New York and vicinity on February 28 in the hope of finding an explanation of the darkness. I am indebted to the officers of the New York office of the United States Weather Bureau for an opportunity to examine their records of temperature, pressure, wind, precipitation and fog over the northeastern part of the United States and especially along the coast in the neighborhood of New York City.

The day was seasonable as to temperature, with a maximum of 37.4 degrees Fahr. and a minimum of 30. The barometer was 29.97 at 8 A.M. and 29.89 at 8 P.M. Between ten and eleven, when the darkness was greatest, the temperature, according to the official records, was 35. This was at the top of the Whitehall Building; in the streets in the center of the city it was doubtless several degrees warmer. It may be taken as sufficiently accurate to say that the temperature throughout the very dark period was just above the freezing point.

The weather was cloudy throughout the entire region about New York, with slight precipitation in the west and north. Fog was reported along the coast from Cape Cod to the Delaware capes.

The wind was E.S.E. from 8 to 9:15 A.M., then mostly S.E. to 10 o'clock. From 10 to 10:55 it was S.S.E. At 10:55 the wind began to shift to the S., then S.W., W. and N.W. to N. It took fifty-five minutes to complete this change. From noon to 1:45 the wind blew from the north; then it veered to the N.E., back to north and was N.E. at 5:15. It blew from nearly all points of the compass, starting from the direction of the sea and continuing so until the darkest period was passed. There was a sensible lightening when the shift to the south occurred.

The velocity of the wind was five miles per hour up to 9 A.M., then 3 m.p.h. to 9:30, 2 m.p.h to 11:25 and 4 m.p.h. to noon. From noon onward to the end of the day, the velocity was from 7 to 8 m.p.h. The period of greatest darkness was the period of least wind. It grew lighter when the wind veered to the south and began to blow a little harder.

The foregoing facts appear to afford a satisfactory explanation of the darkness. During the morning, large masses of air carrying a heavy load of fog were driven very slowly back from the sea. It is probable that they encountered resistance from currents moving in the opposite direction which became noticeable later in the day, and, in consequence, became piled up to a great height. Whether it was due to this cause or not, the thickness of the fog blanket was certainly great. The warmth encountered at the surface of the earth dispelled the fog at the surface and so produced the effect of a city covered with a very heavy, low-lying cloud. When the wind shifted and grew stronger much of the cloud was blown away.

It would be interesting to know how much of the darkness was properly attributable to the smoke of soft coal and other inferior fuels due to the scarcity of anthracite coal. The smoke and fumes and dust produced by the city, and noticeable in the atmosphere, except on the brightest days, would have added materially to the darkness had there been no unusual amount of soft coal in use. The smoke added to, but did not cause the darkness.

It is proper to conclude that the darkness was caused by a great, low-lying and nearly stationary cloud into which countless chimneys were pouring smoke of various degrees of density.

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THE MASS LAW AND STATISTICAL EQUILIBRIUM

THE recent note by Professor Neuhausen[1] on the reaction of slightly soluble salts calls attention to the fact that, while in the past the common error has been to apply the mass law to solutions too concentrated, it is equally fallacious to attempt to reason from it when the solutions are too dilute. Gibbs pointed out that thermodynamics is only an approximation to the exact science of statistical mechanics, the approximation being the better the larger the number of molecules in the system under consideration. Thus by extrapolation from the data for the vapor pressure of tungsten at high temperatures we can calculate the vapor pressure of tungsten at temperatures where there should be only one tungsten atom per liter in the vapor in equilibrium with the solid.

1 SCIENCE, N. S., 57-26, 1923.

Such a calculation may have thermodynamic significance in some cases but it would be absurd to say that a tungsten wire maintains a statistical equilibrium with an atmosphere around it of one atom per liter. The absurdity becomes more obvious when we consider that a very high vacuum contains 10^{10} molecules per liter.

Similarly any calculation from thermodynamic data that one mercury ion exists per 1,000 liters is quite meaningless. If the precipitated mercuric sulfide is in statistical equilibrium with the solution, as appears probable, the absolute number of mercury and sulfide ions per cubic centimeter of solution must still be very great. It is almost an axiom of nature that gross experiments can not give us evidence as to the presence of a single ion or molecule in a given portion of matter.

The question as to the reaction of solutions with solids is answered by the knowledge of the structure of polar crystals furnished by X-ray methods. Since the ions are shown to exist as such in the crystal, the mechanism of reaction is not different than in solution. It is probable that a salt goes into solution one ion at a time although recombination may take place between ions after they are in solution.

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"WHAT IS A PLANT?"

IN SCIENCE for February 9 Professor Martin in an article on "What is a plant?" laments his unsuccessful attempt to find a suitable definition of a *plant* "when introducing the subject of botany to college classes."

Assuming that one can be found, is it necessary that the beginning student learn the definition of a plant? Will he know anything more about a plant after learning the definition than he knew before? It seems a bit illogical to attempt definitions before the student has any basis for them. When the word *plant* is mentioned, most beginning students, I imagine, think of some such organism as a tree, a bush, a weed, or a grass. And at that stage of the game such a conception seems far more desirable than an abstract one involved in a definition covering organisms the student has never seen and embracing ideas for which he has no data to support.

Suppose we let undisturbed the student's "indefinite" conception of a plant. Let him find out by laboratory exercises or field work how his "plant" is constructed. Show him by experiments how his "plant" lives, manufactures its food, grows and reproduces. Let him study and get similar data for ferns, mosses, liverworts, algae, fungi, bacteria. All this time he will have been learning *about* plants, their similarities and differences, their processes, their habitats, their relations to him. It appears that then, and only then, will the student be in a position to appreciate plants, their evolution, their relationships and their classification. It will require little effort on the part of the instructor for the student to realize that his earlier conception of a plant needs considerable modification.

If a plant must be defined, let us wait until the student has seen some illustrative material; until he has learned something about processes and structures of things he has no hesitancy in calling plants; and until he has made his own observations on some of the different organisms we call plants. At that time the student will be able to make his own definition based on what he has observed. Such a definition will not only not be abstract and beyond his grasp, but will be his *own*—of tremendous pedagogical significance.

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THAT PLANT

SOME ten years ago a high school girl wrote to me asking for a definition of a plant. Probably she wanted to floor some opponent in an approaching debate. After racking my brain for several days I wrote, "A plant is a living thing which manufactures its own food from the raw materials of earth and air, or one whose ancestors did so." I have used this definition ever since in my botany classes, but rather as a joke than as a serious matter. But the students take it seriously enough and usually commit it to memory. In substance it is obviously identical with that proposed by Professor Martin (SCIENCE, February 9, 1923), only mine is more prolix. If one must have a definition, I know of nothing better. It is particularly useful in showing that definitions are at best a mere makeshift, and very dan-