In falling this meteorite penetrated the roof of a frame garage and the top of a Pontiac coupe therein, making a neat hole in the cushion of the car to the right of the driver's seat. It also broke the floorboard beneath the seat, and made a slight dent in the car's muffler. The meteorite itself, however, did not hit the ground, as it had become so entangled in the springs of the cushion that it was snapped back up into the cushion by the recoil of the springs.

When discovered and retrieved by the owner the same afternoon, it was found to be roughly prismatic (almost rectilinear) in outline, with dimensions of approximately $110 \times 90 \times 80$ mm. It weighed 1,770.5 grams in air, (after two small fragments of undetermined weight had been removed), and possessed a S. G. of 3.69. Its outer surface was entirely covered with a jet black velvety crust from $\frac{1}{2}$ to 1 mm in thickness. Its interior exhibited a dark gray surface, with chondrules well developed, speckled freely with bright metallic grains of a silvery luster. From weight and appearance it would classify as a typical aërolite.

By the perfect alignment of the holes made in the roof, car and seat, the final end course of the meteorite was determined to be 64° 46′ east of north and at an elevation of 77° 31′ above the horizontal (12° 29′ from vertical). Until more distant observations on its course are obtained, the announcement of its positive direction, radient and velocity must be held in abeyance.

The property upon which the meteorite fell belongs to Mr. Edward McCain, which makes him the owner of the specimen. While it landed with a roar which sounded like "an airplane going into a power dive, and ending in a crash," no one has been interviewed who actually observed its passages through the air. It struck, however, within approximately fifty feet of Mrs. Carl C. Crum, who was working in her yard, just across the alley, at the time. She reported that she could see no smoke clouds and observed no fumes. Thinking that a "plane" had crashed into the rear of their barn, Mrs. Crum rushed out into the alley, and was greatly perplexed on finding no apparent damage to the building. The roof of the garage through which the stone actually fell was so oriented with respect to her position that she was unable to see and observe the hole in the roof from the spot where she was working.

The sound was also heard by Mrs. McCain, who was out pumping water at the time, but somewhat farther from the garage. Several neighbors who were indoors also heard what they took to be an airplane passing over, but "thought nothing of it." This occurrence is certainly unique in several respects, as we believe it to be the first authentic case of any meteorite ever striking an automobile, or for that matter a vehicle of any kind; and the first where its end course could be accurately measured from three established points penetrated in its fall. We also believe Mrs. Crumb came nearest to being actually hit by a meteorite of any person on record in this country. So far as is known, this was a lone individual stone, there having been, to date, no report of others having fallen in the vicinity at the time.

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WHAT DID THE BLUE JAY DO WITH THE NUT?

THIS afternoon (November 21) I observed the following quick sequence of events, which occurred on my front lawn:

1:45. A grey squirrel, answering my tapping signal, ran up a rustic incline which leads to a window box, to secure a nut (paper shell pecan) which I offered him through an open window.

1:46. This squirrel scampered back to the lawn to a point about 15 feet away. He buried the nut and raked a brittle oak leaf over it.

1:47. The squirrel returned to the window box for a second nut. Immediately a blue jay flew down to the precise spot where the first nut had been buried, pecked vigorously through the oak leaf into the soil, and in about 30 seconds seized the nut in his bill and disappeared with swift and sudden flight into a towering elm near by. What did he do with the nut?

I do not wish to worsen the reputation of the blue jay, but the incident seems worth reporting.

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SPECIAL ARTICLES

MAMMARY CARCINOMA IN THE RAT WITH METASTASIS INDUCED BY ESTROGEN*

IN a previous communication pathologic changes in the mammary gland of the rat induced by estrogen and other hormones have been reported and an early comedo carcinoma of the mammary gland illustrated in a castrated female injected with 200 gamma of estrone.[1] The changes in this animal were not discussed, however, because confirmation of the diagnosis of cancer was lacking at the time. Since this communication mammary cancer in the rat has been in-

* Aided by grant from the Anna Fuller Fund.

[1] E. B. Astwood and C. F. Geschickter, *Arch. Surg.*, 36: 672, 1938. Figs. 8 and 10 are whole mounts and paraffin section depicting early adenocarcinoma. The legends compare the condition to a phase of Schimmelbusch disease in the human.

duced in 26 animals. The animals used were a pure strain of albinos, fed on a standard diet. They have been maintained by breeding in this laboratory since 1934 and to date in a colony of 2,000 rats, spontaneous mammary cancer has not appeared in untreated animals. Cancers have been obtained in both male and female castrates and noncastrates, with varying amounts and methods of dosage and metastasis to the lungs and mediastinal lymph nodes has been obtained. The protocol of one of these rats is given below:

Rat number 1274—Born November 22, 1937—Female not castrated.

