$\lambda_{max}^{pH\ 1}$ 255 nm ($\epsilon$ 8100), $\lambda_{max}^{MeOH}$ 255 nm ($\epsilon$ 8400), $\lambda_{max}^{pH\ 11}$ 277 nm ($\epsilon$ 9200). *Anal.* ($C_{30}H_{29}N_5O_5$) C, H, N.

**3-β-D-Arabinofuranosyl-7-oxodihydro-ν-triazolo[4,5-*d*]pyrimid-7-one (16).** The same procedure as for **2** was used starting with 15 (60%): mp 195° dec; $[\alpha]^{25}D$ +75.0° (*c* 1.0, $H_2O$); uv $\lambda_{max}^{pH\ 1}$ 255 nm ($\epsilon$ 6800), $\lambda_{max}^{pH\ 11}$ 275 nm ($\epsilon$ 7500). *Anal.* ($C_9H_{11}N_5O_5$) C, H, N.

**5-Amino-1-(2,3,5-tri-*O*-benzyl-α-D-arabinofuranosyl)-4-cyano-ν-triazole (17).** 5-Amino-1-(2,3,5-tri-*O*-benzyl-α-D-arabinofuranosyl)-4-carbamoyl-ν-triazole (10, 1.1 g) was dissolved in dry pyridine (20 ml) and treated with *p*-toluenesulfonyl chloride (1.5 g). The soln was left at room temp overnight, then $H_2O$ was added, and the soln was extd with EtOAc. The organic layer was washed with $H_2O$, dried ($Na_2SO_4$), and then evapd *in vacuo* to give a syrup which crystd after standing several days. Recrystn from MeOH gave the analytical sample (0.8 g, 75%): mp 114–115°; $[\alpha]^{32}D$ +72.3° (*c* 1.0, $CHCl_3$); ir 2220 $cm^{-1}$ (C≡N); uv $\lambda_{max}^{MeOH}$ 231 ($\epsilon$ 10,800) and 251(sh) nm (8300). *Anal.* ($C_{29}H_{29}N_5O_4$) C, H, N.

**5-Amino-1-(2,3,5-tri-*O*-acetyl-α-D-arabinofuranosyl)-4-cyano-ν-triazole (18).** Method 1. 1-(2,3,5-Tri-*O*-acetyl-α-D-arabinofuranosyl)-5-amino-4-carbamoyl-ν-triazole (11, 0.5 g) was dissolved in dry pyridine (10 ml) and treated with *p*-toluenesulfonyl chloride (0.75 g). The soln was left at room temp overnight, then $H_2O$ was added, and the soln was extd with EtOAc. The organic layer was washed with $H_2O$, dried ($Na_2SO_4$), and then evapd *in vacuo* to give 18 (0.34 g, 72%) as a syrup: $[\alpha]^{25}D$ +51.7° (*c* 1.3, $CHCl_3$); ir 2220 $cm^{-1}$ (C≡N); uv $\lambda_{max}^{pH\ 7}$ 227 ($\epsilon$ 10,500) and 250(sh) nm (6600), $\lambda_{max}^{pH\ 11}$ 232 ($\epsilon$ 8100) and 250(sh) nm (6600). *Anal.* ($C_{14}H_{17}N_5O_7$) C, H, N.

Method 2. 5-Amino-1-α-D-arabinofuranosyl-4-cyano-ν-triazole (19) was acetylated by standard procedures using acetic anhydride in pyridine to give syrupy 18 identical in all respects with the product from method 1.

**5-Amino-1-α-D-arabinofuranosyl-4-cyano-ν-triazole (19).** The same procedure as in the preparation of **12** (method 1) was used starting with 17 to furnish 19 (32%): mp 167–168°; $[\alpha]^{25}D$ +141.3° (*c* 1.0, $H_2O$); ir 2220 $cm^{-1}$ (C≡N); uv $\lambda_{max}^{pH\ 1\ and\ 7}$ 228 ($\epsilon$ 9900) and 252 nm (6800), $\lambda_{max}^{pH\ 11}$ 231 ($\epsilon$ 9000) and 252 nm (6800). *Anal.* ($C_8H_{11}N_5O_4$) C, H, N.

