Austrian Meteorological Society, he expresses the fear that the *Meteorologische Zeitschrift* may cease publication for want of funds. This would be a deplorable circumstance and a distinct loss to meteorology and science. He asks for subscriptions, the price being only $3.20 U. S. currency per year. It is hoped that this note may secure not only renewals, temporarily dropped during the war, but also new subscriptions, so that this valuable periodical may be saved from extinction.

OTTO KLOTZ

DOMINION OBSERVATORY,
December 6

SCIENTIFIC BOOKS

RECENT ADVANCES IN PALEOPATHOLOGY

AN important contribution to the study of the origin and evolution of diseased conditions is contained in the recent volume by Dr. John M. Clarke[1] whose previous studies on this subject have enriched the literature of paleopathology.[2] He has, in the present essay, given a popularized account of his accurate paleontological studies, dealing with the nature of disease and the geological indications of its evolution. He calls attention specifically to the fact that there has been an evolution of disease similar to the evolution of organic forms. Certainly the evidence points to a progressive increase in pathological conditions throughout the geological ages.

Dr. Clarke's evidences are all selected from the field of invertebrate fossils in which his wide acquaintance with invertebrate paleontology and stratigraphy gives his opinion the greater weight. Only a specialist in this field would be able to discriminate benign pathological conditions from those of accidental post-fossilization erosions.

The author has a deeper purpose in view than merely contributing to the subject of paleopathology and his essay is a philosophical study of the nature of symbiotic and parasitic conditions of the ancient Paleozoic world.

Ths subject has been further enriched by the appearance of another volume dealing with the evidence of disease during a more recent period of the world's history.[3] This volume was prepared under the supervision of Lady Alice Ruffer of Ramleh, Egypt, as a memorial to her husband who lost his life in the recent war. The volume consists of nineteen essays which had been previously published in various journals, chiefly the *Journal of Pathology and Bacteriology.* These deal with detailed accounts of Sir Ruffer's studies on ancient Egyptian mummies; one paper relating to a condition of spondylitis deformans in a crocodile from the Miocene of Egypt.

These reprinted essays are accompanied by a brief biographical sketch and a list of Ruffer's writings.

Ancient Peru has contributed greatly to our knowledge of paleopathology, and the civilizations of the Incas and their predecessors have a diligent student in Edmundo Escomel,[4] a practising physician in Arequipa, Peru. His most recent contributions deal with discussions of the ancient surgical art of Peru; the instruments and results obtained, seen especially well in the numerous trephined skulls of the ancient Peruvian burials.

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[1] "Organic Dependence and Disease: Their Origin and Significance," Yale University Press, October, 1921, pp. 1–113; 105 figures.

[2] "The Beginnings of Dependent Life," Fourth Annual Report, State Museum of New York, 1908, pp. 1–28, 13 plates and text-figures.

[3] Sir Marc Armand Ruffer, "Studies in the Palaeopathology of Egypt," University of Chicago Press, October, 1921, pp. i–xx and 1–371; illustrated by 71 plates.

[4] Dr. Edmundo Escomel, "Ciencia y arte en le prehistoria peruana," printed privately, Lima, Peru.

SPECIAL ARTICLES

A SIMPLE METHOD OF OBTAINING PREMATURE EGGS FROM BIRDS

IN connection with studies on the relation of the endocrine glands to sex and reproduc-

tion it was observed some months ago that injections of therapeutic doses of the active principle of the posterior lobe of the pituitary body sometimes causes a premature expulsion of the bird's egg from the oviduct. Soon afterward it was easily established that a somewhat larger dosage could be relied upon to cause an immediate expulsion of the egg from any part of the oviduct. Doubtless this action might have been anticipated from the well-known action of this secretion on the uterine muscle of mammals. The immature or oviducal egg can be utilized to much advantage in the investigation of several kinds of biological and chemical problems but the impracticability of obtaining such eggs—except through the often uncertain, ever expensive and self-limiting process of killing the mother bird—has hitherto handicapped such studies. It therefore seems worth while to describe this simple and useful method.

A full understanding of the method and its limitations involves the following facts concerning the premature egg: The bird's egg requires between 1 and 2 days to pass from the ovary to the exterior. In pigeons this period of passage down the oviduct is a little more than 40 hours. When the ovarian egg is laid it has therefore already undergone development during this number of hours and has had various accessory parts (albumen, shell-membranes, shell) added to it. The first 10 to 15 hours of this period involve the formation of albumen, while the shell is continually formed during the last 25 to 30 hours. The middle and lower portions of the oviduct are more highly muscular in structure than is the extreme upper portion (infundibulum, funnel) into which the egg first passes from the ovary. The movements which propel the egg along the oviduct are involuntary in origin; in the final muscular act of egg-expulsion voluntary action is also involved. In the dove or pigeon the egg is easily and positively palpable 30 hours before the normal time of laying.

