Discussion.—From the results (Table I) the following are evident :

1. Comparing the activity of compounds 6–10 with compounds 11–15, in the light of their structure at the substituent R", it is clear that the replacement of 'CH_3' group on the cholinic nitrogen atom by 'C_2H_5' group slightly increases the antiacetylcholinesterase activity.

2. Further, comparing the activity of compounds 1–6 in the light of their structures at R substituent, it is clear that increases in the bulk of R group at 2-position of thiadiazole ring in the title compounds, decreases the anti-acetylcholinesterase activity.

3. Change in the position of 'CH_3' group on the phenyl ring substituted on R' (compounds 8–10 and 13–15) is of high significance. As CH_3 group moves from 'o', 'm' to 'p'–position on phenyl ring, the activity increases in title compounds.

4. The good anti-acetyl-cholinesterase activity of the title compounds also gives, to some extent, the cholinergic mechanism of exciant action of these compounds on CNS[4].

Thanks are due to Dr. K. P. Bhargava, Head of the Department of Pharmacology, K.G's Medical College, Lucknow and to Dr. K. Kishore, Professor in the Department of Pharmacology, K.G's Medical College, Lucknow, for providing laboratory facilities. The authors are also grateful to Prof. S. S. Tiwari, Head of the Department of Chemistry, Lucknow University, for the gift of the title compounds.

Department of Pharmacology and Therapeutics,
K.G's Medical College,
Lucknow
and
Department of Chemistry,
University of Lucknow,
Lucknow 226 007,
November 17, 1978.

SHAKEEL AHMAD.

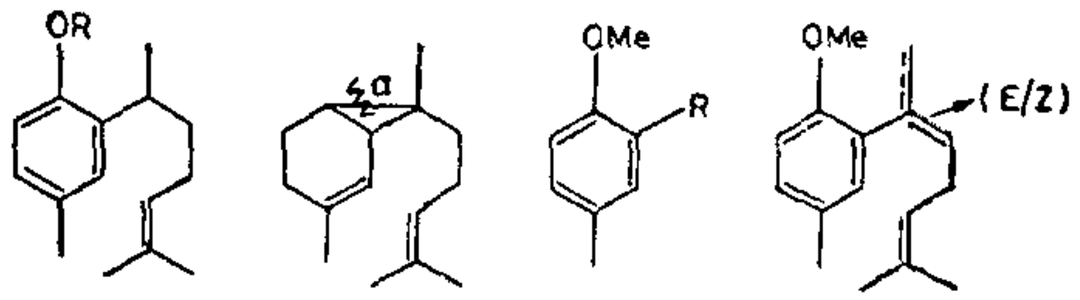
R. K. SATSANGI.

1. Grearin J. E., *Cholinergics and Anticholinergics; Medicinal Chemistry*, Vol. II 3rd ed., Wiley-Interscience, New York, N.Y., 1971, pp. 1297.
2. Berdinskii, I. S., Starostina, L. N. and Kolla, V. E., *Uch. Zap. Perm. Univ.*, 1972, 207, 253.
3. Legheand J., Cuilinaud G., Gier Andre and Pabiot N., *Eur. J. Med. Chem. Ther.*, 1974, 9(2), 193.
4. Tiwari, S. S. and Satsangi, R. K., *Curr. Sci.*, 1978; 47 (22), 839.
5. Parmar, S. S., Joshi, L. D., Kishore, K. and Kumar, R., *Biochem. Pharmacol.* 1966, 15, 723.

SYNTHESIS OF ELVIROL METHYL ETHER

BECAUSE of the biogenetic interest of the phenolic sesquiterpenoid elvirol[1] (I *a*), which we suggest, may originate from sesquicarene[2] (II) by oxidative ring fission (bond *a*) followed by aromatisation, several syntheses of the phenol and its methyl ether have been reported[3]. In continuation of our work on phenolic secosesquiterpenoids[4], a two-step synthesis[5] of elvirol methyl ether (I *b*) is described in this communication.

2-Bromo-4-methylanisole (III *a*) [NMR (60 MHz, CCl_4 + TMS): δ 2·16 (3H, s, Ar-Me), 3·5 (3H, s, Ar–OMe) and 6·53–7·33 (3H, m, Ar–H)] obtained either from *p*-cresol methyl ether by bromination in glacial acetic acid[6] or from 2-bromo-4-methyl phenol[7] by methylation with dimethyl sulphate in alkali, was reacted with lithium dust in ether under nitrogen to furnish 2-methoxy-5-methylphenyl lithium (III *b*). Treatment of 6-methylhept-5-en-2-one with the aryllithium (III *b*) in ether followed by work-up with aqueous hydrochloric acid (1 : 1), and chromatographic purification of the product (silica gel column-hexane gave the arylheptadiene (IV) in 90% yield [IR ν_{max} (neat): 1620 and 1605 cm^{-1} (aromatic and C=C); NMR (CCl_4): δ 1·70 (3H, bs,-vinyl-Me), 1·75 (3H, bs, vinyl-Me), 2·0 (bs, Ar-C(=)–Me), 2·3 (3H, s, Ar–Me), 2·35–3·00 (m, $>CH_2$), 3·75 (3H, s, Ar–OMe), 4·9–5·4 (m, vinyl-H) and 6·65–7·17 (3H, m, Ar–H)]. Identical diene (IV) (IR, NMR and TLC) was obtained by treatment of methylheptenone with 2-methoxy-5-methylphenylmagnesium bromide (III *c*).



