

TABLE

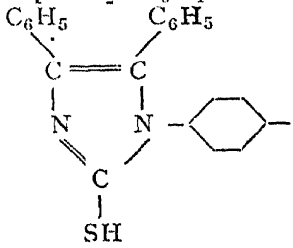
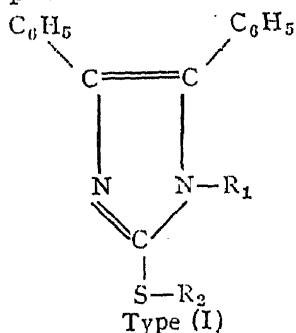
No.	R <sub>1</sub>	R <sub>2</sub>	M.P.° C.
1	H	-CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub>	174
2	H	-CH <sub>2</sub> -CH=CH <sub>2</sub>	181-2
3	H	-CH <sub>2</sub> -CO-CH <sub>3</sub>	150-1
4	H	-CH <sub>2</sub> -CH <sub>2</sub> -OH	167
5	H	-CH <sub>2</sub> -COOH	216
6	H	-CH <sub>2</sub> -C <sub>6</sub> H <sub>5</sub>	185-6°
7	H	-C <sub>6</sub> H <sub>4</sub> -NO <sub>2</sub> -p	209
8	H	-C <sub>6</sub> H <sub>2</sub> -(NO <sub>2</sub> ) <sub>3</sub> 2, 4, 6	186 (decomp.)
9	C <sub>6</sub> H <sub>5</sub>	-CH <sub>2</sub> -CO-CH <sub>3</sub>	153-4
10	C <sub>6</sub> H <sub>5</sub>	-C <sub>6</sub> H <sub>3</sub> (NO <sub>2</sub> ) <sub>2</sub> 2, 4	199-200
11	C <sub>6</sub> H <sub>5</sub>	-C <sub>6</sub> H <sub>2</sub> (NO <sub>2</sub> ) <sub>3</sub> 2, 4, 6	205-6 (decomp.)
12	o CH <sub>3</sub> -C <sub>6</sub> H <sub>4</sub>	H	288-9 (decomp.)
13	p CH <sub>3</sub> -C <sub>6</sub> H <sub>4</sub>	H	319-20 (decomp.)
14	p CH <sub>3</sub> -C <sub>6</sub> H <sub>4</sub>	-C <sub>6</sub> H <sub>3</sub> (NO <sub>2</sub> ) <sub>2</sub> 2, 4	233
15	p CH <sub>3</sub> -C <sub>6</sub> H <sub>4</sub>	-CH <sub>2</sub> -C <sub>6</sub> H <sub>5</sub>	191
16	p CH <sub>3</sub> O-C <sub>6</sub> H <sub>4</sub>	H	297 (decomp.)
17	p CH <sub>3</sub> O-C <sub>6</sub> H <sub>4</sub>	-CH <sub>2</sub> -C <sub>6</sub> H <sub>5</sub>	191-2
18	p CH <sub>3</sub> O-C <sub>6</sub> H <sub>4</sub>	-C <sub>6</sub> H <sub>2</sub> -(NO <sub>2</sub> ) <sub>3</sub> 2, 4, 6	168 (decomp.)
19	p NO <sub>2</sub> -C <sub>6</sub> H <sub>4</sub>	H	284 (decomp.)
20			does not melt even at 340

table) have been prepared. Two molecules of benzoin reacted with *p*-phenylene bistiourea to give compound 20.



Full details will be published elsewhere.

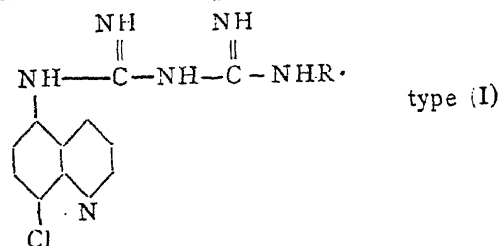
Organic Chemistry Laboratories, M. V. BHATT.  
Indian Institute of Science, B. H. IYER.  
Bangalore, P. C. GUHA.  
April 1, 1948.