**5-Amino-1-(2,3,5-tri-*O*-benzyl-β-D-arabinofuranosyl)-4-cyano-ν-triazole (20).** The same procedure as for 17 was used starting with 13 (77%): $[\alpha]^{25}D$ −31.3° (*c* 1.0, $CHCl_3$); ir 2220 $cm^{-1}$ (C≡N); uv $\lambda_{max}^{MeOH}$ 230 ($\epsilon$ 10,200) and 250(sh) nm (6700). *Anal.* ($C_{29}H_{29}N_5O_4$) C, H, N.

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# 2,5-Dihydro-1,2,4-benzothiadiazepine 1,1-Dioxides. Synthesis and Pharmacological Evaluation†

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A new method of synthesis of 2,5-dihydro-1,2,4-benzothiadiazepine 1,1-dioxide derivatives *via* nitrilium salts is described. A number of the compounds were tested for acute toxicity and CNS activity in mice, and it was found that *n*-hexyl-substituted derivatives effectively antagonized MES seizures.

In recent years considerable attention has been paid to the synthesis and biological study of 1,2,4-benzothiadiazine 1,1-dioxide derivatives and related compounds, owing mainly to the interesting diuretic activities found in some of them.[1] In marked contrast, the homolog heterocyclic system, 1,2,4-benzothiadiazepine 1,1-dioxide, has been scarcely considered. Cignarella and Teotino,[2] by condensation of ethyl orthoformate with *o*-aminomethylbenzenesulfonamide in propylene glycol, obtained in 51% yield a product to which they assigned the structure of 2,5-dihydro-1,2,4-benzothiadiazepine 1,1-dioxide. The reaction, however, was not applicable to other $N^1$-substituted sulfonamides such as *o*-aminomethylbenzenesulfonmethylamide or -sulfonphenylamide. More recently, another group[3] has successfully applied this scheme of synthesis to obtain 7-chloro-2,5-dihydro-1,2,4-benzothia-

†This paper should be considered as paper 10 of our series on nitrilium salts. For paper 9 see ref 14.

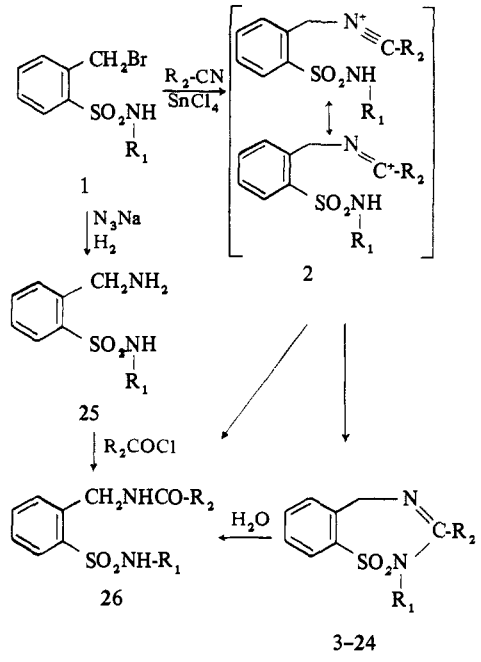
diazepine 1,1-dioxide from 4-chloro-2-aminomethylbenzenesulfonamide.

Wright[4] has described the preparation of 1,2,4-benzothiadiazepine 1,1-dioxides by treatment of 4-chloro-2-benzoylbenzenesulfonyl chloride with benzamidine hydrochloride, guanidine carbonate, or 2-methyl-2-thiopseudourea sulfate. Some members of these series have been shown to exert diuretic[5] and herbicide[6] activities. This paper describes a new and more versatile method for the preparation of 2,5-dihydro-1,2,4-benzothiadiazepine 1,1-dioxide derivatives as well as the results obtained in pharmacologic tests. Such a method takes advantage of an heterocyclization principle, based on the electrophilicity of the nitrilium salts, which has been used before in this laboratory[7] in the development of new synthetic procedures for 3,4-dihydroisoquinoline,[8] 6,7-dihydrothieno[3,2-*c*]pyridine,[9] 3,4- and 1,4-dihydroquinazoline,[10] oxazol,[11] 4*H*-1,3-oxazine,[12] 2,3-dihydro-1*H*-1,4-benzodiazepine,[13] and 4,5-dihydro-1*H*-2,4-benzodiazepine[14] derivatives.

