pathway in the control of estrogen- and progesterone-mediated sexual receptivity in the female rat. It should be noted, however, that studies of the male have indicated only that PCPA may heighten homosexual or male-male mounting behavior. We report here the effects of PCPA and PCPA plus pargyline on sexual interactions between male and female. The data indicate that these agents are not aphrodisiacs in the sense that they do not prolong or intensify male-female sexual interactions.

Seven male Sprague-Dawley rats (450 to 550 g), all sexually experienced and known to be vigorous copulators, were selected for study. These animals were given a series of four sexual satiation tests with receptive females during the dark phase of a 12-hour-light/12-hour-dark cycle. For each test a male was placed with a single female in a cylindrical glass observation jar. The test was terminated when (i) the male failed to mount the female within 30 minutes after they were placed together; (ii) the male failed to mount the female for 30 minutes following any ejaculation; or (iii) there was a 60-minute interval between successive ejaculations.

Typically, the sexually rested male rat will begin to copulate within 5 minutes of pairing and will achieve between 30 to 50 intromissions and 5 to 7 ejaculations on the average before reaching sexual satiation (*5*). Since the aftereffects of sexual satiation on subsequent mating performance remain for approximately 2 weeks (*6*), the present tests were spaced at 3-week intervals.

The first mating test of the series was a control test. The animals were not treated with the drugs but were simply allowed to mate until they were sexually satiated. During the 4 days before the second test, each male was given DL-*p*-chlorophenylalanine methyl ester hydrochloride (100 mg/kg per day, intramuscularly). The final injection of PCPA occurred 4 hours before the beginning of the mating test. The third test involved no drug treatment and served as a control to insure that 3 weeks were sufficient to dissipate the effects of sexual satiation. Before the fourth test the animals were given PCPA (100 mg/kg per day) for 4 days prior to testing. The final injection of PCPA occurred 12 hours before the mating test. Six hours after this injection (6 hours before testing) each animal was given pargyline (100 mg/kg). The final injection schedule was chosen to mimic the dose and treatment parameters found by Tagliamonte *et al.* (*2*) to be effective in inducing homosexual mounting in male rats.

There was no indication that PCPA or PCPA plus pargyline facilitated mating (Table 1). In fact, mean ejaculation frequencies were slightly reduced during tests with drug treatment, and in each of the two drug tests one male failed to ejaculate at all. Furthermore, drug treatments caused no enhancement in the frequency of mounting responses or in the frequency of intromissions prior to sexual satiation. The slight reduction in mating performance observed during drug treatment could have been due to nonspecific stress associated with that treatment.

The control tests indicated that these males performed within normal limits in terms of both intromission and ejaculation frequencies prior to sexual satiation (*5*, *6*) and that 3 weeks were sufficient to dissipate the effects of sexual satiation on mating behavior.

Our data suggest that the effects of PCPA and PCPA plus pargyline on mating may be limited to situations in which the male is presented with a normally inadequate sexual stimulus. Thus it is possible that the drug works not by enhancing sexual motivation, but rather by altering the male's ability to adequately distinguish appropriate sexual partners. The observation by Ferguson *et al.* (*3*) that cats treated with PCPA appear perceptually disoriented would be in line with this interpretation.

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Single Atoms Visibility

Crewe and his co-workers (*1*) are to be congratulated for the outstanding achievement of making visible, with their scanning electron microscope, single uranium and thorium atoms. Highton and Beer (*2*) have reported an almost similar feat by seeing gold atoms used for staining nucleic acids by means of a Siemens Elmiskop.

For many years we have been seeing single atoms of a variety of metals (*3*) without any uncertainty, and also sections of small biomolecules (*4*), by the more direct imaging method of field-ion microscopy. In my atom-probe version of the instrument (*5*) I routinely pick up an individual atom that looks interesting and identify it unambiguously by sending it through a mass spectrometer.

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The Venus Radius Controversy

The muddling through of workers from several organizations who finally arrived at a consensus in interpreting certain data from Mariner 5 and Venera 4 is an interesting story which is not always (*1*) rendered fully and with a sense of the interplay between the various—and merely mortal—workers. It is very human to pretend at the end that splendidly planned, successful experiments were free of errors, and that the new things we learned were, after all, pretty much what we thought all along. This account, in counterpoint, concedes that man is flesh as well as spirit, is prone to error as well as a discoverer of truth; it deals with the ebb and flood of recent opinion about Venus's lower atmosphere as seen from a moderately invariant (and biased) point of view—that of the "radar radius." In this account the work of

the spacecraft experimenters stands out; too much praise cannot be given them.

