twice the weight of the test tumor at 21 days or more after inoculation. When the test tumor was twice the weight of the control it was considered as evidence of stimulation. Following the accepted procedure, a significant difference from the normal frequency distribution depends on the value of P being less than .05. The table shows that there was an excellent fit between the frequency distribution of results from double controls and that of the theoretical normal distribution. The results demonstrate not only a definite inhibiting action of the water extract of the ether-insoluble fraction of the rabbit mammary gland, but also an equally definite stimulating property of the ether-soluble fraction from the same tissue. Furthermore, it would appear that there is a partial neutralization of the two forces in the aqueous extract of the unfractionated mammary tissue.

Additional results, including tests of both rabbit and cow glands, are presented in Table II. The results

TABLE II

TUMOR INHIBITION AS SHOWN BY FRACTIONS OF RABBIT AND COW MAMMARY GLAND

Fractions	Frequency of: Inhibition	No effect	Stimulation	N	χ^2	n′	P*
Unfractionated ..	154	115	29	298	48.49	3	.000001
Ether-insoluble ..	79	43	9	131	48.02	3	.000001
Double controls ..	63	110	68	241	Standard of reference		
Theoretical normal distribution ...	60	120	60	240	1.01	3	.61

* P = "Probability that deviations as great or greater would occur by chance."

are pooled because there was no significant difference between the effects of extracts of rabbit and cow mammary tissues.

The results seem to offer further support to the idea that active normal tissues may contain two factors, one capable of inhibiting the multiplication of cells and the other augmenting the process.

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DOMINANT LETHAL GENETIC EFFECTS CAUSED BY NEUTRONS

IN crosses of unrelated stocks of the parasitic wasp Habrobracon, all females come from fertilized eggs, all males from unfertilized. Treatment of sperm with any physical agent causing dominant lethals should therefore reduce number of female progeny. Number of male progeny should not be affected unless the sperm were themselves rendered incapable of "fertilizing" the eggs. In this case the males would be increased.

As a preliminary experiment wild-type male wasps were sent via air mail to Berkeley, California, and subjected to various dosages of neutrons by Professor Ernest O. Lawrence. Upon being returned these males were crossed with unrelated orange eyed females. Progeny (Table 1) indicate decreased fecundity of the

TABLE 1

Treatment	Total days during which progeny were being produced	Progeny: Orange males	Wild-type females	Males per day	Females per day
Control ..	70	42	139	0.60	2.00
530 R. ...	20	14	35	0.70	1.75
900 R. ...	75	43	50	0.57	0.66
1900 R. ..	65	20	5	0.31	0.08

mates of the treated males. It is likely that the fluctuations in number of male offspring are due to small numbers involved.

Although the data presented herewith are meager, they are reported at this time because the cyclotron will not be available for use for several months.

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RECOVERY OF INFLUENZA VIRUS SUSPENDED IN AIR

THE union of two independent techniques has made possible the recovery of the Puerto Rico 8 strain of influenza virus,[1] experimentally suspended in air. One of us (H. W. B.) prepared liquid suspensions of the influenza virus and confirmed, by means of animal inoculation, its recovery from air.[2, 3] The other (W. F. W.) atomized the liquid suspension of virus into

[1] Provided through the kindness of Dr. T. Francis, Jr., Rockefeller Institute.

[2] H. W. Brown. Unpublished Thesis, Harvard School of Public Health, 1936.

[3] H. W. Brown, *Am. Jour. Hyg.*, in press.

a closed steel chamber of 200 cubic feet capacity, leaving an air suspension of droplet nuclei.[4] Following atomization, samples of the air were withdrawn through siamized tubes to two Wells air centrifuges.[5] One branch led directly to one of the centrifuges; the other branch included a small chamber enclosing a cold quartz mercury vapor lamp, by means of which the air passing to the other centrifuge could be irradiated with ultra-violet light.[6]

The virus in the material recovered from the tank was identified in three ways: (1) production of the characteristic disease in ferrets; (2) virus neutralization tests in mice before inoculation and 17 to 30 days later; (3) reinoculation of the ferrets with virus of known potency.

RESULTS

(1) All the ferrets (8) inoculated with material collected from the air within an hour after suspension contracted influenza. None of the ferrets (7) inoculated with samples collected from the tank an hour or more after suspension of the virus contracted the disease. These negative tests were in general comparable to those of shorter periods which gave positive results, but in each instance some particular condition of test differed. On the basis of this exploratory study, however, the authors do not believe that they have necessarily reached a viability end-point.

(2) Simultaneous sampling under identical conditions of air, (1) as it came from the tank and (2) after irradiation with ultra-violet light, seem to indicate a definite viricidal action of the light. In two tests, the ferrets inoculated with material recovered from unirradiated tank air, suffered a typical attack of influenza, which was confirmed by virus neutralization tests. The ferrets that received material simultaneously recovered from the air of the tank under identical conditions, except for irradiation of the air, failed to show any symptoms of influenza, and virus neutralization tests subsequently showed no development of immunity.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE APPARATUS FOR THE MAINTENANCE OF A GRADED SERIES OF CONSTANT TEMPERATURES

IN 1928 I designed and had constructed for the Zoological Laboratory of the Johns Hopkins University an apparatus by means of which a graded series of five different constant temperatures can be maintained. This apparatus has now been in operation almost continuously for seven years. It has proved to be very useful and efficient and extremely simple to operate.

It consists, in principle, of a series of compartments one above the other with a refrigerating unit in the upper one and a heating unit in the lower (Fig. 1 A). As actually constructed it consists of two series of five compartments side by side (12 x 20 x 20 inches each); a large refrigerating compartment (12 x 25 x 50 inches) above these two series and a heating compartment (9 x 25 x 50 inches) below. Each of the ten compartments contains two wire shelves, and each has a 2-inch space around it (Fig. 1 A). The refrigerating compartment has two trap doors above, the heating compartment two doors on hinges and each of the ten compartments one door on hinges. All the doors are constructed like those on household refrigerators, and each is provided with two gaskets (Fig. 1 B). Between the sheets of celotex and the wood boards and on both surfaces of the sheet cork there are layers of heavy insulating paper, not represented in the figures. The refrigerating compartment contains the low temperature coils of a household electric refrigerator, the heating compartment contains a bank of five 30-Watt lamps with an electric thermostat in series.

The temperature in the different compartments varies with that in the refrigerating and the heating compartments and that of the room. With these temperatures 2°, 30° and 20°, respectively, the temperatures in the five compartments in each of the two series are, beginning with the upper, 10°, 16°, 20°, 24° and 27°, respectively, with a variation under favorable conditions of approximately ½° in each.

The temperature of the five compartments in the series varies directly with that of the room. However, if this does not vary more than about five degrees there is, with ordinary thermometers, little if any observable variation in the temperature in the compartments, and this could be reduced by increasing the thickness of the outer walls and by using more efficient insulating material.

By changing the temperature in the refrigerating and the heating compartments practically any range of temperatures in the compartments desired can be obtained.

[4] W. F. Wells and W. R. Stone, *Am. Jour. Hyg.*, 20: 611, 1934.
[5] W. F. Wells, *Am. Jour. Pub. Health*, 23: 58, 1933.
[6] W. F. Wells and G. M. Fair, SCIENCE, 82: 280, 1935.