These procedures take place with the initial formation of a nitrilium salt which, under the conditions employed, interacts with an electron-rich functional group in a position suitable for cyclization. The nitrilium salt was prepared by the well-known Meerwein procedure,[15] which involves reaction of an alkyl halide with a nitrile-metal halide electrophilic complex.

In this new method, the halogenated compounds were *o*-bromomethyl-*N*-methylbenzenesulfonamide (**1**, $R_1 = CH_3$) and *o*-bromomethyl-*N*-(*n*-hexyl)benzenesulfonamide (**1**, $R_1 = n\text{-}C_6H_{13}$). Their reactions with several nitriles, in the presence of tin tetrachloride, proceed in the expected way and lead, through the corresponding nitrilium salts (**2**), to the desired 2,3-disubstituted derivatives of 2,5-dihydro-1,2,4-benzothiadiazepine 1,1-dioxide (**3-24**). Their ir spectra, with bands at 1655-1680 (C=N) and 1345-1350, 1170-1180 $cm^{-1}$ ($SO_2$), are consistent with the assigned structures. The same can be said about their nmr spectra which in addition to aromatic and other substituent proton absorptions show a characteristic singlet at $\tau$ 4.5-4.6 attributable to C-5 ring protons.

The cyclic system 2,5-dihydro-1,2,4-benzothiadiazepine 1,1-dioxides is particularly sensitive to hydrolysis in acidic




or alkaline media, giving the corresponding *o*-amidomethyl-*N*-alkylbenzenesulfonamides (**26**) by cleavage of the 2-3 bond. These amides show an ir spectrum with bands at 1655-1640 (C=O amide), 3200-3400 (NH), and 1330-1315 and 1170-1150 $cm^{-1}$ ($SO_2$). In their nmr spectra, the protons at C-5 appear as a doublet centered at $\tau$ 5.1, due to the neighboring amidic proton. As expected, exchange of this proton with $D_2O$ abolishes the coupling and the doublet becomes a singlet. All these results are in accordance with structural assignments. Nevertheless, in order to confirm them, we have carried out an unequivocal synthesis in two representative cases by utilizing *o*-aminomethyl-*N*-methylbenzenesulfonamide (**25**) and butyryl and benzoyl chlorides as starting materials.

Finally, a brief comment on the preparation of the halogenated compounds employed should be made. Alkylation of saccharin and lithium aluminum hydride reduction of the *N*-alkylsaccharins proceeds satisfactorily according to litera-

Table I

| Compd | Approx $LD_{50}$, mg/kg ip (mouse) | Anticonvulsant act., $ED_{50}$, mg/kg ip (mouse) | | | $NTD_{50}$,[c] mg/kg ip (mouse) | Potency of hexobarbital sleeping time,[d] $ED_{200}$, mg/kg ip (mouse) | Act. on spontaneous motility[e] (mouse) | |
|---|---|---|---|---|---|---|---|---|
| | | Maximal electroshock[a] | Pentylenetetrazol[b] | Strychnine[b] | | | mg/kg ip | % decrease |
| 3 | 430 | >150 | >150 | >150 | >200 | 53 | 100 | 18 |
| 4 | >500 | >150 | >250 | >250 | 180 | 94 | 100 | 25 |
| 5 | 395 | >150 | >150 | >150 | 120 | 35 | 100 | Inact |
| 6 | 315 | >150 | >150 | >150 | >100 | >100 | 100 | Inact |
| 7 | 400 | >150 | >150 | >150 | >100 | >100 | 100 | 20 |
| 12 | 430 | >150 | >150 | >150 | *f* | *f* | 100 | Inact |
| 17 | 380 | >150 | >150 | >150 | *f* | *f* | 100 | Inact |
| 18 | 315 | >100 | >100 | >100 | *f* | *f* | *f* | |
| 19 | 920 | >300 | >300 | >300 | *f* | *f* | *f* | |
| 20 | 1490 | 287 | 405 | >500 | 270 | 156 | *f* | |
| 21 | 1650 | 375 | >500 | >500 | 296 | 182 | *f* | |
| 22 | >2000 | 183 | 294 | >500 | 245 | 113 | *f* | |
| 23 | 1725 | 378 | 386 | >500 | 198 | 245 | *f* | |
| 24 | >2000 | >500 | >500 | >500 | 400 | 58 | *f* | |

[a] See ref 19. Compds were administered 45 min before electroshock. [b] Administration of compds was followed by sc administration of 125 mg/kg of pentylenetetrazol or 2.5 mg/kg of strychnine 45 min later. [c] See ref 20. The rod was rotated at 6 rpm. Neurotoxicity was considered when the animals fell more than once during a 5-min testing period. Compds were administered 45 min before testing. [d] Administration of compds was followed by ip administration of 90 mg/kg of hexobarbital sodium 45 min later. [e] Determined using circular photocell activity cages for a 30-min period. Values referred to controls 30 min after drug treatment. [f] Not tested.

ture directions.[16] The resulting *o*-hydroxymethyl derivatives were converted without difficulty to the corresponding bromo compounds with phosphorus tribromide in ether. The great number of saccharin-substituted derivatives which have been described and the simplicity of the reactions permitting their conversion to these halogenated compounds are other facts which make more attractive this new method of synthesis of 2,5-dihydro-1,2,4-benzothiadiazepine 1,1-dioxides.

**Pharmacological Activity.** Most of the compounds presented in this paper were originally submitted for acute toxicity and behavioral studies in mice, using the methods described by Irwin.[17] Antagonism to maximal electroshock seizures, antagonism to pentylenetetrazol and strychnine, neurological deficit on a rotarod, potentiation of hexobarbital sleeping time, and effects on spontaneous motility were studied in male mice at doses not greater than approximately 0.33 $LD_{50}$.

All of the compounds were administered ip. Compds **18–24** were suspended in 0.5% Tween 80, and the hydrochlorides of compds **3–17** were dissolved in saline. The results of the testing of these compds are recorded in Table I.

Compds **18–24** provided moderate to very low toxicities with depressant effects on spontaneous activity, irritability, limb and abdominal tone, and righting reflex, as well as increased positional passivity and ataxia. These effects were dose dependent and were noticeable at 100 mg/kg in compds **18** and **22**, compd **24** being the least active of the *n*-hexyl-substituted derivatives. Some of these compds effectively antagonized maximal electroshock seizures, the activity being increased as the bulk of the $C_3$ substituent increased from methyl (**18**) to *n*-butyl (**22**), which showed the maximum of activity in this series. Antipentylenetetrazol activity was weaker, and no antistrychnine activity was observed. All of these compds induced neurological deficit of the animals when tested on the rotarod at about the same anticonvulsant median effective doses.

Compds **3–17** did not show any results of interest in these tests.

## Experimental Section

All melting points (uncorrected) were determined using a Gallenkamp capillary apparatus. Analyses, indicated by the symbols of the elements, were within ±0.4% of the theoretical values. The general description of experimental procedures given in this section is supplemented by references to the appropriate table in which individual compounds are listed. Nmr spectra were taken in $CDCl_3$ soln containing TMS as an internal standard using a Perkin-Elmer R-12 spectrophotometer and ir spectra (liquid films or Nujol) were determined with a Perkin-Elmer 257 instrument.

***N*-Alkylsaccharins.** *N*-Hexylsaccharin was prepared according to literature directions.[16]

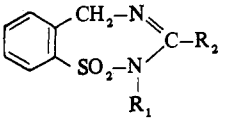
*N*-Methylsaccharin was obtained from a mixture of hydrated sodium saccharin (9.4 g, 0.04 mole), DMF (20 ml), and MeI (5.7 g, 0.04 mole) heated in a sealed tube at 140° for 7 hr. The mixt was poured into 100 ml of water. The solid separated, was filtered, and was washed with water. Recrystallization from aqueous alcohol yielded 7.6 g (98%) of white needles: mp 132°.[18]