In mid-1966 my associates and I reported [and in early 1967 published (*2*)] a new and highly accurate determination of Venus's radius, as derived from Earth-based radar observations; the value was 6055.8 km. Our contribution to this history of errors was made at that time, amounted to 2 km, and was soon corrected (*3*). But for our matrix rank limitation of 23, due to a computer coding error, the radius value would have been 6053.5 km, and, without the slightly inconsistent (*3*) Arecibo data (from Cornell's Arecibo Ionospheric Observatory), about 6049.5 km. In early 1967, two Mariner 5 experimenters visited us to ascertain our very latest value and our confidence in it, stressing the importance of the radius for the forthcoming Mariner 5 flyby. Naturally, we cooperated and became interested; our undirected determination now had an operational role.

The earliest reports (*4*) on Mariner 5, which was a brilliant success, showed that when the data were analyzed on the basis of a radius of 6056 km the Venera 4 data were inconsistent by about 24 km, and warned that something was awry; the warning was not always accepted (*5*). Also reported was an unexplained asymmetry between the night and day refractivity profiles of Venus. The central question was: Are the surface pressure P_s and temperature T_s 19 atm and 553°K, as derived from Venera 4 data, or about 100 atm and 700°K, as derived from Mariner 5 data plus the radar radius?

One possibility, which appealed to some, was that the radius was not 6056 km but about 6080 km. We decided to update the radar determination, adding new data, and to demonstrate the validity of the method. We reported (*3*) the new value of 6050 km (with a formal standard error of 0.5 km) when radar data from Arecibo were included, 6048 km when they were not. We also introduced measurements (*6*) and calculations of absorption at 3.6-cm wavelength in the Venus atmosphere as arbiter for the three "contestants"—Mariner 5, Venera 4, and the radar radius. With this new element, having first verified the radar radius measurement, we then showed (i) that the ray path from Mariner 5 to the Earth site must have passed about 10 km closer to the center of Venus than had been reported (otherwise, radar wave absorption at 3.6 cm would be far greater than that measured), and (ii) that Venera 4 must have been about 19 km higher than had been reported (otherwise, there would be too little 3.6-cm absorption, and a pressure profile inconsistent with Mariner 5 data). These results were first presented at a conference (*7*) sponsored by Kitt Peak National Observatory, at which the several protagonists were well represented.

Of course, the Venera 4 experimenters saw things differently. While defending the measurement, by his colleagues, giving a T_s of 553°K, one visiting scientist at the time (*7*) deduced from radio brightness data a T_s of 650°K, though his curve for 700°K appeared to fit the data even better. After conversations with U.S.S.R. scientists, V. R. Eshleman (*7*, *7a*) suggested that a simple 2 : 1 ambiguity had occurred in the altimeter.

After a reexamination by the Mariner 5 experimenters of the time systems they used, the Venus-centered distance of the ray path was decreased by 8.85 km (*8*), confirming our independent estimate of 10 km for this displacement. As a result, the refractivity profiles became nearly symmetric [see reference *5*, p. 665, in Eshleman *et al.* (*9*)]. Subsequent to the Kitt Peak conference a plethora of papers was published (see for example, *8–11*), which agreed substantively with our analysis, including two (*10*, *11*) which reported new and independent estimates of the radius (6053.7 ± 2.2 km and 6052.5 ± 2 km). The latter value was obtained by means of a fundamentally different technique. After the splendid success of Venera 5 and 6, U.S.S.R. scientists recently suggested that the Venera 4 altimeter had been in error; however, a new problem arose, because, whereas the radius obtained from averaging the results of the Venera 5 and Venera 6 altimeters was 6050 km, the separate heights (measured some 300 km apart) disagreed, for a given pressure, by about 14 km (*12*).

Finally, the radar radius itself kept evolving because (i) radar data as accurate as 0.5 km were accumulating from our Haystack radar observatory, (ii) the Arecibo data were tentatively deleted [but see (*3*)], and (iii) we discovered that Venus does not behave as a spherically symmetric body does (*13*). If it did, our current value would be 6050 km with a formal standard error of 0.3 km; but actually, depending upon the Venus longitude being sounded, its apparent radius varies by about 3 km.

Thus, by trial and error we have converged to the sad knowledge that Venus was designed not as a habitation for man, and to the happier knowledge that, in an era of interplanetary vehicles, ground-based planetary astronomy is far from irrelevant (*14*).

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15. Lincoln Laboratory is sponsored in part by the U.S. Department of the Air Force.

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