N-(AMINOACYL) AND N-(AMINOALKYL) DERIVATIVES OF 4-CYCLOPENTYLANILINE AND N-ETHYL-4-CYCLOPENTYLANILINE; SYNTHESIS AND PHARMACOLOGICAL SCREENING*

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Acylation of 4-cyclopentylaniline (*I*) with chloroacetyl chloride, 3-chloropropionyl chloride, 4-chlorobutyryl chloride and 2-bromo-4-methylvaleryl bromide gave the halogenoacyl derivatives *IV*–*VII* out of which the first two were subjected to substitution reactions with diethylamine and piperidine. The N-(aminoacyl) derivatives *VIII*–*XI* obtained were reduced with lithium aluminium hydride to the N-(aminoalkyl) derivatives *XII* and *XV*. N-Ethyl-4-cyclopentylaniline (*XVI*), prepared by reduction of N-(4-cyclopentylphenyl)acetamide (*II*), was similarly transformed via the chloroacetyl derivative *XVII* to the amide *XVIII* and the diamine *XIX*. Salts of the compounds prepared (amino amides and diamines) bring about in higher doses central excitation which is apparently in close connection with the found discoordinating effect of a part of products (*VIII*–*XI*, *XIII*) in the rotarod test, further with the antireserpine effects in the tests of antagonization of reserpine ptosis and hypothermia (*VIII*, *X*, *XII*, *XIII*) and finally with the anorectic effect of compound *X*. All substances showed a mild spasmolytic effect of the anticholinergic type. On the other hand, the expected local anaesthetic effect was found only with compounds *VIII*, *XVIII*, *XIX*.

In one of the preceding communications of this series[1] we have described one stage of our attempts at finding new neurotropic and psychotropic agents whose molecules would contain the lipophilic 4-cyclopentylphenyl fragment and have described a series of 1-(4-cyclopentylphenyl)ethylamine derivatives. In the present communication we used as the basis the known 4-cyclopentylaniline (*I*) which is accessible by the Beckmann rearrangement of 4-cyclopentylacetophenone oxime[2] with phosphorus pentachloride in ether and by the following acid hydrolysis of the N-(4-cyclopentylphenyl)acetamide (*II*) formed[2]. In reproducing this procedure we found that in the first stage a product is obtained in an almost theoretical yield which, however, is not homogeneous because its melting point is significantly lower than that of the pure acetamido derivative *II*. Its hydrolysis with aqueous-ethanolic hydrochloric acid affords the hydrochloride of the aniline derivative *I* which is soluble in water. Additionally we isolated in yields of 5–10% a water-insoluble substance which proved to be the hydrochloride of a further base. This base is crystalline and by means

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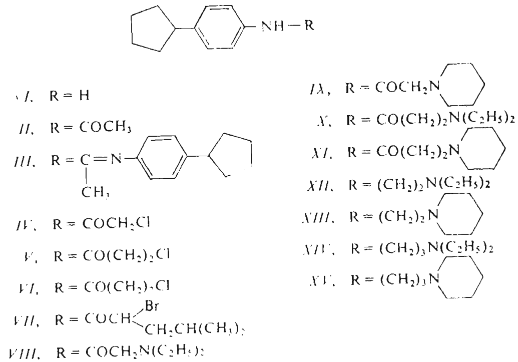
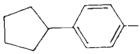
of analysis and spectra it was identified as the amidine *III*. The formation of similar amidines by the Beckmann rearrangement of aromatic aliphatic ketoximes was described[3,4] in cases of the use of thionyl chloride (but also phosphorus pentachloride) as reagents; an attempt was made at the explanation of its mechanism[4]. The Beckmann rearrangement of 4-cyclopentylacetophenone oxime[2] has now been carried out also with boiling trifluoroacetic acid and the homogeneous acetamido derivative *II* was obtained in a high yield; the same compound was also prepared by acetylation of the aniline derivative *I*.



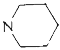
The aniline derivative *I* was acylated with chloroacetyl chloride, 3-chloropropionyl chloride[5], 4-chlorobutyryl chloride and 2-bromo-4-methylvaleryl bromide[6] in boiling chloroform and in the presence of potassium carbonate (method *A*) (for a similar method of chloroacetylation of aniline, *cf.*[7]) and the halogenoacyl derivatives *IV–VII* were obtained. Substitution reactions of compounds *IV* and *V* with excessive diethylamine or piperidine in boiling benzene (method *B*) resulted in the aminoacyl derivatives *VIII–XI*, which are crystalline with the exception of compound *X* and all of them affording crystalline hydrochlorides. Reduction of these four amides with lithium aluminium hydride in ether (method *C*) gave the diamines *XII–XV* which were isolated as crystalline dihydrochlorides.

The acetamido derivative *II* was reduced with lithium aluminium hydride in ether to N-ethyl-4-cyclopentylaniline (*XVI*) which was converted by the use of the mentioned methods *A–C via* the chloroacetyl derivative *XVII* to the piperidinoacetyl derivative *XVIII* and the diamine *XIX*. Compounds prepared by methods *A*, *B* and *C* are assembled in Table I with the usual experimental data while the Experimental describes only examples of these preparations.



XVI, R = H

XVII, R = $COCH_2Cl$

XVIII, R = $COCH_2N$ 

XIX, R = $(CH_2)_2N$ 

Compounds *III*, *VIII*–*XV*, *XVIII* and *XIX* were subjected to the general pharmacological screening in the form of salts, described in the Experimental and in Table I. In the first line, the medium lethal doses (LD_{50}) in mice and the doses (D) which were used in the screening, are given, both in mg/kg and for *i.v.* administration: *VIII*, 50, 10; *IX*, 62·5, 12; *X*, 75, 15; *XI*, 62·5, 12; *XII*, 70, 14; *XIII*, 60, 12; *XIV*, 62·5, 12; *XV*, 50, 10; *XVIII*, 43·7, 8; *XIX*, 50, 10. All of these compounds in doses above D increase the activity and reactivity of mice, bring about ataxia, tremor and finally convulsions. Compound *III* was administered orally; a dose of 2 500 mg/kg is nontoxic and after doses of 300 mg/kg no pharmacological effects were observed. Discoordinating effect in the rotarod test in mice (doses bringing about ataxia in 50% animals): *VIII*, 1–5; *IX*, 5–12; *X*, 5–15; *XI*, 5; *XIII*, 10 (*i.v.* administration); the other compounds were inactive in doses D. Local anaesthetic effect in the test of infiltration anaesthesia (concentration in % bringing about a complete anaesthesia in 50% guinea-pigs; for procaine, ED = 1%): *XVIII*, 0·1–0·5; *XIX*, 0·1–0·5; in the test of corneal anaesthesia (concentration in % bringing about in 50% rabbits a complete anaesthesia of the eye cornea; for trimecaine, ED = 1%): *VIII*, 0·05–0·5; *XVIII*, 0·5, Spasmolytic (parasympatholytic) effect (concentrations in μg/ml exhibiting a reduction of the acetylcholine contractions of the isolated rat duodenum by 50%; for atropine, ED = 0·05): *VIII*, 1–10; *IX*, 1–10; *X*, 10; *XI*, 10; *XII*, 1–10; *XIII*, 1–10; *XIV*, 10; *XV*, 10; *XVIII*, 1–10; *XIX*, 1–10. Spasmolytic (musculotropic) effect (similar arrangement, barium chloride contractions; for papaverine, ED = 5): *VIII*, 1–10; *IX*, 1–10; *XII*, 1–10; *XIII*, 1–10; *XIX*, 1–10. Effect on heart inotropy (concentration in μg/ml eliciting a decrease of inotropy of the isolated rabbit heart atrium by 25%): *IX*, 5–50; *X*, 5–50; *XI*, 25; *XII*, 50; *XIII*, 10–50; *XIV*, 50; *XV*, 50; *XVIII*, 25–50. Effect on heart frequency (similar arrangement): *VIII*, 50; *XI*, 25; *XIII*, 10–50; *XV*, 50, *XIX*, 25–50. Antireserpine activity: (*a*) Ptosis in mice (a dose *i.p.* antagonizing significantly the reserpine ptosis; for amphetamine, ED = 0·5 mg/kg): *VIII*, 10; *X*, 15 (oral doses of 20 and 40 mg/kg practically without effect); *XII*, 14; *XIII*, 12. (*b*) Hypothermia in mice (doses *i.p.* increasing the rectal temperature by 1°C in comparison with the reserpine control group; amphetamine, ED = 0·75 mg/kg): *VIII*, 10; *X*, 15; *XII*, 14; *XIII*, 12. Anorectic activity (dose in mg/kg orally decreasing the food consumption in mice by 50%;

for dexphenmetrazine, ED = 25): *X*, 75. Diuretic effect (oral dose in mg/kg increasing the diuresis in mice by 100% as compared with the control; for hydrochlorothiazide, ED = 100): *X*, 75.

Hyperglycaemic effect (oral dose in mg/kg increasing blood sugar in rats by 20%): *XII*, 70 *XIII*, 60; *XIX*, 25–50.

The compounds were also tested for antimicrobial activity *in vitro* (Dr J. Turinová, Bacteriological department of this institute). Microorganisms, numbers of compounds and the minimum inhibitory concentrations in μg/ml (unless they exceed 100 μg/ml) are given: *Streptococcus β-haemolyticus*, *III* 50, *IX* 50, *X* 100, *XI* 50, *XII* 50, *XIII* 50, *XIV* 50, *XV* 50, *XIX* 25; *Streptococcus faecalis X* 100, *XIV* 100; *Staphylococcus pyogenes aureus*, *III* 50, *IX* 100, *XI* 100, *XIV* 100, *XIX* 50; *Mycobacterium tuberculosis* H37Rv, *VIII* 12·5, *IX* 25, *X* 25, *XI* 25, *XII* 12·5, *XIII* 6·25, *XIV* 12·5, *XV* 3·1, *XVIII* 50, *XIX* 6·25; *Saccharomyces pasterianus*, *III* 25, *VIII* 100, *IX* 100, *X* 100, *XI* 100, *XII* 100, *XIII* 50, *XIV* 100, *XV* 100; *Trichophyton mentagrophytes*, *III* 25, *VIII* 50, *IX* 50, *X* 100, *XI* 100, *XII* 100, *XIII* 50, *XIV* 50, *XV* 50, *XIX* 25; *Candida albicans*, *III* 50, *VIII* 100, *IX* 100, *X* 100, *XI* 100, *XII* 100, *XIV* 100, *XV* 100; *Aspergillus niger* ,*III* 50, *VIII* 100, *IX* 100, *X* 100, *XI* 100, *XIV* 100, *XV* 100.

EXPERIMENTAL

The melting points of analytical preparations were determined in Kofler's block and are not corrected; the samples were dried *in vacuo* of about 60 Pa over P_2O_5 at room temperature or at 77°C. The IR spectra (mostly in Nujol) were recorded with a Unicam SP 200G spectrophotometer, the UV spectrum (in methanol) with a Unicam SP 8000 spectrophotometer and the ^{1}H NMR spectra (in C^2HCl_3) with a Tesla BS 487C (80 MHz) spectrometer. The homogeneity of the compounds was checked by thin layer chromatography on silica gel.

N-(4-Cyclopentylphenyl)acetamide (*II*)

A) 4-Cyclopentylacetophenone oxime[2] (101·5 g) was rearranged by treatment with 155 g PCl_5 in 500 ml ether according to the literature[2] and 101 g (100%) crude *II* were obtained (m.p. 100–103°C) which were used without purification for the hydrolysis to *I*. Lit.[2], m.p. 136°C.

B) 4-Cyclopentylacetophenone oxime[2] (50 g) was added over 30 min to 180 ml refluxing trifluoroacetic acid, the mixture was refluxed for 1·5 h, the acid was distilled off *in vacuo*, the residue was mixed with 150 ml water, the solid filtered, washed with water and dried *in vacuo*; 48 g (96%) crude *II* melting after a single crystallization from 70% aqueous ethanol at 133–134°C.

C) A mixture of 11·3 g *I* (ref.[2]), 100 ml chloroform and 11·6 g K_2CO_3 was stirred and treated at room temperature over 30 min with a solution of 7·2 g acetyl chloride in 25 ml chloroform. The mixture was refluxed for 1·5 h, after cooling decomposed with 100 ml water, the organic layer was washed with water, dried with Na_2SO_4, filtered with charcoal and evaporated. The solid residue (14·1 g) is the crude *II* which was crystallized from 70% aqueous ethanol, m.p. 133–134°C.