The effectiveness of the method is sufficiently indicated in the table which has been constructed from the last series of injections made by us. It will be observed that, with few exceptions, the eggs were laid within 6½ to 25 minutes following the injection. They were laid at stages of immaturity varying from 4 to 26 hours. Four cases required a repetition of the injection. The egg sought at the 37-hour stage (No. 8) was not forced backward but forward into the body cavity—a fact later verified by abdominal operation. A 34-hour stage (No. 11) was, however, forced neither forward nor backward by a dosage one-half of that used in the other tests. In the case of one quite wild common pigeon (No. 14), injected late at night, three injections failed to cause the immediate extrusion of the egg, though they quickly forced the egg down to the extreme posterior part of the oviduct. The time limits involved in this case are uncertain. Egg No. 6 was laid without shell but with the membrane. Several eggs had very little shell while those taken only 4 to 10 hours before the normal period of laying were fairly provided with shell and were capable of incubation in the normal manner. The injections are nearly as effective in the common fowl, though in this case it is not possible to know the exact number of hours of immaturity of the egg thus secured.

The injections are made hypodermically (No. 1) or better intramuscularly into the broad muscles of the breast. Pituitrin of Parke, Davis and Co. was used in the injections cited in the table. It is unnecessary to use the preparation designed for use in obstetrics (used here in Nos. 9, 10, 11, 15, 16, 17) since the difficulty of infecting birds makes the use of pituitrin (oral) practicable. The size of the effective dose depends largely upon the age of the preparation. One preparation evidently made six months later than another was found to be twice as active as the older preparation. The dosage for the weaker preparation, which is perhaps near the average age of preparations on the market, was found (it was used in data of table) to be about 0.133 c.c. per kilo body weight. This dosage is about 4 times that used for

a limited period by us in a current study of the possible rôle of pituitary deficiency in reproductive disorders in birds. Even this smaller dosage not infrequently effected the prompt delivery of an egg. When injected at or near the hour of release of an egg from the ovary this same smaller dosage also sometimes prevents normal ovulation in the pigeon.

Experience has shown that an egg which has very recently entered the oviduct from the ovary can not be secured by this method. Injections rightly timed for this purpose result in the equivalent of an anti-peristalsis of the oviduct (ovum into body cavity); in the pigeon, however, it is easy to obtain prematurely eggs of somewhat more than 30 of the total 40 hours of oviducal development. As carried out by us the wildness of the bird is a factor in the interval of time from injection to laying. This results doubtless from the fact that, when kept close at hand for exact time records, the voluntary part of the act of expulsion is delayed or inhibited in the untamed birds.

It is evident that by this means eggs of various stages of immaturity—including successive eggs from the same parent—are made easily available for studies on the earlier stages of embryonic development; for experimental studies on these most modifiable stages; for chemical studies on various parts of the egg with less than the usual opportunities for change and admixture; and for isolating the functions of the various parts of the bird's oviduct. It is probable also that under certain conditions or limitations this reaction of the dove's oviduct—active and *in situ*—would be useful as a means of standardizing solutions of the active principle of the pituitary gland. Incidentally, it may be added that it has already been found practicable in this laboratory to utilize such prematurely laid eggs to make a crucial test of Stockard's[1] important suggestions on the cause of twinning and double-monster formation as these occur in birds.

[1] Stockard, C. R., *Amer. Jour. Anat.*, 1921, XXVIII., 115.

TABLE I

Data for One Series of Pituitrin Injections

Kind of Bird	No.	Dosage (in Thousandths of 1 c.c.)	Interval, Injection to Laying (Minutes)	No. of Hours Prematurely Laid
Ring-dove	1	22	25	4
	2	20	13	16
	3	22	8	16
	4	22	8	10
	5	22	14	10
	6	22	12	26
	7	22[1]	13	21
	8	22	Into b.c.	(37)
	9	28[2]	8	5
	10	20	6½	5
	11	10	Not laid	(34)
Common pigeon	12	44	13	18
	13	44	19	5
	14	44[1]	Some hrs.	+5
	15	44	22	5
Common fowl	16	264	(45)	?4
	17	2201	(33)	?4

[2] Injection repeated one or more times.

OSCAR RIDDLE

THE DISCOVERY OF OLENELLUS FAUNA IN SOUTHEASTERN BRITISH COLUMBIA[1]

IN the spring of this year, Col. C. H. Pollen, of Cranbrook, British Columbia, forwarded to the University at Vancouver, specimens of chocolate-brown shales showing imprints of lower Cambrian trilobites.

In May, the writer visited the locality for the Geological Survey of Canada, made further collections and studied the stratigraphy over a wide area.

The fossils collected were submitted to Dr. Charles D. Walcott, secretary of the Smithsonian Institution, who identified the following genera and species:

Callavia, cf. *nevadensis* Walcott,
Wanneria n. sp. ?,
Mesonacis gilberti Meek,
Wanneria, cf. *walcottanus* (Wanner),
Olenellus, cf. *fremonti* Walcott,
Prototypus senectus Billings,

Dr. Walcott states concerning the collection:

[1] Published with the permission of the Director, Geological Survey, Ottawa, Canada.