horizontally on each side of the opening of the cage, approximately ½-inch from the top. The bin is placed in the cage opening by inserting the lip and allowing the inverted V cut to rest on the bottom of the opening. It can then be swung either in or out until it is stopped by the extension lip on either side of the bin. To secure the bin in the "in" position, the bolts are slid over the outside of the bin; in the "out" position, they are slid into holes (13) drilled into the ends of the bin. When the bin is removed for cleaning, a metal plate slightly larger than the opening and having small tabs bent in on the bottom edge can be inserted to prevent escape of the animals.

Acid Phosphatase and Lipids in the Mast Cells of the Rat[1]

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The presence of alkaline phosphatase and cytochrome oxidase, localized in the form of cytoplasmic granules in the mast cells, has already been reported (*4*, *5*). Acid phosphatase has been stated to occur only in negligible amounts in the mast cells (*4*). With a slight modification of the technique of Gomori and of Wolf, Kabat, and Newman (*2*), we have been able to demonstrate that acid phosphatase, like alkaline phosphatase, is abundant in the mast cells. This enzyme is localized in the mast cells as discrete, coarse, cytoplasmic granules, brown to black in color. This localization in granules, in contrast to the diffuse appearance of the enzyme in other tissues (*3*), suggests that possibly these granules which contain acid phosphatase correspond to the mast granules. No phosphatase activity was found in the nucleus.

To demonstrate acid phosphatase activity in tissues embedded in paraffin it is necessary to incubate them in the buffered substrate for comparatively long periods of time. For this reason it is thought that the method is faulty, and that perhaps the enzyme is partially denatured during infiltration in paraffin at high temperatures. For the demonstration of acid phosphatase, tissues are fixed in chilled acetone for 12 hours or longer, cleared in toluol or chloroform, infiltrated in paraffin, sectioned, and mounted in the usual manner. The deparaffinized sections are then incubated at 37° C. in a solution of sodium β-glycerophosphate buffered (acetate) to pH 4.7. In these sections enzyme activity in the mast cells is shown after long periods of incubation and is never clear before 24 hours. Often the section must be incubated 72 hours or longer. Better results are obtained when the paraffin infiltration method is eliminated. Whole mesenteries are spread on pieces of cork (previously immersed in cold acetone) and fixed in chilled acetone overnight. The acetone is removed in several quick rinses of distilled water, and the mesenteries incubated in the buffered substrate at 37° C. Some acid phosphatase activity is noted within 1 hour in granular foci in the mast cells. Maximal enzyme activity is obtained in 4–6 hours. Longer incubation periods are undesirable, because after 24 hours the mast cells become so dark that details are obscured. It seems advisable, then, to eliminate the paraffin method from this technique whenever possible. Perhaps embedding in collodion would be satisfactory, since it does not require infiltration at high temperatures.

Our previous findings do not reveal lipids stainable with Sudan IV in the mast cells of the rat. Although Sudan IV gives consistently negative results in the mast cells, when Sudan black B is applied to frozen sections of tissues fixed in formal-calcium-cadmium (*1*), black granules are revealed in the cytoplasm of the mast cells. These lipid granules resist dissolving with solvents and appear to represent phospholipids. Lipid granules have been demonstrated previously in human mast cells (*5*) by the use of Sudan black.

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Sulfur Collection in Precipitation by Means of an All-Weather Noncorrosive Rain and Snow Gauge[1]

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Sulfur, an essential element for the growth of plants and animals, is known to be present in three amino acids (cystine, methionine, and djenkolic acid), the tripeptide glutathione, and two vitamins (thiamine and biotin). Increasing attention is being given to the content in foods of the sulfur-containing amino acids (*2*) as factors in food quality. The total sulfur in plants (and possibly the total of these essential sulfur compounds) is increased by increasing the supply of available sulfur in soils (*4*).

In the course of ordinary fertilizer practice, available sulfur has been supplied to the soil in the form of ammonium sulfate, potassium sulfate, and superphosphate. However, with the anticipated increased use of higher-analysis fertilizers these sources of sulfur will be decreased. Thereafter, except for a small reserve in the soil, the chief natural source to growing plants will be that brought down in the precipitation.

With regard to soil reserves, Lipman and Conybeare (*3*) have reported that, on the average, the soils in the United States contain only about 700 pounds of total sulfur/acre. This is for the most part insoluble and unavailable at any one time; also, that becoming available is subject to rapid loss by leaching. Thus, the quantity of sulfur brought down by precipitation will become increasingly important.

In order to measure the sulfur brought to the soil in rain and snow, a special rain gauge has been designed at this Station. The two general requirements to be met in making this gauge accurate and workable for the purpose were: (1) prevention of absorption of sulfur in gaseous form from the air, and (2) effective functioning in both winter and summer.

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