san drift. It also seems to be mainly a wind deposit, classifiable as loess. He has also visited with Kay exposures of loess on an eroded Kansan drift surface under the Iowan drift of northwestern Iowa, and with him regards this loess as a probable correlative or continuation of the Loveland loess. We are thus in agreement that the Loveland loess is probably pre-Iowan.

The relation of the Loveland loess to the Illinoian drift does not seem to be so easy a matter to determine. There is a loess on an eroded Kansan drift surface beneath the Illinoian drift on the borders of the Mississippi valley to which the writer called attention some thirty years ago.[2] Its fossils were identified by W. H. Dall as of species similar to those found in the surface loess of that region, there described as Iowan loess. The aspect of the deposit is very similar to that of the so-called Iowan loess, though it is more indurated and distinctly older in appearance. In outcrop it bears a striking resemblance to the Loveland loess. This loess thus stands as a possible if not a probable correlative of the Loveland loess, both being down on an eroded Kansan drift surface. This carries with it reference of the Illinoian as well as Iowan drift to a post-Loveland stage.

In general the Illinoian drift is overlain by a single loess deposit which was called Iowan loess, because at the time the name was applied it was supposed to be closely related to the Iowan drift. This loess overlies the Sangamon soil and Illinoian gumbotil, forming the weathered surface of the Illinoian drift. It is now generally held that this loess is an interglacial deposit, for the molluscan fossils in it are of temperate climate species similar to the mollusks inhabiting the region. Its stratigraphic position is between the Sangamon soil and the early Wisconsin drift. It appears to have antedated that drift by only a short period of weathering, to which the name Peorian has been applied. It still stands in the position originally assigned to it, and it is a question whether it should not still carry the name Iowan loess pending the settlement of the place of Iowan glaciation in the Pleistocene chronology. Attempt has been made by some writers to name this loess Peorian, though that name was given to the interval of weathering following its deposition.

Beneath the Iowan loess there are a few places in which silt deposits, which in places simulate loess, occur in close association with the Sangamon soil and Illinoian gumbotil. These deposits are generally not as homogeneous as loess and are probably only in part wind deposits. Kay refers to deposits of this sort at the Farm Creek section, east of Peoria, discussed by Leighton in the *Journal of Geology*, in 1926, and considers them the equivalent of the Loveland loess. The description given by Leighton will serve to show the variable character of this deposit within a space of 225 feet, the length of the exposure:[3]

> Loess-like silt; on east side brownish in upper 1–1½ feet, grading below into grayish-yellow 2–2½ feet, and again into brownish with carbon specks, 3–4 feet, the lower two feet showing slight trace of effervescence with acid; no effervescence in upper 5½ feet; no bedding or stratification. On west side this loess-like silt is bluish-gray with greenish cast below the old soil, the soil and about six inches of the greenish loess is leached; calcareous below, very compact, no bedding or stratification, scattered small pebbles in lower three feet; thickness same on both sides of cut, 7–8 feet.

It appears that Professor Kay, in his attempt to settle the question of the relative ages of the Illinoian and Iowan drifts, is using nondescript deposits of this sort on the Illinoian drift as representative of the Loveland, while overlooking the more characteristic deposit of loess that underlies the Illinoian drift.

In case the loess below the Illinoian drift proves to be of Loveland age, there would be a very slender basis for referring the Illinoian and Iowan drifts to distinct glacial stages.

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ON THE ROTATORY POWER OF SERUM

WE have shown recently[1] that the viscosity of normal serum presented an absolute minimum value at a temperature near 56° C. The existence of this minimum is of particular interest inasmuch as it occurs at a temperature which is known to be of great importance biologically. Assuming that the physicochemical change in the serum (modified dispersion, birth and growth of micellae, fixation of water molecules) which resulted in an increased viscosity as soon as the turning-point (56°–57°) was reached, had an underlying cause of purely chemical nature, we have tried to prove its existence by measuring the rotatory power of the serum at all temperatures up to 70° C. and after heating for various lengths of time. The purpose of this short paper is to summarize the results obtained.

(1) There is no temperature coefficient for the levo-rotatory power of the serum, up to 55° C., for rapid heating. Mean values are, for a tube 10 cm long (normal horse serum), −4°.16 (green line of the mercury arc); −3°.61 (yellow lines); −2°.95 (red line). The mean specific rotatory power being: −58° (green line); −49° (yellow line); −40° (red line).

[2] "The Illinois Glacial Lobe," U. S. Geol. Survey Mon. 38, pp. 114–115, 1899.

