surface water in excess of the doming to be expected from the lowered air pressure. There is no way for the excess water to escape except downward, and this piled-up sea water is lighter than normal.

There are three factors which affect the density of sea water: the temperature, the pressure, and especially the salinity. In the interior of a hurricane, typhoon, or extratropical cyclone, the pressure is lower and the temperature is higher than in the surroundings. Hence, the surface water expands, and the density is less. Furthermore, there is heavy precipitation, so that the salinity is lessened and the density decreased. Therefore, the piled-up lighter surface waters, escaping downward through the core of the water vortex, penetrate into the heavier water at depth. Buoyancy will come into play. The downward-plunging lighter water will be stopped and forced back upward by the surrounding heavier water, and thus vertical oscillation of the vortex will begin. Since the vortex, as stated, must extend to the sea bottom, the vortex oscillator will deliver to the ocean bed a series of blows which will set the ground vibrating and cause it to radiate elastic waves. A hurricane may have a horizontal diameter of 200–300 miles, and an extratropical cyclone may cover a much greater area. Hence, the mass of water in motion is great, and its vibratory momentum will be ample to account for the observed energy of the microseisms.

Let the linear vector velocity of a small portion of the water be $\mathfrak{q}$. Let ρ be the density, and let $\frac{D}{Dt}$ be the Stokes operator. Then the Eulerian equation of motion of the water will be $\frac{D\mathfrak{q}}{Dt} = \frac{\partial \mathfrak{q}}{\partial t} + \mathfrak{q} \cdot \nabla \mathfrak{q}$, and the equation of continuity, $\frac{\partial \rho}{\partial t} + \rho \operatorname{div} \mathfrak{q} + \mathfrak{q} \cdot \nabla \rho = 0$.

To simplify the discussion, let us assume a columnar vortex, in which the angular velocity ω is the same for all parts and $\frac{D\omega}{Dt} = \omega \cdot \nabla \mathfrak{q}$, and a region outside this core, in which the curl vanishes, the motion depending on a velocity potential ϕ, so that $\mathfrak{q} = \operatorname{grad} \phi$ and $\frac{D\rho}{Dt} = \rho \nabla^2 \phi$.

Let the average density of the normal sea water in the surroundings be $\rho_0 = 1.027$, and the density of the lighter water piled up to an average excess height h, $\rho_1 = 1.02$. Let the time of motion of the lighter water down and back be the period of oscillation of the vortex and the same as that of the microseisms, $T = 6$ seconds. Then, combining Newton's second law of motion with the buoyancy law, we find that $h = 2$ mm. Assuming a depth of 7 kil. and a radius of 200 kil., the kinetic energy involved in one blow on the ocean bed will be about 10^{17} ergs.

Using a formula given by Jeffreys (*Geophys. Suppl. Monthly Not. R.A.S.*, 1928, **1**, 22–31), $E = 8\pi^3 \rho R \sin \Delta \frac{a^2 H V \, dt}{T^2}$, where R is the radius of the earth and ρ is its density, Δ is the arcual distance from the wave source to the point of observation, a is the amplitude of horizontal motion, H is 1.12 times the wave length, V is the wave velocity, and T is the wave period, we obtain for microseisms of 10 μ range also about 10^{17} ergs as the energy radiated in one wave.

This tentative solution is offered merely as a suggestion in the hope that it will stimulate further investigation of the problem.

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Verb Derived From "Fission"

The present letter was stimulated by the communication from Ira M. Freeman (*Science*, 1946, **104**, 87) in which the adjective derivable from the noun "fission" was discussed.

In conversations with the "atomizers" one often hears the verb, presumably derived from this noun. The verb, as used, is spelled "fiss" and pronounced similarly to "fish." I maintain that if there is a verb derivable from this noun, the above verb is certainly incorrect, for it does not seem to fit into the general scheme of the derivations in English grammar. I should welcome an appropriate authoritative commentary on what seems to me an interesting variation of the language.

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Adjective Derived From "Fission"

Concerning the recent letter by Ira M. Freeman on the use of the term "fission" (*Science*, 1946, **104**, 87), I have found use of the word "fissionable" objectionable even in scientific articles. As Dr. Freeman points out, the proper word is "fissile," but this is not wholly satisfactory, as it usually carries the idea of splitting into layers or plates. Might it not be wise to replace "fissionable" by a new word, "fissible," which would be applied only to those substances capable of undergoing nuclear fission?

I would suggest that the word be pronounced as spelled. To pronounce it "fishible" would be unfortunate.

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Successful Use of Oxidized Cellulose in Surgery of the Uterus

During the last few years the experimental use of oxidized cellulose as an absorbable hemostatic surgical dressing has increased rapidly. The material has been used successfully in brain surgery and the abdominal cavity. Among the favorable attributes of this material are the absence of foreign-body reactions and its rapid dissolution *in vivo*.