***o*-Hydroxymethyl-*N*-hexylbenzenesulfonamide** was prepared as described in ref 16.

***o*-Hydroxymethyl-*N*-methylbenzenesulfonamide.** A soln of 20 g (0.1 mole) of *N*-methylsaccharin in 200 ml of anhyd THF was added with stirring to a suspension of 4 g (0.1 mole) of $LiAlH_4$ in 600 ml of dry THF. After the addition was completed, the mixt was stirred for 3 hr. Water (40–50 ml) was then added, and the mixt neutrallized with HCl. The inorganic solids were filtered off, and the filtrate was concd *in vacuo* to a small volume and extd several times with $Et_2O$. The ether soln was dried over $MgSO_4$, the ether stripped off, and the product, 15.5 g (76%), recrystallized from benzene: mp 81°. *Anal.* ($C_8H_{11}NO_3S$) C, H, N.

***o*-Bromomethyl-*N*-hexylbenzenesulfonamide.** To a soln of 10.8 g (0.04 mole) of *o*-hydroxymethyl-*N*-hexylbenzenesulfonamide in 100 ml of anhyd $Et_2O$, was added 3.6 g (0.013 mole) of $PBr_3$. After the resulting yellow soln was allowed to stand 48 hr at room temp, it was washed with 5% $NaHCO_3$ and water, dried ($MgSO_4$), and concd under reduced pressure to afford 9.6 g (77%) of a white solid:

Table II. 2,5-Dihydro-1,2,4-benzothiadiazepine 1,1-Dioxides




| Compd | $R_1$ | $R_2$ | Yield % | $n^{\circ}C_D$ | Mp base (mp picrate), °C | Recrystn solvent[a] | Formula | Analyses |
|---|---|---|---|---|---|---|---|---|
| 3 | $CH_3$ | $CH_3$ | 62 | $1.565^{22}$ | (167) | A | $C_{10}H_{12}N_2O_2S \cdot C_6H_3N_3O_7$ | C, H, N, S |
| 4 | $CH_3$ | $C_2H_5$ | 64 | $1.560^{21}$ | (161) | A | $C_{11}H_{14}N_2O_2S \cdot C_6H_3N_3O_7$ | C, H, N, S |
| 5 | $CH_3$ | $n$-$C_3H_7$ | 66 | $1.554^{22}$ | (178) | A | $C_{12}H_{16}N_2O_2S \cdot C_6H_3N_3O_7$ | C, H, N, S |
| 6 | $CH_3$ | $i$-$C_3H_7$ | 54 | $1.552^{22}$ | (166) | A | $C_{12}H_{16}N_2O_2S \cdot C_6H_3N_3O_7$ | C, H, N, S |
| 7 | $CH_3$ | $n$-$C_4H_9$ | 60 | $1.549^{22}$ | (191) | A | $C_{13}H_{18}N_2O_2S \cdot C_6H_3N_3O_7$ | C, H, N, S |
| 8 | $CH_3$ | $n$-$C_5H_{11}$ | 55 | $1.544^{22}$ | (177) | A | $C_{14}H_{20}N_2O_2S \cdot C_6H_3N_3O_7$ | C, H, N |
| 9 | $CH_3$ | $C_2H_5S$ | 10 | | (167) | A | $C_{11}H_{14}N_2O_2S_2 \cdot C_6H_3N_3O_7$ | C,[b] H, N |
| 10 | $CH_3$ | $C_6H_5CH_2$ | 33 | | (192) | A | $C_{16}H_{16}N_2O_2S \cdot C_6H_3N_3O_7$ | C, H, N |
| 11 | $CH_3$ | $p$-$ClC_6H_4CH_2$ | 15 | | (191) | A | $C_{16}H_{15}ClN_2O_2S \cdot C_6H_3N_3O_7$ | C, H, N |
| 12 | $CH_3$ | $C_6H_5$ | 67 | | 114 | E | $C_{15}H_{14}N_2O_2S$ | C, H, N, S |
| 13 | $CH_3$ | $p$-$CH_3C_6H_4$ | 33 | | 143 | I | $C_{16}H_{16}N_2O_2S$ | C, H, N |
| 14 | $CH_3$ | $o$-$CH_3C_6H_4$ | 35 | | 156 | I | $C_{16}H_{16}N_2O_2S$ | C, H, N[c] |
| 15 | $CH_3$ | $m$-$CH_3C_6H_4$ | 37 | | 152 | I | $C_{16}H_{16}N_2O_2S$ | C, H, N |
| 16 | $CH_3$ | $p$-$ClC_6H_4$ | 30 | | 171 | I-E | $C_{15}H_{13}ClN_2O_2S$ | C, H, N |
| 17 | $CH_3$ | $p$-$NO_2C_6H_4$ | 40 | | 284 | D-W | $C_{15}H_{13}N_3O_4S$ | C, H, N |
| 18 | $n$-$C_6H_{13}$ | $CH_3$ | 31 | $1.538^{23}$ | (137) | A | $C_{15}H_{23}N_2O_2S \cdot C_6H_3N_3O_7$ | C, H, N, S |
| 19 | $n$-$C_6H_{13}$ | $C_2H_5$ | 34 | $1.532^{24}$ | (146) | A | $C_{16}H_{24}N_2O_2S \cdot C_6H_3N_3O_7$ | C, H, N, S |
| 20 | $n$-$C_6H_{13}$ | $n$-$C_3H_7$ | 36 | $1.527^{23}$ | (170) | A | $C_{17}H_{26}N_2O_2S \cdot C_6H_3N_3O_7$ | C, H, N, S |
| 21[d] | $n$-$C_6H_{13}$ | $i$-$C_3H_7$ | 50 | $1.526^{24}$ | | | | |
| 22 | $n$-$C_6H_{13}$ | $n$-$C_4H_9$ | 46 | $1.524^{24}$ | (162) | A | $C_{18}H_{28}N_2O_2S \cdot C_6H_3N_3O_7$ | C, H, N, S |
| 23 | $n$-$C_6H_{13}$ | $n$-$C_5H_{11}$ | 42 | $1.519^{23}$ | (161) | A | $C_{19}H_{30}N_2O_2S \cdot C_6H_3N_3O_7$ | C, H, N, S |
| 24 | $n$-$C_6H_{13}$ | $C_2H_5S$ | 25 | $1.554^{24}$ | (100) | Ac-Pe | $C_{16}H_{24}N_2O_2S_2 \cdot C_6H_3N_3O_7$ | C, H, N, S |

