do not vary by more than 15 percent from those noted previously, either before or after heat inactivation. Similarly, the percentages of inactivation are comparable in most cases.

A precipitate formed when polymers B-8.0 and E-1.3 were heated in buffer. Residual activity after heating was found only in the soluble fraction. The precipitate constituted about one-quarter of the total sample.

That activity and heat inactivatibility are not attributable to microbial contamination is indicated, as before (*6*), by the absence of microbial growth from a tested polymer and by the fact that activity and heat inactivatibility were noted with fractions (from a Sephadex G-50 column) of low molecular weight [less than 10,000 (*11*)].

Because the insolubility of the polymers used with OAA caused some loss of polymer, the reported apparent second-order rate constants would represent minimum rates. However, Table 2 shows that in every case the polymers are now more active than reported previously (*7*). Percentages of increase in activity for lysine-rich proteinoids are 32 and 88 at the extremes, with an average of 58. For thermal polylysine, the respective values are 73 to 145, with an average of 98. These increases, which for each polymer are statistically significant (*12*) at the 99 percent confidence level, are likely not due to (unknown) differences in assay conditions because unpolymerized lysine and also controls for spontaneous decarboxylation gave values in the current study comparable to those obtained previously. The absence of microbial growth when a representative polymer was tested on six kinds of growth media indicates that the increase in rate is not due to possible microbial contaminants. Reasons for the increase are unresolved.

The activity of both types of lysine-rich polymer was largely associated with the insoluble portions, as judged by assays on resuspended pellets; the supernatants contained less than 10 percent of the total activity. As before, mineral acid hydrolyzates of polymers gave a low level of activity, indicating the importance for activity of polymeric form (*7*, *8*). The importance of free amino groups is indicated by the low activity of acetylated polymers (*7*). The acetylated polymers, incidentally, were insoluble in assay medium; the low level of activity of these polymers suggests that the increase in activity of the parent polymers is not due to surface-adsorption phenomena.

The foregoing study has shown that individual thermal polyamino acids retain their catalytic activity for at least 5 to 10 years. The interim between testing the activity is minute in terms of geological time; also, the conditions of storage of these polymers would represent only one of many possible geological conditions. However, the current results do support the concept that primitive enzyme-like polyamino acids would have been stable enough to be available for long periods of time to contribute to processes of molecular evolution.

The feature of longevity of enzymic action, as suggested by this study, could have offered obvious evolutionary advantages to developing and competing primitive systems (*3*, *13*). The limited requirements in such systems for continued de novo synthesis of enzyme molecules could have been particularly important before template-directed mechanisms for duplication of enzymes originated.

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P-Chlorophenylalanine Methyl Ester: An Aphrodisiac?

Abstract. p-*Chlorophenylalanine methyl ester and the ester plus pargyline have been reported to facilitate sexual mounting behavior in animals, but these studies have shown only a facilitation of homosexual mounting. The present study indicates that these agents do not enhance the probability or frequency of heterosexual interactions in rats.*

The methyl ester of *p*-chlorophenylalanine (PCPA), an agent which depletes brain serotonin (*1*), has been reported to induce hypersexuality in both rats and cats (*2*, *3*). The studies reported that male animals given long-term treatment with PCPA or with PCPA plus pargyline exhibited facilitated mounting behavior. In one sense the studies may be considered as an extension of the work of Meyerson (*4*), who has implicated a serotonergic inhibitory

Table 1. Effects of *p*-chlorophenylalanine methyl ester (PCPA) and PCPA plus pargyline on the heterosexual behavior of male rats. Numbers indicate the mean ± standard error of the number of mounting responses and intromissions which preceded each ejaculation and the total number of mounts, intromissions, and ejaculations which preceded sexual satiation.

Group	No. per ejaculation		Satiation		
	Mounts	Intromissions	Mounts (No.)	Intromissions (No.)	Ejaculations (No.)
Control: before PCPA	11.2 ± 1.5	7.1 ± 1.3	72.6 ± 7.3	46.0 ± 5.2	7.0 ± 0.9
PCPA*	11.3 ± 4.0	6.1 ± 1.0	55.2 ± 17.6	29.3 ± 3.8	5.0 ± 0.4
Control: after PCPA	9.0 ± 1.5	7.2 ± 1.0	51.6 ± 7.6	43.7 ± 5.6	6.1 ± 0.5
PCPA plus pargyline*	16.0 ± 5.3	6.8 ± 1.3	63.0 ± 12.6	34.8 ± 8.7	5.0 ± 0.7

* Scores for these tests do not include scores for an individual animal which failed to mate during the first 30 minutes of the test.

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