The behavior of sulfonic acid groups was tested by a study of sulfanilic acid. It was found that this substance behaves exactly like acid fuchsin: the commoner gram-negative bacteria, when exposed to it at 45° C. are readily killed, gram-positive aërobes under the same treatment remaining uninjured. This would seem to be proof that the reverse selective property of acid fuchsin (reverse, that is to say, as compared with gentian violet) depends on the sulfonic-acid groups which it contains.

Since opposite selective activities have thus been demonstrated for two dyes (magenta and acid fuchsin)—one of which kills gram-positive spore bearers and spares gram-negatives, while the other does just the reverse—and since the chemical group in the latter substance which is responsible for its selective activity has been determined, data would seem to be at hand for the determination of the fundamental cause of the difference between these two types of organisms.

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Detoxication in the organism of the fowl.

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Various organic compounds more or less toxic to the organism have been fed to human beings as well as to many of the lower animals, but little work of this kind has been carried out with the fowl.

Previous investigation has shown that the first action of the animal body is an attempt at complete oxidation of the foreign molecule. Should this fail, an effort is next made to render the compound less toxic by means of reduction with or without subsequent oxidation. If neither of these types of reactions sufficiently alters the foreign substance, recourse is finally had to a synthetic type of reaction by which the original compound is joined in most cases with another compound or radical.

It may be said in general that the effect of oxidation or reduction upon a compound of this kind is to produce either an alcohol

or an acid. The acids then are usually detoxicated by being joined with glycocoll, glutamine, ornithine or glycuronic acid, while the alcohols are combined with either the sulphate radical, glycuronic acid or cysteine. Besides this we have methylation of pyridine compounds, acetylation of amino compounds, and the combination of amino compounds to form uramino acids.

For our work we chose compounds which illustrate type reactions only and which in some instances undergo entirely different processes of detoxication in different organisms.

1. Phenylacetic acid was fed to check up some of the older work, and it was found that in the organism of the dog phenylactic acid is combined with glycocoll and appears in the urine as phenaceturic acid. In the human organism, however, it is joined with glutamine and is excreted as phenylacetyl-glutamine, and when fed to chickens it is excreted as phenacetornithuric acid, *i.e.*, in combination with ornithine.

2. Benzaldehyde, both when fed to human beings as well as to lower animals is oxidized to benzoic acid and excreted as hippuric acid.

We fed a total of 3 gms. to a hen and isolated from the excreta 0.5 gm. of ornithuric acid (2 molecules of benzoic acid combined with 1 molecule of ornithine.)

3. Para-hydroxy benzaldehyde when fed to human beings is oxidized to para-hydroxy benzoic acid and is excreted as such, but when fed to lower animals it is as a rule detoxicated further by being combined with glycocoll and is excreted at least in part as para-hydroxy hippuric acid. The chicken, however, employs the same means of detoxicating this compound as does the human being.

After feeding 3.6 gms. of para-hydroxy benzaldehyde to a hen we isolated 1.5 gms. para-hydroxy benzoic acid from the excreta but no conjugation product appeared.

4. Phenylpropionic acid, when fed to animals, undergoes beta oxidation and is converted into benzoic acid. After feeding 2.5 gms. of phenylpropionic acid to a hen we extracted from the excreta about 0.5 gm. benzoyl ornithine together with some free benzoic, showing that beta oxidation takes place as readily in the organism of the fowl as in the bodies of other animals.

5. It is generally believed that cinnamic acid by a preliminary process of reduction is first converted by the animal body into phenyl-propionic acid, then by subsequent oxidation into benzoic acid. This type of reaction is apparently employed by the fowl for the detoxication of cinnamic acid, for we isolated somewhat more than 0.5 gm. benzoyl ornithine from the excreta after feeding a hen 3 gms. of cinnamic acid.

6. Nitro benzene when fed to animals is extremely toxic, but is detoxicated to some extent by a simultaneous oxidation and reduction through which it is converted into para-amino phenol. We fed 0.5 gm. nitro benzol to a hen. The chicken died at the end of 12 to 14 hours, but qualitative tests were obtained for para amino phenol in the excreta.

Meta-amino benzoic acid undergoes two different kinds of reactions in the animal body. When fed to dogs it is detoxicated to some extent by being joined with glycocoll to form meta-amino hippuric acid. When fed to rabbits, however, it is largely detoxicated by undergoing combination with urea to form a meta-uramino benzoic acid. When fed to fowls the acid seems to undergo a process of acetylation whereby acetic acid is joined onto the amino group of the acid with the splitting out of water resulting in the formation of meta-acetyl-amino benzoic acid.

We fed 4.5 gms. meta-amino benzoic acid to a chicken and recovered 1.8 gms. meta-acetyl-amino benzoic acid.

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Merogony experiments on sea-urchin eggs.

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By merogony in the broader sense is meant the fertilization and development of egg fragments whether nucleated or not.

By means of the more accurate method of using a mechanical apparatus for microdissection an attempt was made to repeat the work of earlier investigators (O. and R. Hertwig, Boveri, Driesch, Morgan, Loeb, Wilson and others) especially for the purpose of cross-fertilizing egg fragments of the sea-urchin and sand dollar.