[a] A, MeCN; E, absolute EtOH; I, *i*-PrOH; D-W: DMF–$H_2O$; Ac–Pe, AcOEt–petroleum ether. [b] C: Calcd, 40.88; found, 41.27. [c] N: Calcd, 9.33; found, 10.07. [d] Chromatographed on alumina with $CHCl_3$.

recrystallized from petroleum ether; mp 68°. *Anal.* ($C_{13}H_{20}BrNO_2S$) C, H, Br, N, S.

*o*-Bromomethyl-*N*-methylbenzenesulfonamide was prepd in the same manner from *o*-hydroxymethyl-*N*-methylbenzenesulfonamide (5.6 g, 0.028 mole) and $PBr_3$ (2.5 g, 0.009 mole) in 250 ml of $Et_2O$–THF (4 : 1). The white solid, 7.2 g (98%), was recrystallized from benzene–petroleum ether: mp 103°. *Anal.* ($C_8H_{10}BrNO_2S$) C, H, N, S.

2,5-Dihydro-2,3-dialkyl-1,2,4-benzothiadiazepine 1,1-Dioxides (3–11 and 18–24, Table II). To 0.1 mole of nitrile, placed in a flask fitted with reflux condenser and $CaCl_2$ tube, were added 0.01 mole of $SnCl_4$ and then 0.01 mole of *o*-bromomethyl-*N*-alkylbenzenesulfonamide. The reaction mixt was heated 4–8 hr at 120–140°. After cooling, it was poured into 2 *N* aqueous NaOH and extd with $Et_2O$. The combined extracts were washed with water and dried ($MgSO_4$). The evapn of the ether yielded in all cases a dark oil. Due to their instability, the products were isolated as picrates which were recrystallized from MeCN and decompd through an alumina column with chloroform as eluent. When the salts were not soluble in the common solvents, they were suspended in $Et_2O$ and a slow stream of $NH_3$ was passed through the system until all the precipitate was ammonium picrate. The solid was filtered, and the ethereal soln was washed with 25% $NH_4OH$ and water, dried ($MgSO_4$), and concd *in vacuo* to give the free base.

