basic ration made of 10 per cent. pure casein, 6 per cent. sea salt and 84 per cent. white flour. The rats were allowed to eat this *ad libitum* and were supplied with ordinary tap water in addition. At the end of the thirty-second day butter fat was added to the ration to the extent of 1 gram per rat per day. The experiment lasted 65 days. In the above experiment, two rats, both males and weighing 65 grams each, and of the same litter, were taken and fed this diet. At the end of the 65 days the rat getting the barley with 0.5 per cent. P_2O_5 weighed 108 grams, whereas the one getting barley containing 1.06 per cent. P_2O_5 weighed 117 grams. This difference of 9 grams is small, and yet, owing to the exact manner in which the experiment was performed and the fact that the rats were of the same sex, size and litter, this small difference is significant.

In the experiment with oats two female rats of the same litter were taken. These rats were practically the same weight. In fact they were of exactly the same weight (55 grams) on the second day of the experiment. At the end of 65 days the rat receiving oats with 0.53 per cent. P_2O_5 weighed 86 grams and the rat receiving oats containing 1.1 per cent. P_2O_5 weighed 97 grams. It may be remarked that the experiments with female rats are not always quite as uniform as those with male rats, but these female rats showed no peculiarities in the growth curves. These experiments are in harmony with those of a number of workers and show that the vitamine content of *milled grains* is proportional to the content in P_2O_5. In the case of milled grains, however, the variation in P_2O_5 is due to its partial removal in milling, whereas in experiments recorded in the present paper the variation is due to the amount of available phosphoric acid in the soil. Since butter fat was fed uniformly throughout the last half of the experiment, the difference in growth of the rats is due to difference in vitamine *B*.

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MOLD HYPHÆ IN SUGAR AND SOIL COMPARED WITH ROOT HAIRS

To compare sugar with soil as a place for growing molds may at first sight be revolutionary, but to one who has studied molds in soil, the first glimpse of a moldy sample of sugar under the microscope compels the comparison put forward in the title of this paper. Mold hyphæ as seen in foods such as sugar and in soil strikingly resemble root-hairs as they develop in earth. Hyphæ of fungi and root-hairs are analogous structures. Both belong to the vegetative phase of a plant's life cycle. Both are turgid, thin-walled cells. The elongating hypha pushes itself between sugar crystals or between soil particles in the same fashion as the elongating root-hair progresses in the soil. The elongating hypha, like the root-hair, is a feeding and growing portion of a plant, which is submerged in a substratum. The hyphal tip, as is commonly understood of the apex of a root-hair, follows between the sugar crystals or soil particles along the path offering the fewest obstacles. Such a path or course is at best winding, irregular, now wide and again extremely narrow. The mold hypha under suitable conditions grows between the faces of the sugar crystals or soil particles. As would the root-hair, it forces its way into a narrow passage, its shape conforming to the space discovered. There may be a bulge on one surface of the hypha and a flattened area on the opposite surface, all depending on the space available for expansion. Attracted by the films of water and available solutes adhering to the sugar crystal or to the soil particle, the mold hypha grows over the face of a particle, conforming to the irregularities in the surface of the object.

It is impossible to separate these bits of mold hyphæ from the respective sugar crystals or soil particles in conjunction with which they are growing. It is commonly known that a separation of soil particles from root hairs, which are much grosser units than segments of mold hyphæ, is impossible without injury to the root-hairs.

To one familiar alone with the easily studied and regular structure of a root-hair developed in a moist chamber, the root-hair as it grows in the soil is not recognizable except as it is traced to its point of attachment among the other epidermal cells of the root. Parallel to this statement it may be said that to one familiar alone with mold hyphæ as they may develop with freedom in liquid or solid culture media such as agar or gelatine, the mold hyphæ growing under natural conditions among sugar crystals or between soil particles are totally unrecognizable, neglected and passed over. No suitable bacteriological methods of making dry smears or stained preparations have yet been devised for demonstrating molds in such situations. These mold hyphæ are enough larger than minute bacteria to be plasmolyzed and for their structure to be dried out beyond recognition by this exceedingly harsh treatment. The best of objectives with high magnifications are required to demonstrate this close relation of mold hyphæ either to sugar crystals or to soil particles. For this an oil immersion objective must have a long working distance to permit a mount as thick as a sugar crystal or soil particle to be examined with the mold hyphæ attached. This has been possible with such a combination as a Zeiss 3 mm. N. A. 1.30 apochromatic objective and a 12 X compens. ocular. Few other available combinations will give the necessary clarity of field, magnification and working distance to demonstrate the intimate relationship existing between the mycelium of saprophytic molds and certain substrata.

This intimate relationship between mold hyphæ and the substratum explains why many have overlooked active growths of molds in the soil and others have denied it. It explains also in part the spoilage of certain foodstuffs such as sugar. Much damage can undoubtedly take place without macroscopic evidence of mold. Mold hyphæ have just such an intimate relationship to sugar crystals or soil particles as is well known to exist between root hairs of higher plants and the soil particles of the ground wherein they grow.

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Organo tellurium bases: A. LOWRY AND R. F. DUNBROOK. Aromatic bases and $TeBr_4$ react in ether or acetic acid solution to produce organo tellurium bases. The following complexes have been prepared and analyzed:

$(C_6H_5NH_2)_2.TeBr_4$
= Bi-aniline tellurium tetrabromide,
$[C_6H_5N(CH_3)_2]_2.TeBr_4$
= Bi-dimethylaniline tellurium tetrabromide,
$(\beta\text{-}C_{10}H_7NH_2)_2.TeBr_4$
= Bi-β-naphthylamine tellurium tetrabromide,
$p\text{-}C_6H_4(NH_2)_2.TeBr_4$
= p-phenylenediamine tellurium tetrabromide,
$m\text{-}C_7H_6(NH_2)_2.TeBr_4$
= m-toluylenediamine tellurium tetrabromide,
$(p\text{-}BrC_6H_4NH_2)_2.TeBr_4$
= Bi-p-bromoaniline tellurium tetrabromide,
$[(C_6H_5)_2NH]_2.TeBr_4$
= Bi-diphenylamine tellurium tetrabromide,
$H_2NC_6H_4.C_6H_4.NH_2.TeBr_4$
= Benzidine tellurium tetrabromide,
$[(CH_3)_2N.C_6H_4]_2CH_2.TeBr_4$
= Tetramethyl-diamino-diphenyl-methane tellurium tetrabromide.

Alkaloids also produce complexes with $Tebr_4$.

The rôle of acetic acid and ammonia as catalysts in the formation of acetamide from ammonia acetate: W. A. NOYES AND WALTHER GOEBEL. Dr. M. A. Rosanoff showed several years ago that acetamide may be prepared at atmospheric pressure by heating ammonium acetate with an excess of glacial acetic acid. He considered that the acetic acid is a catalytic agent but, as he worked under conditions such that the water formed distilled away, he did not actually prove whether the acetic acid acted as a catalyst or whether it merely retained the ammonia and made it possible to heat the mixture to a higher temperature without the loss of much ammonium acetate by dissociation. By heating ammonium acetate in sealed tubes, alone, and again with acetic acid and in other experiments with ammonia, we have shown that either acetic acid or ammonia acts as a catalyst and hastens the reaction. The liberation of ammonia by the addition of a little sodium hydroxide to the ammonium acetate, however, retards the reaction, probably because the acetate ions from the sodium acetate formed repress the ionization of the acetic acid formed by the dissociation of the ammonium acetate. These