Fifty gamma of estrone daily (excluding Sundays) November 23rd to December 29th (37 days).

Twenty-five gamma estrone twice daily (excluding Sundays) December 30th to March 21st (70 days).

Estrone pellet 4 milligrams March 21st.

Estrone pellet 2 milligrams June 16th, 1938. Autopsied November 3rd, 1938 (346 days old).

The entire abdominal wall was covered by mammary tumors for a period of over six weeks prior to death. Sections of the mammary cancer show areas of adenocarcinoma arranged in coils and lining duct channels. The epithelial cells are oval and compressed and contain numerous mitotic figures. In places the cancerous epithelium is more of the transitional type and in other areas shows squamous cell metaplasia. Nearly all the mammary tissue is replaced by cancer. The mediastinal lymph nodes are in a large measure replaced by solid cancerous tissue. The lungs in addition to terminal pneumonia show numerous small metastases similar to the primary tumor.

The uterus is lined by epidermoid tissue; the canal is dilated, but there is no pyometrium. The lining of the fallopian tubes is hyperplastic and there is an adenoma at the fimbriated ends of both tubes, probably in the parovarian. The ovaries are atrophic and show minute follicles. The transitional lining of the renal pelvis is thickened; the kidneys are otherwise negative. The adrenals showed atrophy of the external cortical layer, and the pituitary showed a large chromophobe adenoma. In the gross the hypophysis was about three times its normal size. The other organs were essentially negative.

In the present series of experiments 85 rats were subjected to various types of estrogenic treatment, the chief object being to determine the nature of the changes preceding the formation of mammary cancer and the most effective method of producing mammary carcinoma in the rat.

These experiments (see Table 1) indicate that a daily dosage of 200 gamma of estrone injected intramuscularly is most suitable for the detailed study of the mechanism of cancer production in the mammary gland of the rat. Microscopic cancer occurs within 150 to 200 days with such dosage.

TABLE 1

MAMMARY CANCERS IN THE RAT PRODUCED BY ESTROGEN

Experiment number	No. of rats*	Estrone dosage	Number of cancers produced	Age at beginning of treatment	Days required to produce cancer
1	4†	50 gamma daily	3 males	26 days	534–565
2	8†	100 gamma daily	3 males 1 female	37 days	359–400
3A	13†	200 gamma daily	5 females	21 days	150–200
3B	4†	200 gamma daily plus testosterone	1 female	25 days	191
4A	28‡	25 gamma twice daily plus pellets	6 females	1st day	150–247 17 still living
4B	18†	25 gamma twice daily plus pellet	4 females	1st day	208–240 7 still living
5	11‡	Pellets	2 females	1st day	23–43 11 still living
	86		19 females 6 males	Earliest cancer in 23 days	

* Includes males and females.
† Castrated.
‡ Not castrated.
Pellets are crystalline estrone in 2 to 3 milligram amounts. Experiments 4A and B and 5 are still in progress, the animals being between the 205th and 400th day of treatment. The cancers listed are only those which have been microscopically studied. The estrone used was ketohydroxyestrin supplied by E. R. Squibb and Sons.

Cancer can be produced by the injection of smaller doses in 500 to 600 days with 50 gamma and in 350 to 400 days with 100 gamma. They can be obtained more quickly by implanting the crystalline hormone in the form of pellets (25 to 50 days).

With injections of the hormone in oil once daily, the time required is inversely proportional to the size of the dose, the total dose being relatively constant. With the use of pellets a higher and more constant rate

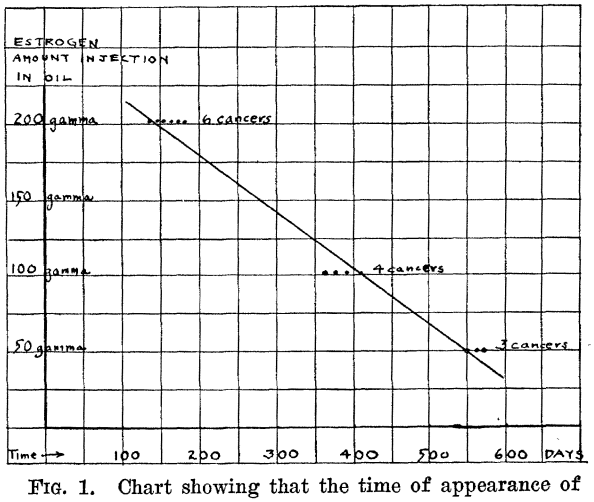

FIG. 1. Chart showing that the time of appearance of mammary cancer in the rat is inversely proportional to the amount of estrogen injected daily subcutaneously in oil.

of absorption is obtained and the cancer is produced sooner and with a smaller total dose. With pellets a total of five to ten milligrams is sufficient, whereas with injections in oil a total of 30 to 40 milligrams is used.