[3] *Journal of Geology*, 34: 169, 1926.

[1] *J. of Gen. Phys.*, 12: 363. 1929.

(2) One hour's heating at 50° only produces a very slight change in α. After 55°, an increase in the rotatory power is observed and the rate of the increase becomes considerable as soon as 60° are reached. The increase is always much more rapid in the first minutes of heating. The slope of the curve representing the phenomenon is less marked as the time of heating increases. (Heating in sealed tubes.)

(3) When 10-cm tubes are used, the readings are no longer possible, on account of the darkening of the field, after an increase of, roughly, 0°80 in the angle of rotation is observed. This darkening occurs generally, whether the serum is heated for two hours at 58°, one hour at 59°, forty minutes at 60°, twenty minutes at 61°, five minutes at 64° or two minutes at 68°. It limits the readings, so that no greater increase in the angle of rotation was observed. However, these figures are not absolute, and refer to one kind of serum. Different sera may yield slightly different values.

These results are interesting if we compare them with the data obtained from viscosity measurements. From the latter we know that up to 50° C. the physico-chemical properties of the serum are not permanently affected. The polarimeter shows that no chemical modification occurs up to that temperature. The slope of the viscosity curve as a function of temperature begins to change after 50°, and reaches a minimum between 56° and 58°. At the same temperature, the angle of rotation shows a marked increase. After 59°, the viscosity increases, and this increase becomes very rapid when 62° are reached. The same phenomenon characterizes the rotatory power.

We therefore believe that it may be concluded that the alteration in the structure of the protein molecules, the chemical phenomenon which is followed by means of the polarimeter, is the underlying cause of the physical perturbation in the colloidal equilibrium of the serum on the one hand, and of the biological perturbation—the "destruction of the complement"—on the other hand. The darkening of the solution, which does not influence the rotatory power, is probably the optical expression of the physical changes in the solution which affect the viscosity.

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INHERITANCE IN LETTUCE

IN an investigation conducted at the Illinois Agricultural Experiment Station for five years, the author made crosses between representative varieties of heading, leaf and Cos types of cultivated lettuce. Crosses were also made between these and the lobed and unlobed forms of the wild *Lactuca scariola* L. found in central Illinois. Some crosses were grown to the fourth generation.

In making the crosses, Oliver's method of depollenation by means of a stream of water was employed. The investigation has shown that both cultivated lettuce and the wild forms of *L. scariola* are largely self-fertilized.

The Big Boston, May King and wild forms have anthocyanin pigment in their leaves and stems, while Grand Rapids and Paris White Cos have none. Five crosses were made involving pigmented and unpigmented parents. Inheritance was found to take place in simple Mendelian fashion in four crosses. Influences which interfered with normal segregation and recombination were apparently in operation in the cross unlobed Wild × Paris White Cos, and it was not determined conclusively how inheritance occurred. Anthocyanin pigment was dominant in all cases.

The plants which carried anthocyanin pigment in stems and leaves were found, without exception, to have ray florets with blue pigment on their undersurfaces. Anthocyanin in stems and leaves and in the ray florets were, therefore, inherited in the same manner. The two conditions are due either to one and the same gene or to two completely linked genes. The single-gene interpretation appears to be the more probable.

Six crosses were made which involved black- and white-seeded parents. Black seeds proved dominant in all crosses. Inheritance took place on a simple Mendelian basis, but in the cross May King × lobed Wild an influence was in operation which consistently caused a deficiency in the number of black-seeded plants in F_2.

Five crosses were made between the prickly wild forms and cultivated varieties. Inheritance of prickliness apparently took place on a simple Mendelian basis, but in four crosses the ratios deviated significantly in some families from the expected proportions. In the cross May King × Wild, the F_2 ratios deviated widely in 1915 but were approximately normal in 1916 and 1917. The prickly condition was dominant in all crosses.

In crosses of the unlobed Big Boston and May King varieties with the lobed wild *L. scariola,* two pairs of factors acting in a complementary manner were apparently involved. In a cross between the same lobed strain and an unlobed wild form, inheritance took place on a simple Mendelian basis. Lobed leaves were dominant in all three crosses.

Differences in leaf length, leaf width, width index, leaf area, time required to produce flowers, plant height and rosette habit were found to be inherited in a quantitative manner. The F_1 generations were found to be no more variable, as a rule, than the parental types. Increased variability and segregation were shown by the F_2 generations. Certain genes