equations by the method of least squares, are, respectively, 0.340 and 0.356. The error, due to the use of the rapid method of fitting the curves, was less than one per cent. in each case, which is undoubtedly well within the limits of the experimental error involved.

The chief source of inaccuracy in the rapid method of fitting the curves probably lies in using the gains in live weight, per unit feed eaten, over finite intervals of time as approximations to the values of the derivative, $\frac{dW}{dF}$. If the chickens used in the writer's study had been weighed at less frequent intervals, the rapid method probably would not have yielded quite such accurate results.

The advantages of this method over the method of arithlog plotting are the elimination of the errors of judgment, which are inherent in the latter, and the fact that the value of the constant, C, which is of particular interest if the curve is used to interpret the results of a feeding experiment, can be determined directly.

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THE EFFECT OF THE APPLICATION OF A FIELD OF ATTRACTION TO A GAS

CONSIDER a gas of molecules, or electrons, in a shallow vessel having two of its plane walls parallel to each other. The vessel is placed in a field of attraction with these walls at right angles to it. Let us suppose that the conditions are such that a molecule on moving from one of these plane walls to the other has little chance of undergoing a collision with another molecule. Hence when a molecule moves from one of the plane walls to the other against the field, it undergoes a decrease in velocity, while when it moves in the opposite direction its velocity undergoes an increase. Hence the molecules impinge and rebound from one of the walls with a greater velocity than is the case at the other wall. Now the velocity of rebound[1] is an index of the temperature of the gas close to the wall; and hence under these conditions there will be a continual transference of heat from one wall to the other. But this is thermodynamically impossible. It follows therefore that the molecules must undergo certain changes compensating for this effect of the field. The occurrence of inelastic collisions of the molecules with the walls can not, it will be found, by themselves explain the effect. If, however, we suppose that the molecules possess certain properties previously deduced in other ways,[2] this effect can be compensated for. These properties are: (a) A molecule, or electric charge, slows down when moving freely, and absorbs radiant energy in the process which is stored up as internal energy; (b) potential energy of attraction, or repulsion, may become internal energy, and *vice versa;* (c) internal energy may also be directly converted into radiation.

We may now suppose that the internal energy accumulated by a molecule during its motion according to (a) and (b), is mainly converted into potential energy of repulsion according to (b), and this into kinetic energy, at the wall where the molecules arrive with a decrease in velocity. This is to take place in such a manner that the average velocity of collision is reduced at one of the walls and increased at the other, so that the temperature is the same at both walls.

If a different explanation of the difficulty is possible, I shall be glad to hear about it.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE IOWA EYE-MOVEMENT CAMERA

MANY efficient cameras for photographing eye movements have been built since the inauguration of the corneal reflection method of eye photography by Dodge in 1901. The first cameras obtaining a continuous record of eye movement recorded only the horizontal movements of one eye. Dearborn made an advance by recording the vertical movements of one eye on a horizontally moving film and the horizontal movements of the other eye on a vertically moving film. The camera herein described obtains simultaneous binocular records of both vertical and horizontal movements.

The light used to produce the corneal reflection for photographing is a direct current Bausch and Lomb automatic carbon arc. This light, screened from the view of the reader, is placed at right angles to the eyes as is illustrated in Fig. 1. The light is focussed by a large condensing lens on a diaphragm which allows only the center of the light from the positive carbon to pass on. Between the light and the diaphragm is a chopping disc operated by a synchronous motor which interrupts the beam of light fifty times

[1] Apart from the increase caused by the attraction of the wall. R. D. Kleeman, *A Kinetic Theory of Gases and Liquids,* John Wiley & Sons, New York.

[2] R. D. Kleeman, *Phil. Mag.,* 7: 493, 1929; *Nature,* 124: 728, 1929; SCIENCE, 70: 478, 1929; 71: 340, 1930; 72: 224, 1930; *Z. anarg. u algem. Chemie,* 196: 284, 1931; *Z. Electro-chemie,* 37: 77, 1931; 37: 371, 1931.