I a, R = H
b, R = Me

II

III a, R = Br
b, R = Li
c, R = Mg Br

IV

The regioselective reduction of the styryl double bond in the diene (IV) by lithium in liquid ammonia[8] (dried over sodium), followed by decomposition with ammonium chloride and chromatographic purification of the product (silica gel column-hexane) gave elvirol methyl ether (I *b*) in 87% yield [IR (neat): 1605 and 1595 cm^{-1} (aromatic and C=C); NMR (CCl_4): δ 1·13 (3H, d, J = 7Hz, Ar-CHMe), 1·46 (3H, s, vinyl-Me), 1·60 (3H, s, vinyl-Me), 1·3–2·0 (4H, m, CH_2), 2·2 (3H, s, Ar-Me), 2·8–3·26 (1H, m, Ar-CHMe), 3·7 (3H, s, Ar-OMe), 5·05 (1H, m, vinyl-H) and 6·46–6·93 (3H, m, Ar-H)]. The spectral characteristics of the specimen agree with those reported for elvirol methyl ether[3] (I *b*). After completion of this work[5] our attention was drawn to an account of

the synthesis of elvirol by the Australian workers[9] on similar lines.

One of the authors (T. K. J.) is grateful to the authorities of the Indian Institute of Science, Bangalore, for financial assistance.

Department of Organic Chemistry,
Indian Institute of Science,
Bangalore 560 012,
November 24, 1978.

T. K. JOHN.*
G. S. KRISHNA RAO.

* *Present Address:* Department of Chemistry, Emory University, Atlanta, Georgia 30322 (U.S.A.).

1. Bohlmann, F. and Grenz, M., *Tetrahedron Letters*, 1969, p. 1005.
2. Ohta, Y. and Hirose, Y., *Ibid.*, 1968, p. 1251.
3. Vig, O. P., Sharma, S. D., Kumar S. D. and Handa, V. K., *Indian J. Chem.*, 1978, **16B**, 112; and references cited therein.
4. John, T. K. and Krishna Rao, G. S., *Indian J. Chem.* (In press).
5. —, *Ph.D. Thesis*, Indian Institute of Science, Bangalore, June 1977.
6. Sherwood, I. R., Short, W. F. and Woodcock, J., *J. Chem. Soc.*, 1936, p. 322.
7. Ungande, H. E. and Orwoll, E. F., *J. Am. Chem. Soc.*, 1943, **65**, 1736.
8. Birch, A. J. and Subba Rao, G., in *Advances in Organic Chemistry, Methods and Results*, edited by E. C. Taylor, Wiley-Interscience, New York, 1972, **8**, 1.
9. Dennison, N. R., Mirrington, R. N. and Stuart, A. D., *Aust. J. Chem.*, 1975, **28**, 1339.

CHROMOSOME NUMBER AND DNA, RNA VALUES IN SOME INDIAN BATS (CHIROPTERA)

OUR knowledge about the chromosomes of bats has been very meagre till todate despite their wide distribution. A survey of the literature reveals that cytogenetic reports of only a few Indian species of bats are available. The present studies were therefore, undertaken with a view to exploring the chromosomal data on as many representatives of bats as possible. The present findings, which are a part of a larger programme of research work on Indian bats, have been made on nine species. Of these, the chromosomal number of four species, *viz.*, *Rhinopoma microphyllum kinneari*, *Taphozous nudiventris kachensis*, *Taphozous perforatus perforatus* and *Hipposideros fulvus pallisidus* is being reported for the first time, whereas that for the remaining five species, *viz.*, *Cynopterus sphinx sphinx*[1], *Rhinopoma hardwickei hardwickei*[1-2], *Scotophilus heathi heathi*[3], *Megaderma lyra lyra*[4] and *Rousettus leschenaulti*[5] had been known beforehand also. The studies also include the estimation of DNA and RNA in mg/gm of known weight of tissues like liver and spleen in order to find out the possible relationship between these biochemical components of the nucleus and the chromosome number in the various species of bats under report.

For chromosomal studies, 0·5% of colchicine per kg body weight[6] was injected intraperitoneally and 2½ hours later the specimens were sacrificed and the marrow from the long bones was collected. After hypotonic treatment in sodium citrate (0·9%) for half an hour and fixation in acetic-alcohol (1 : 3) overnight[6], the usual air-drying technique[7] was followed.

The quantitative estimation of DNA and RNA contents from the tissues was confined to a known weight (100 mg) by employing perchloric acid method[8-9]. The readings for DNA and RNA were taken from at least five different samples of the same species for every tissue on Bausch and Lomb Spectronic-20. The mean values in mg/gm were thus calculated from the standard graphs prepared by using the standard DNA's and RNA's of calf thymus gland and yeast respectively. The standard deviations and standard errors of the 'mean' were also calculated which refer to variation among the averages obtained from different individuals of the same species.

The studies of chromosomal slides reveal the diploid number of chromosomes varying from 34–54 in these various species (Table I). It is 34 in two, 42 in two, 36 in four and 54 in one species. The studies point out that the 2N number of chromosomes varies not only in the species belonging to different genera but also in the species of the same genus. Thus the species are rather indistinguishable on the basis of chromosome number alone.

The mean values for DNA, RNA in mg/gm. of the known weight of the various tissues obtained through repeated experimentation are also mentioned in Table I and Figs. 1 and 2.

Considering the chromosome number and DNA and RNA values on a collective basis, one finds that the species with the same diploid number of chromosomes possess a variable amount of DNA and RNA in their tissues. This has also been reported in the various species of the genus *Bufo* and in Amphibia in general[10] where the total nuclear DNA amount is the most variable cytogenetic character while the chromosome numbers are relatively constant. Similarly, in the two species, *viz.*, *Hipposideros fulvus pallisidus* (Microchiroptera) and *Cynopterus sphinx sphinx* (Megachiroptera) both with a diploid number of 34 chromosomes, the DNA values are higher in the former than in the latter. Similarly, *Rhinopoma hardwickei hardwickei*, *Taphozous nudiventris kachensis*