

at Boynton field tests which shall be comparable to these wire-basket experiments. The main crops to be grown are corn and wheat.

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SUDAN III. DEPOSITED IN THE EGG AND
TRANSMITTED TO THE CHICK

IN repeating the experiments reported by Dr. Oscar Riddle¹ in *SCIENCE*, June 19, 1908, p. 945, for the purpose of demonstration before the third session of the Graduate School of Agriculture of the United States, held July 6-30, 1908, at Cornell University, the results obtained by Dr. Riddle were confirmed; *i. e.*, Sudan III. fed to hens during the laying period stained red the layers of yolk deposited during the feeding of the Sudan. The amount of the stain used was much greater (20 to 25 milligrams at a dose) than Dr. Riddle for his special purpose found desirable, hence the yolks were strikingly colored, and always in concentric layers. Even when all the food eaten by the hen during the entire twenty-four hours was mixed with Sudan, the layers of the yolk were marked.²

¹ Riddle's paper was presented at the zoological meetings during convocation week at Chicago, 1907-8. He kindly gave to the authors personally the technique necessary for obtaining the colored eggs.

² If any of the readers of *SCIENCE* desire to experiment with Sudan III. the following hints may be of service: Sudan III. may be purchased of any dealer in microscopic supplies, *e. g.*, the Bausch and Lomb Optical Company, Rochester, N. Y. It is practically tasteless and the dry powder may be mixed with the food or it may be dissolved in olive oil and that mixed with the food. The dose is small (for a hen, 3 to 25 milligrams). The larger doses give more brilliant coloration. Water, glycerin and formalin do not dissolve either fat or Sudan III., hence watery solutions of glycerin and formalin are good preservatives of tissues containing the stained fat. The most satisfactory preservative found both for the eggs and for the entire animals containing colored fat is 5 per cent. formaldehyde. (Strong formalin 10 parts, water 70 parts.) Eggs are best prepared by boiling 15 to 20 minutes, then

In order to carry the investigation a step farther and to answer the question whether this coloring matter could be carried over to the chick, some of the "red eggs" were incubated, with following results:

1. As the yolk softened during the processes of growth of the embryo the layered mass became homogeneous and of a uniform pink. This was marked from the third day onward. For the first ten days the transparent embryo showed no sign of the color.

2. As soon as the developing chick began to deposit fat, at the seventeenth day of incubation, a minute mass of fat lying in the loose connective tissue between the leg and the abdomen was found with the characteristic pink color which depositing fat takes in adults fed with this stain. At this time the egg mass is of a nearly uniform dark red and almost enclosed within the body.

3. At hatching and several days thereafter the pink fat increased in amount, extending along the side of the sternum, the neck and head and finally appearing on either side of the back in the pelvic region. At the same time the yolk was losing its red color.

4. It was hoped that the peculiar fat of nerve fibers might take up some of this stain in the period during which myelinization is rapidly proceeding; but the nerve tracts showed only their usual glistening white.

To briefly summarize:

1. The specific fat stain, Sudan III., colors the fat laid down in the living hen and in the fatty portions of the yolk while the feeding experiments are in progress, and thus serves to give exact data concerning the time and amount of deposit.

2. The eggs so colored hatch, and the chick utilizing the yolk as food, produces fat in its own body colored as in the adult, showing in the most striking manner the transmission of a specific and unusual or foreign substance the shell is removed from the large end and the white and yolk cut off in thin slices, holding the egg and knife under water. Sections through the germinal disk are the most instructive. For permanent support and preservation of the prepared eggs glycerin jelly has been found satisfactory.

from the mother to the egg, and from the egg to the offspring, and thereby marking the transmission of the actual substance of the egg, and indirectly of the mother, to the offspring.

3. The precision of the method and its striking results apparently open to biologists a field which has lain dormant since its discovery by Daddi³ twelve years ago, *i. e.*, the possibility of following with great exactness at least one of the processes of nutrition.⁴

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GEOLOGY AT THE BRITISH ASSOCIATION

THE seventy-eighth annual meeting of the British Association for the Advancement of Science was held at Dublin, September 2 to 9, largely in the buildings of Trinity College and the Royal University. The Lord Lieutenant of Ireland, the universities, and the city cooperated to extend to the visitors a true Irish hospitality. In addition to the presidential address by Dr. Francis Darwin, popular illustrated evening addresses were delivered by Professor Turner, of Oxford University, on "Halley's Comet," and by Professor Davis, of Harvard University, on "The Lessons of the Colorado Canyon."

The mornings only were devoted to the reading of papers, the afternoon hours being wholly taken up by excursions and by elaborate social functions. In the sectional meetings an innovation was introduced in a large bulletin board set up at the front of each room, on which appeared "Papers Now Being Read." Beneath this were placed large letters to designate the individual sections of the association, and under each was a peg on which was hung up the number of the paper which at the moment was being read. A boy in attendance almost noiselessly received the telephonic messages at one end of the presiding officer's desk and adjusted the numbers on the board after the manner in use at American football games. The method proved a success, and

³ Daddi, in 1896 (*Arch. Ital. de Biol.*, T. XXVI., 1896, p. 143), was the first to show that fat deposited in the living body is stained by Sudan III. when ingested with the food.

⁴ The authors wish to express their thanks to the staff of the poultry department of the New York State College of Agriculture for the abundant facilities and assistance placed at their disposal.

might well be adopted by the American Association. As some of the section rooms were rather widely separated, an inter-section service of automobiles running at ten-minute intervals was instituted, but of its success the writer is unable to speak.

The invitation of the city of Winnipeg for the association to hold its meetings of 1909 in that city was brought by Dr. Bryce, vice-president of the Royal Society of Canada, and was accepted. The meetings will be held at Winnipeg during the last week of August and will be followed by an excursion through the Canadian Rockies by special train to Vancouver, B. C., with stops at Banff, Glacier and other intermediate points. To members of the British and American Associations the trip will be made for one fare, or \$50, and an excursion from Vancouver to Alaska and perhaps to still more distant points is under consideration. To members of the American Association attending the meetings the usual dues of a sovereign will be remitted, and it is hoped that the occasion will be notable by reason of the large number of British, Canadian and American scientists brought together. As was the case on the occasion of the South African meeting of the British Association, a considerable number of distinguished scientists will be made the special guests of the occasion.

Section C (Geology) was well attended by representative geologists of Great Britain, and the distant dependencies of the empire were represented by Hume, of Egypt; Hayden, of India; Maitland, of Western Australia; Hatch, of South Africa, and Grabham, of the Soudan.

The address before the section was delivered by Professor John Joly, F.R.S., of Trinity College, Dublin, the president of the section, on "Uranium and Geology." It was an able and scholarly address dealing with the recent developments in the study of radio-activity as a factor in geological dynamics, and ascribing to it large importance in the explanation of the earth's interior heat and of mountain growth. Professor Joly's own studies in connection with the great Alpine tunnels, where he found the least quantity of radium corresponded to the greatest depth below the surface, he explained by the radio-active nuclei originally distributed fortuitously through the earth's mass, heating and expanding beyond the capacity of the surrounding material, and in consequence rising to the surface. It would thus seem that it is not necessary to assume such large quantities of radium to be still contained in the core of the earth as are now to be found in its outer shell.