significantly increased variability. Approximately one-third of the observations showed a rise, one-third a fall, and one-third no change. This is reflected in the large mean deviation. In spite of the constancy of the mean sugar level during the depression, there is a very definite drop in this level at the time of recovery. This cannot be due to inanition since Scott⁴ has shown that a 2-hour fast period produced in the rabbit a mean drop of only 5 mg.; 4 hours of fasting produced a drop of 10 mg. Since our recovery samples were taken on an average $2\frac{1}{2}$ hours after the injection of the pentobarbital and show a mean drop of 20 mg., it is evident that the fall is due to something other than the inanition. Just what this mechanism may be we are at present unable to say.

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Inulin and its Suitability for Intravenous Administration in Man.

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After having administered dahlia inulin (lot 661-non-toxic) intravenously in large doses to dogs, and to man in 42 instances in doses ranging from 30 to 150 gm., without reaction, an unexplained transient reaction consisting of chills, fever, lumbar pain, nausea, vasomotor depression, herpes and anuria was encountered. The same reaction was encountered simultaneously in another laboratory where an independent sample of inulin was being used. The material that produced the reaction in our laboratory (lot 661-toxic) was a new shipment which had been purified separately by the manufacturer from the same batch of crude inulin as had supplied lot "661-non-toxic." At our request the manufacturer supplied a fresh, highly purified sample (lot 681) prepared from a new batch of dahlia roots, which proved to be, if anything, more toxic than "661-toxic", 1.0 gm. sufficing to produce either chill, fever, headache, nausea or lumbar pain. This reactive inulin appeared to be relatively innocuous for dogs, rabbits and guinea pigs, even when administered in very large doses. Boiling for 30 minutes in distilled water did not appreciably diminish the toxicity; partial hydrol-

⁴ Scott, E. L., Arch. Int. Med., 1929, 43, 393.

ysis with dilute acetic acid (sufficient to increase the reducing power from 0.9 to 13% by weight) diminished the toxicity somewhat, and complete hydrolysis with N/10 H_2SO_4 decreased the toxicity considerably. However, a fairly typical reaction was obtained after the administration of 20 gm. that had been hydrolyzed in the latter manner. Spectroscopic examination of the ash of both preparations revealed traces of numerous metals, but showed no Pb or Si, and no significant differences between the toxic and nontoxic preparations.

Through the courtesy of Dr. Eaton M. Mackay and of the Bureau of Chemistry and Soils of the U.S. Department of Agriculture, we subsequently obtained a quantity of crude chicory inulin. This material was purified in the Department of Physiology, and with the exception noted below has proved to be innocuous to animals and to man. This material has, at the time of writing, been administered intravenously to man 28 times in doses of 30 to 40 gm. without reaction, and it produced no reaction in doses up to 80 gm. But during the purification of successive batches from the original supply a single reactive lot (lot 7-chicory) was encountered, produced apparently by having been unintentionally superheated during drving. Though the reactions induced by small doses (5 and 10 gm.) of this lot of chicory inulin are not identical in every individual tested, they consist of lumbar pain, temperature, nausea, bronchiolar spasm and headache, and strongly suggest that the fundamental trouble is the same here as in lots "661-toxic" and "681" of dahlia inulin.

Attempts have been made to demonstrate the presence of a new molecular species in both the reactive dahlia and chicory inulin by making successive extractions with water at 22° C., but the total hydrolysable reducing substance, total solids, native reducing power, speed of hydrolysis and the optical rotation of these extracts show no significant differences. Further investigation of the physical properties of these and other samples of inulin are now being carried out. On the supposition that the reactive samples of dahlia inulin owe their toxicity to having been superheated while drying, the Pfanstiehl Chemical Company has kindly cooperated by preparing fresh dahlia inulin purified with due regard to our precaution against this presumed danger. A sample of this new lot of inulin (1226, received January 22nd) has been tested by us on man. No untoward reactions have been observed in doses up to 100 gm., administered intravenously.