2,5-Dihydro-2-alkyl-3-aryl-1,2,4-benzothiadiazepine 1,1-dioxides (12–17, Table II) were prepd as solid products from *o*-bromomethyl-*N*-alkylbenzenesulfonamides, $SnCl_4$, and arylnitriles according to the usual procedure. The ethereal soln was sepd and extd with 25% HCl. The acidic soln was made basic with 20% NaOH and extd again ($Et_2O$). The combined extracts were dried ($MgSO_4$), and, after evapn of the ether, the crude products were purified by recrystallization from appropriate solvents.

*o*-Butyramidomethyl-*N*-methylbenzenesulfonamide. Method A. 5*H*-2-Methyl-3-propyl-2,4-benzothiadiazepine 1,1-dioxide (4 g, 0.014 mole) and 40 ml of 25% HCl were heated with stirring for 2 hr. After cooling, the mixt was extracted with $Et_2O$. The combined exts, dried ($MgSO_4$) and filtered, were concd to give 3 g (69%) of an oily product which after 1 month solidified: recrystallized from benzene; mp 98°; ir (Nujol) 3380 (NHCO), 3180 ($NHSO_2$), 1650 (CO), 1320 and 1160 $cm^{-1}$ ($SO_2$). *Anal.* ($C_{12}H_{18}N_2O_3S$) C, H, N.

Method B. To a solution of 1.1 g (0.01 mole) of triethylamine in 50 ml of anhyd $Et_2O$ was added 2 g (0.01 mole) of *o*-aminomethyl-*N*-methylbenzenesulfonamide. Then a solution of 1.1 g (0.01 mole) of butyryl chloride in 20 ml of $Et_2O$ was slowly added. The reaction mixt was refluxed for 6 hr and finally concd *in vacuo*. The residue was treated with water, and the white solid filtered and washed with water: recrystallized from benzene; 1.5 g (52%); mp 98°.

*o*-Benzamidomethyl-*N*-methylbenzenesulfonamide was prepd from benzoyl chloride according to methods A and B as a white solid: recrystallized from EtOH; mp 125°; ir 3400 (NHCO), 3310 ($NHSO_2$), 1645 (CO), 1315 and 1160 $cm^{-1}$ ($SO_2$). *Anal.* ($C_{15}H_{16}N_2O_3S$) C, H, N.

*o*-Aminomethyl-*N*-methylbenzenesulfonamide. To a soln of 5.4 g (0.02 mole) of *o*-bromomethyl-*N*-methylbenzenesulfonamide in 60 ml of EtOH, was added 1.4 g (0.02 mole) of $NaN_3$, and then the soln was refluxed for 7 hr. The solvent was removed *in vacuo*, and the residue was treated with $CHCl_3$. The NaBr was filtered, and concentration of the solution yielded an oil with an ir spectrum (liquid film) consistent with that of the expected azide (strong band at 2100 $cm^{-1}$). To this oil, dissolved in 200 ml of abs EtOH, 1 g of Pd/C was added, and the mixture was shaken at room temp under 3 $kg/cm^2$ of $H_2$ for 3 hr. The catalyst was filtered off, and the filtrate evaporated. The residue was treated with 25% HCl and extd with $Et_2O$. Drying of the ethereal extracts ($MgSO_4$), filtration, and removal of the $Et_2O$ *in vacuo* left 2.1 g (50%) of a basic product: white needles (EtOH); mp 121° (lit.[2] 120–122°).

*o*-Aminomethyl-*N*-hexylbenzenesulfonamide was obtained in the same way, *via* azide intermediate, from *o*-bromomethyl-*N*-hexylbenzenesulfonamide. It was an oil: bp 188–190° (0.1 mm); picrate, mp 138° (*i*-PrOH); ir (liquid film) 3380–3280 (amine-$NH_2$ and amidic-NH), 1340 and 1170 $cm^{-1}$ ($SO_2$). *Anal.* ($C_{19}H_{25}N_5O_9S$) C, H, N, S.

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