1. Barger and Dale: *J. Physiol.*, 1909, **41**, 19.
2. Scholz, *J. Ind. and Engg. Chem.*, 1945, **37**, 120-5.
3. Smirk and McGeorge, *Lancet.* 1912, **243**, 301.
4. Müller, *Annalen*, 1894, **284**, 25-35.
5. Biltz and Krebs, *ibid.*, 1912, **391**, 194-95.

### STUDIES IN ANTIMALARIALS SOME N<sup>1</sup>-(8-CHLORO-5-QUINOLYL)-N<sup>5</sup>- SUBSTITUTED BIGUANIDES

In continuation of our work on quinoline substituted biguanides as possible antimalarials,<sup>1</sup>

a number of N<sup>1</sup>-(8-chloro-5-quinolyl)-N<sup>5</sup>-substituted biguanides of type (I) have now been synthesised. May, et al<sup>2</sup> have prepared a few methoxy-8-quinolyl biguanides but found them inactive against blood inoculated *P. gallinaceum* infection. In the present



series of compounds, the similarity to paludrine<sup>3</sup> is kept up in that the biguanide chain is at 5-position and the chlorine atom at the 8-position of the quinoline nucleus. It may also be interpreted that a pyridine ring is fused to the *p*-chlorobenzene nucleus, present in paludrine and it is hoped that they will be active against malaria parasites.

The compounds (*vide* Table I), were prepared by condensing 8-chloro-5-amino-quinoline hydrochloride with the appropriate cyanoguanidines in alcoholic solution. The base was liberated from the reaction mixture by treating it with dilute alkali solution and purified by recrystallising from organic solvents. The acetates prepared in the usual manner, were purified by recrystallisation from absolute alcohol and dry acetone.

While both the base and the salt (No. 1 in Table I) from the reaction with cyanoguanidine contain one molecule of water of crystallisation

tion, none of the other bases or salts contain any water of crystallisation.

$\frac{C}{N}$	R	m.p. of base	m.p. of salt
1	-H, H <sub>2</sub> O	213° C. (d)	229-30° C. (l)
2	C <sub>6</sub> H <sub>5</sub> -	198 (d)	188-189 (d)
3	p-CH <sub>3</sub> -C <sub>6</sub> H <sub>4</sub> -	170-171 (d)	288 (d)
4	p-CH <sub>3</sub> O-C <sub>6</sub> H <sub>4</sub> -	210-11 (d)	182-183 (d)
5	p-CH <sub>3</sub> CONHC <sub>6</sub> H <sub>4</sub> -	194-96 (d)	242-43 (d)
6	p-NH <sub>2</sub> -C <sub>6</sub> H <sub>4</sub> -	165-63° C. (l)	228-30° C. (d)
7	p-NO <sub>2</sub> -C <sub>6</sub> H <sub>4</sub> -	207 (d)	214-15 (d)
8	p-Cl-C <sub>6</sub> H <sub>4</sub> -	214 (d)	143-44 (d)
9	p-Br-C <sub>6</sub> H <sub>4</sub> -	210-11 (d)	160-62 (d)
10	p-I-C <sub>6</sub> H <sub>4</sub> -	152° C.	269-70° C. (d)

Full details will be published elsewhere.

Our sincere thanks are due to Dr. B. H. Iyer for his ungrudging help and to the Lady Tata Memorial Trust for the award of a research scholarship to one of us (P. R. Gupta).

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1. Gupta, P. R., Iyer, B. H., Guha, P. C., *Current Science*, 1948, 17, 53. 2. May, E. L., *et al.*, *J. Org. Chem.*, 1947, 12, 869. 3. Curd, F. H. S., *et al.*, *J. C. S.*, 1946, 729.

guanidine (205°); *m*-methylphenylcyanoguanidine (202°); *p*-cyanophenylcyanoguanidine (244°); *m*-nitrophenylcyanoguanidine (229°) and  $\beta$ -naphthylcyanoguanidine (237°).

