9,10,11,12-Tetraphenyltetracyclo[6,4,0,0^{4,12},0^{5,9}]dodec-10-ene

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WE report the synthesis of the title compound, which contains a new polycyclic system, in one operation from tetracyclone (tetraphenylcyclopentadienone) and *cis,cis*-cyclo-octa-1,5-diene.

Reaction of tetracyclone with the cyclo-octadiene at the reflux temperature slowly produced (in good yield) a sparingly soluble crystalline compound, m.p. 309—310°, $C_{36}H_{32}$ [elemental analysis and molecular weight (mass spectrometer)]. The product did not give any of the usual tests for unsaturation, and the high m.p. suggested a highly condensed structure†; the accumulated n.m.r. spectrum (CCl$_4$) showed τ 2·5—3·1 (10 H), 3·32 (10 H), 7·10 (4 H), and 7·8—8·5 (8 H). The evidence is consistent with structure (II), which has a highly hindered olefinic bond, two sets of aromatic protons in broadly different environments, eight methylene protons, and four methine protons which would be expected to experience deshielding by the β-phenyl groups at the bridgeheads.

The formation of (II) must have proceeded *via* an initial Diels–Alder reaction to give the carbonyl-bridged adduct (III), thermal elimination of carbon monoxide in the known[2] manner then yielding the bicyclic triene (IV), which by an intramolecular diene addition finally formed the polycyclic product (II). The flexibility of the fused eight-membered ring in (IV) evidently enabled the double bond to take up a suitable

position for such intramolecular reaction, as shown in (V)‡ [this is independent of the configuration (*endo*- or *exo*-) of the initial adduct (III)].

(I)   (II)

(III)   (IV)

(V)
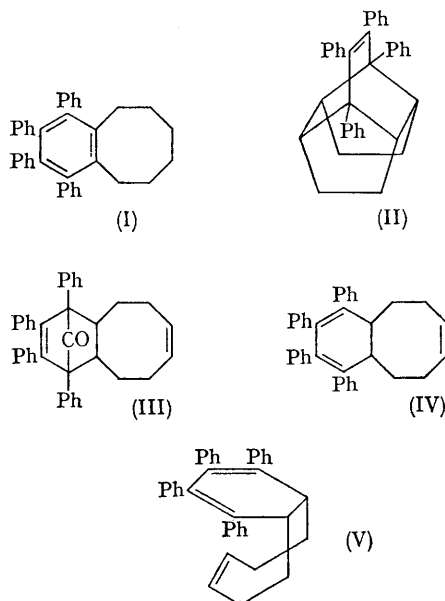
† The m.p. of the isomeric benzocyclo-octene (I), for example, is 226—228°. (ref. 1).

‡ Demonstrable by means of molecular models.

¹ G. Wittig and R. Pohlke, *Chem. Ber.*, 1961, **94**, 3276.
² C. F. H. Allen, *Chem. Rev.*, 1945, **37**, 209; 1962, **62**, 653; M. A. Ogliaruso, M. G. Romanelli, and E. I. Becker, *ibid.*, 1965, **65**, 261.