

between Irish and German Catholics are only occasional.

When, however, we come to ascertain the relative value of heredity and environment in determining the character of offspring, it seems to me that it is necessary to use extreme caution, to eliminate, on the one hand, mere coincidence, and on the other hand to avoid confusing the two influences. The development of the germ cell and the fertilizing cell we must consider heredity, but gestation is largely environment, and surely this period is of profound importance to the new being, especially in the case of human beings, with which the period is long and markedly subject to psychic influences. The period of infancy is, so far as rulers, or the highest social classes even, are concerned, a period of special environment, eminently adapted to continue and intensify any qualities distinctly marked in the parents. Monarchs' children are from their birth set apart from the world at large, surrounded by an atmosphere of authority and pretense; surely these conditions must have a large share in determining character. If one feature looms largest in the characters of rulers throughout the ages, it is their ruthlessness, that is, their indifference to the rights and feelings of their subjects. Just as the mass of children learn from their parents and associates to consider the lower animals as having no rights that human beings are bound to respect, so the young prince is taught to regard the mass of his nation.

Nor can we overlook opportunity as an element in favoring the ruler. By the very condition of things, his views prevail. In the light of modern theories, especially, the materialistic conception of history, are not many of the incidents of a given reign merely manifestations of causes within the core of humanity itself, and the monarch a creature of such causes rather than himself a cause? In other words, in ascribing to Louis XIV. a profound share of the development of France, are we not making the mistake of assigning Tenterden steeple as the cause of Goodwin Sands? "There was a man sent from God whose name was John." Is it permissible to say that there

was a man sent from God whose name was Abraham Lincoln? Can any one assert that Abraham Lincoln was any more necessary to the working out of a proper destiny of this country than a hundred of the prominent statesmen, north and south, in his day? I think it has been proved by Adams in his recently published volume, that the success of the Federal forces was almost entirely due to the efficiency of the blockade of the ports of the Confederacy.

In Professor Woods's two volumes on this topic we miss a study of the influence of two important classes of rulers with whom heredity can have little concern, namely, the popes and the presidents of the United States. Chosen under more or less emotional conditions, a long line of pontiffs exhibits striking examples of human excellence and human failings. The latest, and probably the best authority, on this series—the Catholic Encyclopedia—places Gregory VII. as the greatest of them, yet by his own statement he was from the proletarian. Of recent popes, Leo XIII. is the most able; his claim for noble descent was only established with difficulty and there is no ascription to him of blood royal.

Then what is to be said of the great line of American statesmen, drawn from the lower ranks, such as Franklin, Paine, Hamilton, Jackson, Lincoln? It is admitted that the cause of American independence was furthered as much by a journeyman printer and a journeyman corset maker, as by any one.

HENRY LEFFMANN

A FEMINIZED COCKEREL

FROM time to time during the last five years, grafts of various sorts have been attempted in connection with studies of the effects of castration on the domestic fowl. The condition of one of the birds on which grafts have been made is of particular interest.

A Brown Leghorn *male* was castrated completely when 24 days of age and the ovaries from two brood sisters, cut in several pieces, were placed beneath the skin and also within the abdominal cavity.

At date of writing, the bird is as obviously

a female in general appearance as its brood sisters. Several skilled poultrymen, when shown the bird, have unhesitatingly pronounced it a pullet.

Aside from a perfectly clear record, the marks of the operation, which are still visible, show that the bird when operated on must have been a male.

While possible that this particular individual may owe its feminized character to a constitutional condition, such as hen feathering, such an assumption is extremely improbable. Rather, it seems more probable that the bird has actually been feminized by the implanted ovaries in similar fashion to the rats and guinea-pigs of Steinach.

A full account of the bird will be published after it has been under observation for several months.

H. D. GOODALE

MASSACHUSETTS EXPERIMENT STATION,
AMHERST, MASS.

A THIRD ORDER RAINBOW

TO THE EDITOR OF SCIENCE: On September 11, as I stood near the lake in Beardsley Park, Bridgeport, Conn., I observed a rainbow in such an unusual position that it seems to be worthy of some short description. The rainbow was first noticed about a quarter of five in the afternoon, with the sun perhaps 60° from the zenith. The sky in general was clear, though there were heavy clouds above the eastern horizon and very light cloud streaks between the observer and the sun, with a few fleecy clouds near the zenith. No rain was falling, and probably none had fallen in the region for some time, nor was there indication that any would fall for hours; yet, between the observer and the sun, some 10° from the zenith, there appeared between two of the clouds a distinct rainbow, clearly observed by others whose attention was called to the phenomenon.

The bow was rather short, not over an eighth of a circumference, convex toward the sun, and showed plainly the usual rainbow colors. Not until the bow had faded to such an extent that the colors were no longer marked was

it recalled that no accurate statement of the order of colors could be given. It is my impression now that the red was on the convex side.

Wood's "Physical Optics," second edition, p. 343, gives for the deviation produced by K internal reflections in a sphere

$$D = 2(i - r) + k(\pi - 2r)$$

and for minimum deviation,

$$\cos i = \sqrt{\frac{\mu^2 - 1}{K^2 + 2K}}.$$

For $K = 3$, this gives

$$\begin{aligned} i &= 76^\circ 50', \\ r &= 46^\circ 55', \\ D &= 318^\circ 20', \end{aligned}$$

whence the angle between the emergent and incident light would be about 42°. This would agree fairly well with the rough estimate of 50°. Hence the conclusion that the rainbow observed was the result of three internal reflections within suspended drops of such small size and number as to give no appearance of a cloud.

Various authorities, however, state with more or less emphasis that the bows corresponding to three reflections are never seen on account of the much more intense direct light from the sun. In the case cited above it would seem that the light clouds directly between the observer and the sun served to diminish the intensity of the direct light to such an extent that the bow was plainly seen.

This seems to be the only explanation for the bow, but considering the very light clouds noted above, the observation is all the more remarkable.

H. W. FARWELL

A SOLAR HALO IN VIRGINIA

THE solar halo, a sketch of which is appended, was visible over a considerable portion of east Virginia for several hours on Sunday, November 2, 1913. It was observed by the writer at Fredericksburg, Virginia, at one p.m. on that day. The phenomenon was of the greatest brilliancy, the accessory "suns" being at times almost as brilliant as the sun itself. The great circles around the horizon were dis-