4-Cyclopentylaniline (*I*)

Crude *II* (101 g) obtained according to *A*) was hydrolyzed by refluxing for 3 h with a mixture of 500 ml ethanol and 150 ml hydrochloric acid. The volatile components were evaporated *in vacuo* and the residue was dissolved in 700 ml warm water. The undissolved solid was filtered

TABLE I

N-(Halogenoacyl), N-(aminoacyl) and N-(aminoalkyl) derivatives of 4-cyclopentylaniline

Compound	Method (yield, %)	M., °C (solvent)	Formula (mol.wt.)	Calculated/Found			
				% C	% H	% N	% Cl
IV	*A*[a] (93)	151–152 (benzene–hexane)	$C_{13}H_{16}ClNO$ (237·7)	65·68 65·86	6·78 6·91	5·89 5·72	14·92 15·14
V	*A* (95)	138–139[b] (benzene–hexane)	$C_{14}H_{18}ClNO$ (251·7)	66·79 67·12	7·21 7·36	5·56 5·71	14·08 13·93
VI	*A* (92)	104–105[c] (benzene–hexane)	$C_{15}H_{20}ClNO$ (265·8)	67·78 67·98	7·59 7·65	5·27 5·27	13·34 13·40
VII	*A* (98)	88–89[d] (hexane–benzene)	$C_{17}H_{24}BrNO$ (338·3)	60·35 59·62	7·15 7·15	4·14 3·95	23·63[e] 23·86
VIII	*B*[a] (100)	47–48 (hexane)	$C_{17}H_{26}N_2O$ (274·4)	74·41 74·43	9·55 9·46	10·21 10·18	— —
VIII-HCl	—	187–188 (ethanol)	$C_{17}H_{27}ClN_2O$ (310·9)	65·66 65·74	8·76 8·54	9·02 8·87	11·41 11·41
IX	*B* (100)	79–80 (hexane)	$C_{18}H_{26}N_2O$ (286·4)	75·48 75·64	9·15 9·11	9·78 9·77	— —
IX-HCl	—	219–220 (ethanol)	$C_{18}H_{27}ClN_2O$ (322·9)	66·95 67·25	8·43 8·40	8·68 8·70	10·98 11·13
X-HCl	*B* (100)	180–181 (ethanol–ether)	$C_{18}H_{29}ClN_2O$ (324·9)	66·54 66·41	9·00 9·11	8·62 8·51	10·92 10·89
XI	*B* (96)	66–67[f] (hexane)	$C_{19}H_{28}N_2O$ (300·4)	75·95 75·96	9·39 9·23	9·33 9·22	— —
XI-HCl		223–224 (ethanol)	$C_{19}H_{29}ClN_2O$ (336·9)	67·72 67·52	8·68 8·49	8·32 8·23	10·53 10·66
XII-2 HCl	*C*[a] (100)	116–117 (acetone–ethyl acetate)	$C_{17}H_{30}Cl_2N_2$ (333·3)	61·24 61·01	9·07 9·12	8·41 8·35	21·28 21·20
XIII-2 HCl	*C* (100)	252–253 (ethanol containing HCl)	$C_{18}H_{30}Cl_2N_2$ (345·4)	62·59 62·70	8·76 8·60	8·11 8·06	20·54 20·75
XIV-2 HCl	*C* (96)	157–158 (ethanol–ether containing HCl)	$C_{18}H_{32}Cl_2N_2$ (347·4)	62·22 62·05	9·29 9·19	8·07 7·88	20·42 20·25
XV-2 HCl[g]	*C* (98)	208–210 (ethanol–ether containing HCl)	$C_{19}H_{32}Cl_2N_2$ + 0·5 H_2O (368·4)	61·92 62·13	9·03 8·99	7·61 7·53	19·26 19·36
XVII	*A* (100)	[h]	$C_{15}H_{20}ClNO$ (265·8)	— —	— —	5·27 5·48	— —
XVIII-M[i]	*B* (83)	116–117 (ethanol–ether)	$C_{24}H_{34}N_2O_5$ (430·5)	66·95 66·96	7·96 8·05	6·51 6·38	— —
XIX-2 HCl	*C* (99)	226–227 (ethanol–ether containing HCl)	$C_{20}H_{34}Cl_2N_2$ (373·4)	64·33 64·14	9·18 8·96	7·50 7·55	18·99 18·79

off and the filtrate was made alkaline with 20% NaOH. The base *I* was isolated by extraction with benzene and distillation; 60·0 g (75%), b.p. 118—120°C/0·2 kPa. Lit[2], b.p. 165—167°C/ /3·0 kPa.