In a parallel group of experiments, an attempt has been made to induce mammary carcinoma of the rat with other estrogenic substances. The compounds used have been estradiol, estradiol dipropionate and diethyl-stilboestrol. The experiments are still incomplete but cancer has been obtained in one rat injected with 200 gamma of diethyl-stilboestrol daily for 100 days. This cancer induced with diethyl-stilboestrol is significant because the substance has the physiological action of estrone but is not a sterol. This suggests that the mammary cancers induced in the rats by the injection of estrogenic substances are due to the physiological changes produced rather than to the cancerogenic nature of the chemicals used.

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FUMARIC ACID FORMATION ASSOCIATED WITH SEXUALITY IN A STRAIN OF RHIZOPUS NIGRICANS

A DEFINITE relation has been known for some time to exist between the sexuality of fungi belonging to the *Mucorales* and certain biochemical reactions exhibited by them. Thus Satina and Blakeslee[1] demonstrated a high degree of correlation of the sexual nature of these fungi with such properties as reducing power of cell extracts toward $KMnO_4$ and tellurium salts, Manoilov's reaction, catalase content, etc. On the other hand, these authors could not establish any differentiation based on the carbohydrase systems of the various races. The differences in reactions obtained for the male and female races were in almost all cases quantitative rather than qualitative.

The present note concerns one strain of *Rhizopus nigricans* whose male and female races are distinct by virtue of the *possession or the complete lack of a certain specific physiological mechanism,* namely, the enzyme system by which the organism produces fumaric acid when grown on a glucose-mineral solution (Table I). So far as the authors are aware no similar case has yet been reported. The male race (−) was tested under a variety of experimental conditions and never was found to form fumaric acid, whereas the female race (+) produced this acid abundantly. Further, despite the fact that a large part of the glucose consumed was transformed by the plus race into fumaric acid, this organism was able to utilize the energy much more efficiently and synthesize much more cell substance than its male homologue, as measured by nitrogen consumption.

The ability to form fumaric acid is but one of the many specific reactions of which this group of fungi

TABLE I

FUMARIC ACID PRODUCTION BY MALE (−) AND FEMALE (+) RACES OF A STRAIN OF RHIZOPUS NIGRICANS*

	Female race (+)	Male race (−)
Glucose consumed, gm.	6.472	6.662
Fumaric acid produced, gm.	2.059	0
Conversion, per cent.	31.8	0
NH_3–N consumed in culture, mgm.	80.7	40.6
Calcium in solution due to organic acids, mgm.	722.1	49.6
Fumaric acid equivalent, calculated from Ca^{++}, gm.	2.094	.....
Per cent. of total acid as fumaric	98.3	.....

* Medium used: 200 cc portions of 5 per cent. glucose-mineral solution containing 82.0 mgm NH_3–N; incubation, 15 days at 28° C.

is capable, and it is not impossible that sexual differences within this group may eventually be correlated with other as yet unstudied physiological processes. It must not be inferred, however, that the above results are characteristic of all or even a significant number of sexual pairs of *Rhizopus;* another pair tested simultaneously yielded no such dissimilarity and even members of the same race differed in this respect. This would seem to indicate that fumaric acid formation is not at all a property specific to a race but may rather be attributed to some biological characteristic giving rise to strain specificity.

A detailed study of the process of fumaric acid production and its possible function in the mechanism of energy utilization by different species of *Rhizopus* will be published shortly.[2]

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GAS BUBBLES AS NUCLEI FOR "OOLITES"[1]

SPHERICAL bodies of calcium carbonate, with some of the characteristics of oolites, are now forming in a swimming pool supplied with water from one of the Pinkerton Hot Springs in southwestern Colorado. Five large springs and several smaller ones occur within an area of about a quarter of a square mile on the west side of the Animas River, about 12½ miles north of Durango. They appear to issue from fissures in the Ouray limestone, but the points of emergence are obscured by cones of travertine that have been deposited by the spring waters. The year-round tem-

[1] S. Satina and A. F. Blakeslee, *Proc. Nat. Acad. Sci.*, 12: 191–96, 197–202, 1926; 13: 115–22, 1927; 14: 308–16, 1928.

[2] The authors are indebted to Dr. A. F. Blakeslee for supplying cultures used in these investigations.

[1] Published by permission of the Director, Geological Survey, United States Department of the Interior.