Table 1. Uterus-to-serum ratios of urea-C^{14} and sucrose-C^{14} 3 minutes after injection. The differences between means for each substance (controls as against experimental group) is significant at P = .01 for urea and at P = .001 for sucrose. There were six rats in each group. The ratios for sucrose distribution are less than those for urea; this is due to the larger volume of distribution of urea.

Group	Mean ± S.E.
Urea-C^{14}	
Control	0.69 ± 0.09
Estrogen	1.02 ± 0.04
Sucrose-C^{14}	
Control	0.38 ± 0.01
Estrogen	0.46 ± 0.01

the tissue and precipitating protein; supernatant from this procedure was assayed for radioactivity and found to yield the same results as that obtained by the "diffusion" method outlined above.) Counting of radioactivity was performed in a liquid scintillation counter.

In Fig. 1, the ratio counts per minute per milligram of uterus to counts per minute per microliter of serum is plotted as a function of time after the injection of urea-C^{14} in animals that were injected with estradiol or saline 1 hour before sacrifice. It is apparent that there is no clear difference in the tissue-to-serum ratio after about 5 minutes. It is also clear that there is a steeper slope toward a ratio of unity for the estrogen-treated animals than for controls.

It was the purpose of the next set of experiments to evaluate this estrogen effect in quantitative terms. For this purpose all animals were killed 3 minutes after the injection of a trace amount of urea-C^{14} or sucrose-C^{14}, and 1 hour after estrogen or saline administration. Results for these two tracers, studied in separate groups of animals, are given in Table 1. The results show a significant difference between control and experimental groups for each radioactive substance. The tissue-to-serum ratios are higher in each case where the rats had received estrogen.

On the basis of the foregoing results it is contended that there is an increased rate of equilibration of small molecules between uterus and serum as early as 1 hour after estradiol treatment. Examination of plasma levels of each tracer as a function of time after injection revealed no apparent difference in the die-away curves for estrogen-treated and control animals. The results do not prove that there is enhanced permeability of the uterus, since we have been unable to determine the influence of changes in blood flow. Even the "increased capillary permeability" mentioned above may be a reflection of an increased blood-flow rate. In an earlier report it was demonstrated that uterine blood flow is markedly enhanced 4 hours after estradiol administration (*3*); in a few experiments we have found an increased blood flow as early as 1 hour after estradiol injection.

It thus appears that there is no basis for a categorical dismissal of a proposed estrogen effect on permeability of the uterus at the present time. At the same time the point should be made that the rate of access of small molecules into the uterus is enhanced by this hormone (*7*).

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10 July 1961

Potassium-Argon Age of Devils Tower, Wyoming

Abstract. Devils Tower consists of columnar phonolite porphyry which contains large phenocrysts of orthoclase. Potassium-argon determinations on the orthoclase indicate an age of 40.5 million years ± 4 percent. This is consistent with the geologically accepted Tertiary age.

Devils Tower, located in the northeastern corner of Wyoming, stands about 1800 m above its immediate surroundings and has a diameter of about 2400 m at its base (*1*). Vertical columnar jointing causes its steep sides to be fluted (Fig. 1). The tower itself and the talus surrounding its base have been classified as phonolite porphyry (*2*).

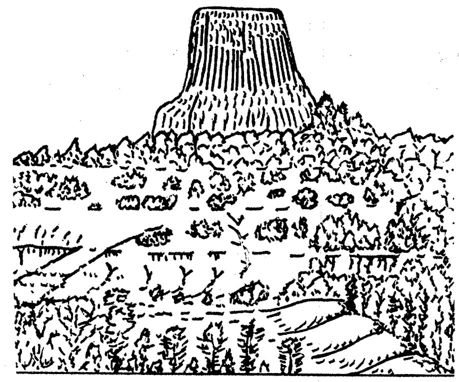

Fig. 1. Devils Tower, Wyoming, from the south. [P. F. Kerr]

Soda-rich orthoclase phenocrysts range from 6 to 12 mm across and offer suitable material for potassium-argon age determinations.

Devils Tower lies in a region of Triassic and Jurassic sedimentary strata. In Fig. 1 the flat valley in the foreground is the Gypsum Spring formation (Triassic), and the cliffs in the middle distance are members of the Sundance formation (Jurassic). The tower itself is considered to be Tertiary on geological evidence (*3*).

A sample of phonolite porphyry was crushed and sized, and the orthoclase phenocrysts were separated from the rest of the rock by means of an isodynamic magnetic separator. The potassium content of the orthoclase was found, by flame photometric determinations, to be 4.88 percent. Two mass spectrometric determinations of the argon-40 by the isotope dilution method gave 8.04×10^{-6} and 7.86×10^{-6} cm^3/g (STP). Ages calculated from these values with constants $\lambda_e = 0.585 \times 10^{-10}$ yr^{-1} and $\lambda_\beta = 4.830 \times 10^{-10}$ yr^{-1} (*4*), are 41.0 million years and 40.0 million years, respectively. The average of these two values places the probable age of the Devils Tower phonolite porphyry at about 40.5 ± 1.6 million years (*5*).

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5. The work reported here was conducted under the auspices of the U.S. Atomic Energy Commission.

13 July 1961