

varies during a laying cycle. The pattern of these changes is not always consistent for the same hen and varies between animals. For hen number 1 the bone mass values decreased as the egg shell calcified. Ovulation of the next egg which usually occurs about $1\frac{1}{2}$ h after an egg is laid⁴, was generally followed by an increase in bone mass suggesting that a stimulus for medullary bone formation occurred possibly associated with estrogen release. The pattern for this hen appeared to be regular. The patterns exhibited by hens 2 and 3 also show a rise in bone mass near the time of ovulation with a leveling off or decline in value as shell calcification proceeds. The pattern demonstrated by hen number 4 is not so clear although shell calcification appears to occur when the bone mass values are low; this hen also had the lowest bone mass values. Hen number 5 did not lay on the day following the first egg. The bone mass decreased apparently until ovulation occurred for the next egg when rising values were noted preceeding shell formation. The accumulated bone mineral then seemed to decrease as shell formation proceeded. The second egg was laid at a low point followed by slightly increasing values coincident with the time of ovulation of the next egg. The third egg was laid at a peak. Either bone formation took place at this time for reasons that are not presently obvious or an error in technique occurred since ovulation evident from egg laying records did not occur for at least 15 h more; this hen also showed the smallest variability in bone mass values during the period of observation (see standard deviation ranges above).

While the number of hens used in this study are insufficient for statistical treatment they seem to confirm the results of BLOOM et al.² who found no correlation between the extent of medullary bone calcification and the position of the egg in the oviduct.

(+) Lupanine in *Lupinus hilarianus* Benth.

DEULOFEU and GATTI¹ isolated (+) hydroxylupanine from the seeds of *L. hilarianus* Benth. This alkaloid seemed to be the only base present in this part of the plant. A re-investigation of the alkaloids present in seeds harvested in December 1959 near the city of Santa Fé (Argentina) permitted again the isolation of a fairly large amount of (+) hydroxylupanine.

When the ether mother liquors remaining after the separation of this base were essayed on ascending paper chromatography on Whatman 1, employing butanol:acetic acid:water (80:3:17) as mobile phase, two spots were detected employing Dragendorff reagent. One, with Rf 0.29, corresponds to hydroxy-lupanine; and the other, with Rf 0.41, to another base, present in a very small amount.

Evaporation of the solution gave a residue that was chromatographed on a column of alumina (Woelm, grade III). Elution with a mixture of benzene-cyclohexane (50:50) gave the base with Rf 0.41. Elution of the hydroxylupanine was effected by using a larger amount of benzene in the mixture (70:30).

The base giving the spot with Rf 0.41 was identified as (+) lupanine. On evaporation of the solution, a syrup was obtained from which the following derivatives could be prepared: perchlorate, m.p. 211–213° (α)_D²⁵ + 40.0° (c, 0.3 ethanol); hydriodide m.p. 188–189°; methiodide m.p. 256–257°; all values in agreement with those given in the literature². The m.p. of the perchlorate was not depressed

The technique of quantitative roentgenography is particularly useful for studying those physiological and nutritional factors associated with skeletal metabolism. In applying this technique to avian studies in the future, certain facts relating to calcium metabolism in birds appear important. For example, it has been observed that certain chickens lay eggs with thick shells while others lay thin shelled eggs. This may be indicative of individual differences in the mobilization of bone calcium for shell production⁵. Species which lay clutches of eggs spaced so that the events of the laying cycle are clearly distinguishable might produce more regular bone mass patterns⁶.

Zusammenfassung. Der Mineralstoffgehalt der Tibia-Fibula von Legehennen, mit quantitativer Röntgenographie *in vivo* bestimmt, scheint während des Legezyklus mehr zu variieren als auf Grund des Fehlers der Methode erwartet werden kann. Eine Korrelation zwischen diesen Änderungen in der Knochenmasse und der Position des Eies im Eileiter konnte bisher nicht gefunden werden.

H. SCHRAER and ROSEMARY SCHRAER

Biophysics Laboratory, Department of Physics, The Pennsylvania State University, University Park (Penn.), December 5, 1960.

⁴ D. C. WARREN and H. M. SCOTT, Poultry Sci. 14, 195 (1935).

⁵ C. TYLER, J. agr. Sci. 48, 171 (1956).

⁶ This work was supported by grant A-1292 from the National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, U.S. Department of Health, Education and Welfare.

when mixed with an authentic sample of (+) lupanine perchlorate. The Rf 0.41 was also given by the authentic base.

It is interesting that all species of *Lupinus*, seven in total², in which (+) hydroxylupanine has been found, contain also (+) lupanine, both bases having the same stereochemical configuration in carbons 6 and 11. *L. albus* is the only species from which, in addition, the stereo-isomeric (–) lupanine has been isolated as such³; the latter isomer is present in form of the racemate also in the seeds of *L. angustifolius*⁴.

Zusammenfassung. (+)-Lupanin wurde aus den Samen der *L. hilarianus* Benth. isoliert.

B. FRYDMAN and V. DEULOFEU⁵

Laboratorios de Investigación, E.R. Squibb & Sons Argentina S.A., Martínez (Prov. Buenos Aires, Argentina), February 6, 1961.

¹ V. DEULOFEU and A. GATTI, J. org. Chem. 10, 179 (1945).

² N. J. LEONARD, *The Alkaloids* (R. H. F. MANSKE and H. L. HOLMES, Academic Press Inc., New York 1953), Vol. III, p. 119; Vol. VII, p. 253.

³ E. P. WHITE, New Zealand J. Sci. Technol. B 38, 718 (1957).

⁴ A. P. PELLET, Ann. Pharm. Franc. 8, 551 (1950).

⁵ We thank Prof. N. J. LEONARD (Urbana, Illinois) and I. RIBAS (Santiago, Spain) for the generous gift of samples of (+) lupanine perchlorate.