The undissolved solid by-product was obtained in a yield of 4·0 g (5%) (in another experiment there were obtained from 305 g 4-cyclopentylacetophenone oxime 24·0 g, *i.e.* 9% of the same product), m.p. 220—225°C, and was characterized as the hydrochloride of a base. Its suspension in water was made alkaline at 60°C with 20% NaOH and the base was extracted with benzene. Processing of the extract gave a product which was crystallized from hexane and melted at 116 to 117°C (needles). It was identified as N,N'-bis(4-cyclopentylphenyl)acetamidine (*III*). UV spectrum: λ_{max} 263 nm (log ε 4·23). IR spectrum: 822, 831 (2 adjacent Ar—H), 1 219, 1 379 (Ar—N), 1 506, 1 516, 1 539 (Ar), 1 635 (Ar—N=C), 3 210, 3 290 cm^{-1} (NH). ^1H NMR spectrum: δ c. 7·00 (m, 8 H, Ar—H), 6·08 (bs, 1 H, NH), 2·90 (m, 2 H, 2 Ar—CH of the cyclopentyls), 1·90 (s, 3 H, C—CH_3), 1·00—2·20 (m, 16 H, 8 CH_2 of the cyclopentyls). For $C_{24}H_{30}N_2$ (346·5) calculated: 83·19% C, 8·73% H, 8·09% N; found: 83·21% C, 8·86% H, 8·11% N.

Hydrochloride, m.p. 238—239°C (ethanol-ether). For $C_{24}H_{31}ClN_2$ (383·9) calculated: 75·27% C, 8·16% H, 9·26% Cl, 7·32% N; found: 75·31% C, 8·24% H, 9·43% Cl, 7·32% N.

N-(4-Cyclopentylphenyl)chloroacetamide (*IV*) (Method *A*)

K_2CO_3 (16·6 g) was added to a solution of 16·1 g *I* in 50 ml chloroform and the stirred mixture was treated at room temperature over 45 min with a solution of 15 g chloroacetyl chloride in 50 ml chloroform, added dropwise. It was then refluxed for 1·5 h, cooled and diluted with 150 ml chloroform (to dissolve the precipitated *IV*), the chloroform solution was washed with water, dried with Na_2SO_4 and evaporated *in vacuo*. The residue was mixed wtih 50 ml hexane, filtered, washed with hexane and dried *in vacuo*; 22·1 g (93%), m.p. 145—147°C. Analytical sample, m.p. 151—152°C (benzene-hexane). IR spectrum: 824, 838 (2 adjacent Ar—H), 1 252, 1 515, 1 559, 1 614, 1 670 (Ar—NH—CO), 3 135, 3 203, 3 270 cm^{-1} (NH). The analysis, *cf.* Table I.

←

[a] See Experimental. [b] IR spectrum: 835 (2 adjacent Ar—H), 1 518, 1 540, 1 660 (NHCO), 1 610 (Ar), 3 140, 3 210, 3 315 cm^{-1} (NH). [c] IR spectrum: 822 (2 adjacent Ar—H), 1 529, 1 595, 1 665 (Ar—NHCO), 3 335 cm^{-1} (NH). [d] IR spectrum: 824 (2 adjacent Ar—H), 1 367, 1 384 [$CH(CH_3)_2$], 1 530, 1 600, 1 664 (Ar—NHCO), 3 320 cm^{-1} (NH); ^1H NMR spectrum: δ 8·12 (bs, 1 H, NH), 7·40 (d, J = 8·0 Hz, 2 H, 2,6-H_2), 7·10 (d, J = 8·0 Hz, 2 H, 3,5-H_2), 4·42 (t, J = 7·0 Hz, 1 H, COCHBr), 2·90 (m, 1 H, Ar—CH of cyclopentyl), 1·98 (d, J = 7·0 Hz, 2 H, CH_2 in the acyl residue), 1·30—2·20 (m, 9 H, 4 CH_2 of cyclopentyl and CH of isopropyl), 0·98 and 0·88 (2 d, J = 6·0 Hz, 6 H, 2 CH_3 of isopropyl). [e] % Br. [f] IR spectrum (KBr): 826 (2 adjacent Ar—H), 1 520, 1 595, 1 650 cm^{-1} (Ar—NHCO); ^1H NMR spectrum: δ 11·15 (bs, 1 H, NH), 7·40 (d, J = 8·0 Hz, 2 H, 2,6-H_2), 7·10 (d, J = 8·0 Hz, 2 H, 3,5-H_2), 2·30—3·00 (m, 9 H, ArCH of cyclopentyl, $COCH_2$ and 3 NCH_2), 1·30—2·20 (m, 14 H, 4 CH_2 of cyclopentyl and remaining 3 CH_2 of piperidine). [g] Hemihydrate. [h] Homogeneous oily substance obtained by chromatography of the crude base on neutral Al_2O_3 (activity II) and elution with hexane; n_D^{22} 1·5356; ^1H NMR spectrum: δ 7·28 (d, J = 8·0 Hz, 2 H, 3,5-H)$_2$), 7·04 (d, J = 8·0 Hz, 2 H, 2,6-H_2), 3·78 (s, 2 H, $COCH_2Cl$), 3·71 (q, J = 7·0 Hz, 2 H, NCH_2), 2·90 (m, 1 H, Ar—CH of cyclopentyl), 1·20—2·20 (m, 8 H, 4 $CH_2$of cyclopentyl), 1·12 (t, J = 7·0 Hz, 3 H, CH_3 of ethyl). [i] Maleate.