This report is a preliminary note concerning the successful application of oxidized cellulose (kindly supplied by Johnson and Johnson) to experimental uterine surgery in the dog. Pregnant females near term were subjected to unilateral Cesarean section under pentothal or ether anesthesia. One horn of the uterus was emptied and

packed with oxidized cellulose gauze, the uterus sutured, and the incision closed. Subsequently the contents of the opposite uterine horn were emptied by normal processes, live puppies were born, and lactation became established. Ten days after the Cesarean section an exploratory operation was performed, and no gauze was found. The uterus on the packed side contained a small amount of slightly sanguineous fluid. Biopsies obtained from the operated and opposite horns revealed an indentically normal *post partum* histological appearance.

We conclude that oxidized cellulose may safely be used as a hemostatic uterine surgical packing.

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Trophoblast Elements in Cancer

In confirmation of the findings of Roffo (*Bol. Inst. med. exp. Estud. Cancer,* 1944, **21**, 419–588) that, when injected into immature white rats, an extract of the blood or urine of cancer patients causes enlargement of the uterus and the formation of corpora lutea in the female animals, we have obtained from cancer patients of both sexes, by urinary extraction, preparations having pronounced estrogenic as well as gonadotropic properties. Nonmalignant, nonpregnant controls were negative.

It is our conclusion, on the basis of studies now in progress (*Science,* 1946, **103**, 25), that the estrogenic factor (termed "steroid E" by Roffo) arising from the definitive malignant elements is identical with the steroids produced by the syncytial trophoblast of pregnancy (Jones, Gey, and Gey. *Johns Hopk. Hosp. Bull.,* 1943, 72, 23–38). The only so-called false positives observed by Roffo were those in which pregnancy urine was used. Moreover, 20 days after implanting human trophoblast into the eye of a virgin doe, we found uterine and ovarian changes which duplicated those reported above for the immature rat recipients of cancer urine (*J. clin. Endocrinol.,* in press).

It is well known that chorionepitheliomas, genital as well as primary extragenital in both sexes; many ovarian and most testicular cancers; the chorionic (trophoblastic) or malignant phase of many teratomata; and even some cases of carcinoma simplex are responsible for the presence of chorionic (cytotrophoblastic) prolan in sufficient quantities in the blood or urine to produce a positive Aschheim-Zondek reaction. In these tumors the prolan titer tends to vary directly with the concentration of cytotrophoblast (Langhans cells), being almost beyond detection in the absence of overt trophoblast.

Using rodents as indicators, it is impossible to distinguish accurately between anterior pituitary and chorionic prolans. In pregnancy and in the malignant tumors cited, the chorionic prolan is present in such excess of pituitary prolan that diagnosis becomes a matter of quantitation. In the past, attempts to recover chorionic prolan from the blood or urine of all cancer cases showing no *overt* trophoblast have been thwarted by cross-reactions with pituitary prolan. Employing the technics of chromatographic adsorption (Katzman, Godfrid, Kain, and Doisy. *J. biol. Chem.,* 1943, **148**, 501–507) and the use of the African clawed toad (*Xenopus laevis*) as a specific indicator of chorionic prolan, these obstacles are overcome. Employing a combination of such technics, we have obtained egg extrusion in *Xenopus laevis* through the injection of 1 cc. of the concentrate of as little as 800 cc. of urine from nongenital cancer in the human male. Controls of the same age were negative.

Although sufficient determinations have not yet been made to warrant the conclusion that specific steroids and/or cytotrophoblastic prolans are present in all cases of cancer, our preliminary results would suggest this.

In conclusion, it would appear significant that many of the most malignant exhibitions of cancer are known to yield a readily detectable quantity of gonadotropin, duplicated only by that produced by the trophoblast cell; that now tumors of lesser malignancy are found to yield this same gonadotropin; and, finally, that the only cell never observed in the benign state in the male or, aside from the canalization of pregnancy, in the female is the trophoblast cell. Parallel to this is the finding in cancer of a steroid duplicated only by the syncytial trophoblast. These data would seem further to substantiate the unitarian nature of all exhibitions of cancer and to suggest the trophoblast elements (however masked morphologically) as the constant malignant component.

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Japanese Scientists and the POW's

I read with interest the article on "The war and biological sciences in Japan" (*Science,* 1946, **103**, 755–758). Lt. Gressitt states that it is his belief that the majority of the Japanese were ignorant of the actual facts of the war and resentful of the militarists. Let me present the picture from a different point of view. I was there during the war as a prisoner, having been captured on Bataan and taken to Japan in November 1942. From that time until the end of the war I was in three camps scattered from Shikoku Island on the south, to Osaka in the central portion, to the foothills of the alps near Fukui.

Of all the classes of Japanese people that we prisoners encountered, the scientists, and especially the physicians, were the most haughty, resentful, hateful, and cruel. Physical conditions of the prisoners meant nothing to the Japanese doctors. The Japanese Army Medical Corps fought a good war on the Prisoner Front, succeeding as they did, in killing off many allied prisoners. Presentation of scientific evidence of malnutrition, in addition to loss of weight, was laughed at. Men with 101° fever were sent out to backbreaking labor, as were those unfortunates quaking with malarial chill.

Construction by the writer of a handmade biophotometer to run some eye tests and subsequent discovery of this by the Japanese doctor at the camp resulted not in scientific curiosity but only in a good beating. From camp to camp the same was true. The better-educated Japanese, although they would not admit it, realized