Attempts to prepare N<sup>4</sup>-cyanoguanidino sulphanilamides from the corresponding triazenes have failed due to the non-formation of labile hydrochlorides of these triazenes which are perhaps necessary for such a denitrogenation<sup>1</sup>. This was due to the acidic nature of the substituents in the phenyl ring which hindered the formation of such an intermediate labile salt. It has also not been possible to obtain similar triazenes derived from trihalogen substituted anilines and 2-aminothiazole, while both the diazonium groups derived from benzidine have reacted only with one molecule of cyanoguanidine.

Full details of this work will be published elsewhere.

Thanks are due to Professor P. C. Guha and Dr. B. H. Iyer, for their guidance and kind interest and to the Indian Research Fund Association for the award of a fellowship.

H. L. BAMJ.

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May 3, 1948.

1. Walther and Grieshammer, *J. für Prakt. Chem.*, 1915, 92, 209. 2. Bami, Iyer and Guha, *J. Indian Inst. Sci.*, 1946, 29A, 1, 15. 3. Broadbent and Rose, U. S. Patent 24,9832, 1946.

### ARYLCYANOANIDINES FROM ARYLAZOCYANOANIDINES

WALTHER and Grieshammer<sup>1</sup> converted the arylazocyanoguanidines referred to as triazene into their labile hydrochloride salts which on treatment with hot water liberated the azo-nitrogen to give arylcyanoguanidines. It has been possible to denitrogenate the above type of triazenes in a mixture of a hydrolytic solvent and acid at low temperature to get the required products.<sup>1,2,3</sup> Consequently a systematic study of *p*-chloro-phenylazocyanoguanidine has been made in various mixtures of hydrolytic solvents and acids and it has been observed that a mixture of acetone, acetic acid or dioxane with hydrochloric acid or sulphuric acid at 30-40° C. gives best yields of *p*-chloro-phenylcyanoguanidine (an important intermediate for the synthesis of paludrine). Only a few arylcyanoguanidines have been prepared.<sup>1</sup> The following new substituted arylcyanoguanidines have been prepared by this method which have been used as intermediates for the synthesis of substituted biguanide as potential anti-malarials:—

2 : 4-Dichlorophenylcyanoguanidine (217° C. m.p.); *o*-Chlorophenylcyanoguanidine (170°); *meta*-chlorophenylcyanoguanidine (232-33°); *m*-bromophenylcyanoguanidine (233°); *p*-iodophenylcyanoguanidine (217°); *p*-fluorophenylcyanoguanidine (211°); *o*-methylphenylcyano-

### TAMARIND AND CHILLIES—THEIR EFFECT ON S. INDIAN DIET

THE work of Krishnamurti, De and Subramanyan<sup>1</sup> on the above subject is extremely interesting. But, it is in apparent variance with the work of earlier nutrition schools. Chillies and Tamarind are good sources of vitamin C. It is well known that such natural sources of vitamin C usually contain vitamin P (also called Citrin or C<sub>2</sub>). The work of Cotereau and others<sup>2</sup> shows that vitamin P plays a very important role in the absorption and retention of vitamin C. Chillies and red pepper are good sources of vitamin P just like cabbages, citrus fruits, buck-wheat and lemon peel. Chillies form a daily article of diet in the food of the South Indians and of most other Asiatics. In spite of an apparently poor diet, the population of S. India cannot be definitely said to be of lower vitality. This anomaly is due probably to the intake of vitamin P in the chillies and tamarind. The idea is being pursued.

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May 10, 1948.

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1. Krishnamurti, *et al.*, *Curr. Sci.*, 1948, 17, 51.  
2. Cotereau, *et al.*, *Nature*, 1946, 158, 343. *Ibid.*, 1948, 161, 557.