N-(4-Cyclopentylphenyl)diethylaminoacetamide (*VIII*) (Method *B*)

A mixture of 11·0 g *IV*, 70 ml benzene and 8·5 g diethylamine was refluxed for 6 h and allowed to stand overnight. The precipitated diethylamine hydrochloride was filtered off, the filtrate was washed with water, dried with Na_2SO_4 and evaporated *in vacuo*; 12·6 g (100%) oil crystallizing from hexane and melting at 47—48°C. IR spectrum: 830 (2 adjacent Ar—H), 1 530, 1 695 (NHCO), 1 506, 1 590, 1 615 (Ar), 3 290 cm^{-1} (NH). ^1H NMR spectrum: δ 9·25 (bs, 1 H, ArNHCO), 7·45 (d, J = 8·0 Hz, 2 H, 2,6-H_2), 7·10 (d, J = 8·0 Hz, 2 H, 3,5-H_2), 3·10 (s, 2 H, $COCH_2N$), *c*. 2·90 (m, 1 H, Ar—CH of cyclopentyl), 2·58 (q, J = 7·0 Hz, 4 H, CH_2NCH_2 of diethylamino), 1·40—2·10 (m, 8 H, 4 CH_2 of cyclopentyl), 1·08 (t, J = 7·0 Hz, 6 H, 2 CH_3 of diethylamino). Hydrochloride, m.p. 187—188°C (ethanol). Analyses, *cf.* Table I.

N-(2-Diethylaminoethyl)-4-cyclopentylaniline (*XII*) (Method (*C*)

A solution of 6·3 g *VIII* in 50 ml benzene was slowly added to a stirred suspension of 2·5 g $LiAlH_4$ in 50 ml ether and the mixture was refluxed for 5 h. After standing overnight it was decomposed under stirring by a slow addition of 10 ml 20% NaOH, the mixture was stirred for 30 min, the solid was filtered off and washed with benzene. The filtrate was evaporated and gave 6·0 g (100%) crude oily *XII*. It was dissolved in 60 ml ether and the solution was neutralized with ethanolic solution of HCl. The mixture was evaporated *in vacuo*, the residue was dissolved in 50 ml acetone and the solution was treated slowly with 70 ml ethyl acetate. After standing overnight 6·2 g dihydrochloride were filtered, m.p. 114—117°C. Analytical sample, m.p. 116 to 117°C (acetone–ethyl acetate). Analysis, *cf.* Table I.

N-Ethyl-4-cyclopentylaniline (*XVI*)

A solution of 22 g *II* in 140 ml benzene was slowly added to a suspension of 8·0 g $LiAlH_4$ in 80 ml ether and the mixture was refluxed for 5 h. After cooling it was decomposed with 32 ml 20% NaOH, added dropwise, the salt was filtered off and the filtrate evaporated. The crude product was distilled; 19·8 g (97%), b.p. 125°C/0·13 kPa, n_D^{21} 1·5545. ^1H NMR spectrum: δ 7·00 (d, J = 8·0 Hz, 2 H, 3,5-H_2), 6·50 (d, J = 8·0 Hz, 2 H, 2,6-H_2), 3·25 (bs, 1 H, NH), 3·10 (q, J = = 7·0 Hz, 2 H, NCH_2), *c*. 2·85 (m, 1 H, Ar—CH of cyclopentyl), 1·40—2·10 (m, 8 H, 4 CH_2 of cyclopentyl), 1·18 (t, J = 7·0 Hz, 3 H, CH_3). For $C_{13}H_{19}N$ (189·3) calculated: 82·48% C, 10·12% H, 7·40% N; found: 82·25% C, 10·08% H, 7·35% N.

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