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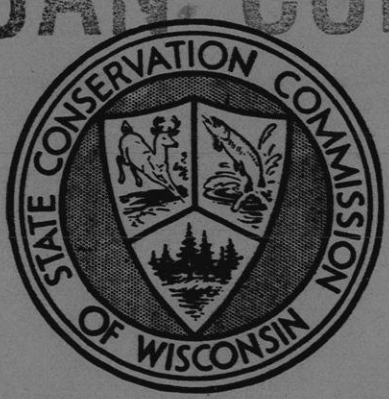
DEVICE FOR DATING NATURAL EVENTS IN GAME ANIMALS

by

Cyril Kabat, Donald R. Thompson,
and Frank M. Kozlik

Pittman-Robertson Project 9-R



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CYRIL KABAT, DONALD R. THOMPSON AND FRANK KOZLIK
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INTRODUCTION

Numerous aging techniques for wild animals have been developed within the past two decades. These, among other things, enable game managers to classify the juvenile component of many species of game populations into age groups based on time intervals, the length of which may be weeks as in upland game birds, or months as in deer. In most studies it is desirable to convert these data to birth dates and the date of the first day of incubation or gestation.

Charts and tables have been devised to expedite the conversion process and eliminate repetitive calculations of the large mass of numerical age data that game research projects collect annually. The charts and tables suffice for rapid aging, but require interpolation in order to make many of the desired conversions. This report describes a calculating device embodying the slide-rule principle and based on the Gregorian calendar. It permits rapid computation of natal dates of known-age animals.

INSTRUMENT CONSTRUCTION

The authors first constructed such a computing instrument from an inexpensive wooden slide rule by scraping off the logarithmic calibrations and replacing these with a continuous horizontal calendar on one scale and a series of weekly intervals on the slide (Figure 1). It was used for converting juvenile pheasant ages to hatching dates. The instrument was patterned after a similar device in use by poultrymen. Various modifications of the instrument can be

made depending on the purpose and the species studied.

If desired, only the A and B scales need be removed, leaving the C and D scale functional in their original capacity. However, since marking of the wood or plastic rule can be difficult, it may be desirable to lay out the scales on thin, high-quality paper (such as tracing paper) and cement these to the rule. If several interchangeable scales are to be used, they may be attached temporarily with thumb-tacks or scotch tape.

APPLICATION OF THE INSTRUMENT

Age data on juvenile animals that can be converted to natal dates can be acquired from several different sources. First, nestlings can be trapped shortly after birth or within a period of time during which their age can be accurately estimated. Secondly, sight records can be obtained in the field at a time when the young birds or mammals possess characteristics that enable the observer to classify them into age groups. Finally, many species of game animals that are shot during hunting seasons can be aged quite accurately. The procedure for acquiring juvenile age data is summarized for three different gallinaceous species by Thompson and Taber (1948).

At the present time the most fruitful application of this instrument is the computing of breeding phenology dates for juvenile upland game birds, particularly the ring-necked pheasant. Earlier attempts to get mass data on the breeding phenology of upland game birds were limited because the primary source of such material was procured during the course of special intensive nesting studies. Nesting studies are ordinarily too expensive and involved to conduct on an annual schedule.

At present, game managers in many states are able to estimate quite accurately the age of the many immature cock pheasants (that is, those under 17 weeks of age) seen along roadsides during early morning and thus obtain mass data. Likewise, large volumes of age data can be obtained on those juvenile pheasants, quail and ruffed grouse that have not completed the development of their post-juvenile primary wing feathers at the time they are shot during the hunting season. All three species can be aged quite accurately at this time, according to Buss (1946), Petrides and Nestler (1943), and Bump, Darrow, Edminster and Crissey (1948), respectively.

The arrangement of scales on the computing instrument for conversion of known ages to natal dates for gallinaceous birds and the method of operation are shown in Figure 1. In this usage it may also be desirable to scale molt according to the number of primaries shed and the intermediate states of molt, for which age is known as in bob-white and ruffed grouse, on the sliding age scale.

In those states having an any-deer or antlerless deer hunting season on the white-tailed deer (including fawns), excellent opportunities are offered for acquiring masses of age data on the young of this species. Cahalane (1932) was the first to report on the possibilities of accurately aging young white-tailed deer by dentition characteristics. In 1949, Severinghaus published a report on an intensive study of the tooth development and wear

in white-tailed deer that gave game managers an even more refined method for aging fawn deer. When using Severinghaus' criteria to compute natal dates for fawns, the slide bar (scale B) on the computing instrument could be calibrated in monthly intervals.

Natal dates can also be computed for the vast number of muskrat litters trapped in houses during the many studies that are being currently conducted on a nationwide basis. However, the number of juvenile muskrats that can be accurately aged at this time is limited only to those trapped shortly after they are born. The development of a growth curve for juvenile muskrats by Errington (1939), which is essentially linear for the major part of the interval when the greatest degree of weight increase is being made, offers the possibility of extending the period during which age of trapped litters can be estimated. However, further refinement of the growth curve is necessary, since Errington was unable to trap known-age muskrats at each of the stages shown in his growth curve, and hence the weights for some of the points were interpolated.

In those species in which weight can be used to compute age, the weight, too, can be plotted on the computing instrument like the arrangement of molt for upland game birds. There are many other possible applications of the computing instrument; for example, estimation of the date of such discrete events as opening of eyes, the appearance of mammae, and weaning dates and dates of maturity in certain juvenile mammals. These events may also be used as age points on the age scale.

The value of being able to compute the natal dates of juveniles lies in the fact that this information provides game managers with one means of measuring the effect of such factors as weather, food availability, sex and age ratios, and density on reproduction phenomena.

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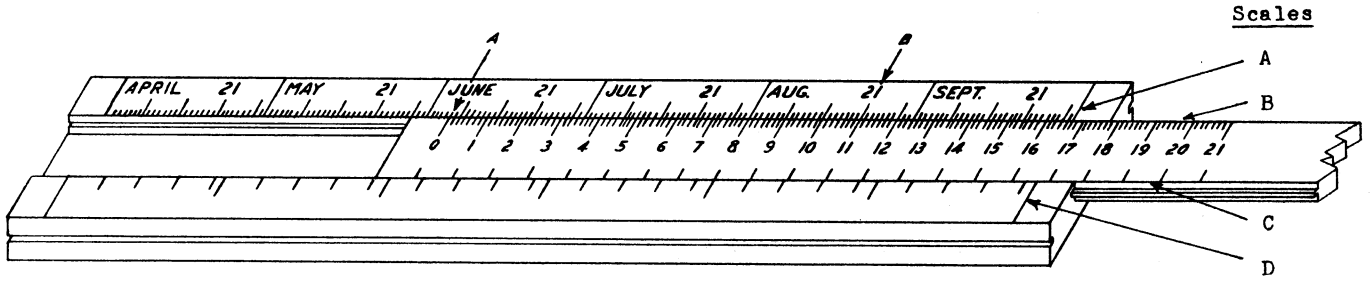
Figure 1

DIAGRAM OF CONVERTED SLIDE RULE FOR DERIVING HATCHING DATES OF GAME BIRDS



Arrow B represents an 11-week old pheasant brood observed on August 21. The hatching date of this 11-week old brood is June 5, as shown by Arrow A.

Scale C could be calibrated in primaries shed or weight intervals.

Scale D could be calibrated in weekly intervals for upland game birds or in months for deer.