clearly that the effect of ionization upon the monolayer properties is connected with their hydrophobic character. It is also evident that the strength of the hydrophobic properties largely determines the nature of the effect. Differences similar to those noted for the rosin acids may also be found among other groups of substances in which the hydrophobic properties undergo similar variations.

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Thiohydrazides and Thiohydrazones: A New Class of Antibacterial Substances

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In 1934 Jensen [1] prepared several co-ordination compounds of thiosemicarbazide and substituted thiosemicarbazides. Recently Jensen and Miquel [2] found that thiobenzhydrazide, $C_6H_5CSNHNH_2$, forms nickel complexes of the same type as are formed by the thiosemicarbazides. A close parallel appears to exist between tuberculostatic activity of the thiosemicarbazones and their ability to form co-ordination compounds with copper [3]. Since the complex compounds of thiosemicarbazides and thiohydrazides are similar we should expect that thiohydrazones would also possess antibacterial activity. A large number of thiohydrazides and thiohydrazones were therefore prepared and tested. Preliminary experiments showed that both classes of compounds were antibacterial as well as fungistatic, so we are now making a more detailed investigation of their activity.

The thiohydrazides were prepared by reaction of esters of dithioacids or the free dithioacids with hydrazine. The following new thiohydrazides were prepared:

Thiophenylacethydrazide. M.p. 71°.

$C_8H_{10}N_2S$ (166.2)
Calc. C 57.82 H 6.07 N 16.86 S 19.26
Found » 57.52 » 5.95 » 16.96 » 19.25

2-Hydroxythiobenzhydrazide. M.p. 102°.

$C_7H_8ON_2S$ (168.2)
Calc. C 50.00 H 4.80 N 16.66 S 19.07
Found » 49.98 » 4.85 » 16.95 » 18.92

4-Hydroxythiobenzhydrazide. M.p. 208°.

$C_7H_8ON_2S$ (168.2)
Calc. C 50.00 H 4.80 N 16.66
Found » 50.25 » 4.73 » 16.83

4-Methoxythiobenzhydrazide. M.p. 126°.

$C_8H_{10}ON_2S$ (182.2)
Calc. C 52.72 H 5.53 N 15.38 S 17.59
Found » 52.85 » 5.48 » 15.31 » 17.30

3-Methoxy-4-hydroxythiobenzhydrazide. M.p. 148°.

$C_8H_{10}O_2N_2S$ (198.2)
Calc. C 48.48 H 5.09 N 14.14
Found » 48.68 » 5.18 » 14.06

4-Acetamidothiobenzhydrazide. M.p. 234°.

$C_9H_{11}ON_3S$ (209.3)
Calc. C 51.67 H 5.30 N 20.09
Found » 51.71 » 5.38 » 20.41

4-Dimethylaminothiobenzhydrazide. M.p. 170°.

$C_9H_{13}N_3S$ (195.3)
Calc. C 55.37 H 6.71 N 21.53
Found » 55.31 » 6.75 » 21.50

2-Furanethiocarboxhydrazide. M.p. 135°.

$C_5H_6ON_2S$ (142.2)
Calc. C 42.25 H 4.26 N 19.71 S 22.52
Found » 42.28 » 4.44 » 19.92 » 22.45

2-Thiophenethiocarboxhydrazide. M.p. 156°.

$C_5H_6N_2S_2$ (158.2)
Calc. C 37.98 H 3.83 N 17.72 S 40.53
Found » 38.11 » 3.58 » 17.83 » 40.42

2-Pyrrolethiocarboxhydrazide. M.p. 122°.

$C_5H_7N_3S$ (141.2)
Calc. C 42.55 H 5.00 N 29.78 S 22.67
Found » 42.66 » 5.29 » 29.82 » 22.56

3-Indolethiocarboxhydrazide. M.p. 173°.

$C_9H_9N_3S$ (191.2)
Calc. C 56.54 H 4.75 N 21.98 S 16.77
Found » 56.97 » 5.02 » 22.16 » 16.85

A large number of thiohydrazones were prepared by condensation of the thiohydrazides with aldehydes, *e.g.* thiobenzhydrazones of salicylaldehyde (m.p. 155°), 2-methoxybenzaldehyde (m.p. 144°), anisaldehyde (m.p. 84°), 3-hydroxybenzaldehyde (m.p. 158°), 4-nitrobenzaldehyde (m.p. 109°), 4-dimethylaminobenzaldehyde (m.p. 125°), 4-acetamidobenzaldehyde (m.p. 170°), 4-succinylamidobenzaldehyde (m.p. 176° with decomposition), 1-naphthaldehyde (m.p. 126°), 2-naphthaldehyde (m.p. 132°), 2-quinolinecarboxaldehyde (m.p. 138°), 8-quinolinecarboxaldehyde (m.p. 159°), glucose (m.p. 194°); thiophenylacethydrazones of 2,4-dichlorobenzaldehyde (m.p. 152°), 4-nitrobenzaldehyde (m.p. 171°), 4-acetamidobenzaldehyde (m.p. 193°) phthaldehydic acid (m.p. 167°), 1-naphthaldehyde (m.p. 160°), furfural (m.p. 98°); 4-methoxythiobenzhydrazone of 4-acetamidobenzaldehyde (m.p. 172°); 2-furanethiocarboxhydrazones of furfural (m.p. 138°), 4-acetamidobenzaldehyde (m.p. 197°) *etc.* Some thioacylated hydrazides were also prepared in the same manner as benzoyl-thiobenzhydrazide (*cf.* Jensen and Miquel [2]), *e.g.* nicotinylthiobenzhydrazide (m.p. 142°) and *iso*nicotinyl-thiobenzhydrazide (m.p. 130°).

Further details will be given in a subsequent paper in this journal.

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On the Atomic Composition of the Mineral Belyankite

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The Russian mineralogist Dorfman has recently published a paper [1] on a new fluorine mineral, belyankite, from Central Kazakhstan. Amongst other things Dorfman has determined some optic constants, thermic data, and the specific weight (2.720) for this mineral. Further Dorfman gives x-ray data (S. S. Kvitka) and a chemical analysis (M. O. Stepan), giving the following weight percentages:

Table 1.

Al_2O_3	21.88
CaO	34.00
F	49.01
H_2O+	15.35
H_2O-	0.30
	120.54

On the basis of this analysis Dorfman assigns the following formula to belyankite: $Ca_2Al_3(F, OH)_{13} \cdot [H_2O]$.

If the analysis is recalculated according to the method usually employed for double fluorides (discounting H_2O^-, as Dorfman himself does), we get: