"NERVOUS" GOATS

JAY L. LUSH*

A FLOCK of goats showing a peculiar hereditary nervous behavior was seen by the writer on several visits to a farm in Dickens county, Texas. Opportunity to determine by breeding tests the manner of inheritance of this peculiarity did not occur. However, the facts which were observed will be of interest to students of heredity in animals and perhaps also to those interested in the entire field of abnormal mental behavior.

This is probably the same peculiarity briefly noted by Hooper[4] as reported to him from certain regions in eastern Tennessee or Kentucky and as described in more detail by Dexler[3] who obtained much of his information from an article by White and Plaskett[7] and from a report made to Dexler personally by Dr. J. F. Gudernatsch of Cornell University. The cases reported by Dexler were from Maury county and from Marshall county, Tennessee, and agree in every essential respect with those seen by the writer in Texas.

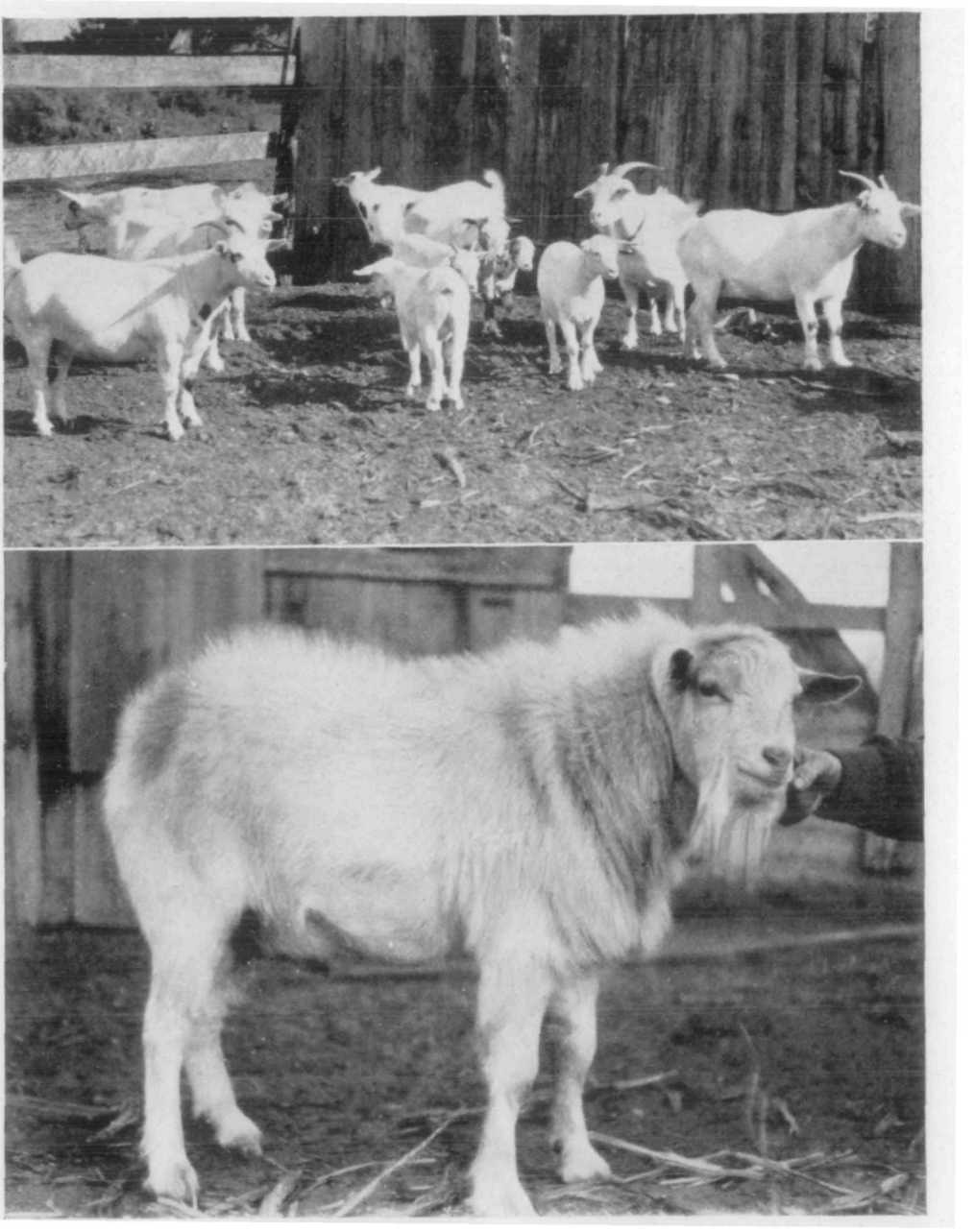
White and Plaskett reported that these goats were found in at least five counties in south central Tennessee (Marshall, Giles, Lawrence, Maury and Coffee) although they believed that the total number in those counties was not large. Their description of the behavior of these goats when frightened corresponds exactly with that observed in Texas but the observations of White and Plaskett were much more detailed and prolonged than ours were.

The Texas flock was brought directly from Giles county in central Tennessee. Dexler mentions a buck goat of this kind brought from Canada to Marshall county, Tennessee. The Texas A. & M. College also owned in its small zoo at College Station during about 1926 and 1927, one of these "nervous" goats of uncertain antecedents. No other cases of this kind have come to the writer's attention and, with the possible exception of the two individuals last mentioned, all seem to have come from a region in central Tennessee. Dr. White (in a recent letter to the writer) states that he observed a flock of goats like these in the summer of 1929 in Egypt between the Suez canal and the Palestine border. He also states that he shipped some of the Tennessee goats years ago to Professor Nagel, Nervous Disease Institute, Freiburg, Germany, and that Professor Nagel made quite a study of them.

Behavior of "Nervous" Goats

If these goats are suddenly surprised or frightened they become perfectly rigid. While in this condition they can be pushed or turned over as if they were carved out of a single piece of wood. This spell or "fit" usually lasts only a short time—about ten to twenty seconds. They recover the use of their muscles in the front end of the body first. Often one will see these goats, on recovering from fright, regain control of their forelegs enough to start running away, but the two hind legs will drag or move very stiffly as if the goat were still quite stiff from the loin back although fully in control of the muscles of its front legs, head, and neck. After having been thus frightened a goat cannot usually be frightened again, no matter how great the excitement may be, until it has had at least twenty or thirty minutes to rest. It is as if some substance were used up in a sort of nervous explosion and no further explosion could result until time enough had elapsed for a new supply of this substance to be formed.

* Formerly of the Texas Agricultural Experiment Station, now of the Iowa State College.



"NERVOUS" GOATS "AT REST"

Figure 1

Two views of members of the Lovell herd of "nervous" goats at Dickens, Texas. Except for this peculiarity the goats are normal. The trait is of economic importance because such goats do not climb and jump as readily as ordinary goats, even the thought of such a proceeding apparently bringing on a transitory paralysis!

FALLEN AND STIFF WITH FRIGHT

Figure 2

During the fright-induced paralytic fits the animals are as rigid as though carved from wood. The fit only lasts a short time, and the animal regains control of its front legs first, the hind legs dragging appreciably for a moment. No cases of death from fright have been authentically recorded in spite of abundant opportunities.

The worst frightened of the goats usually fall over to the ground (through starting to run and being caught off their balance when the "fit" strikes them ?) but some become rigid in a standing position and remain utterly motionless for many seconds. If pushed over while in this condition they fall down as rigidly and clumsily as if they were statues carved out of wood, but recover in a few seconds and start to walk off, dragging their hind legs slightly at first, but very quickly recovering complete control of their entire bodies.

Fright can be induced in several different ways. The principal element necessary seems to be surprise. A loud noise such as the report of a shotgun or the sound of a galvanized iron wash tub landing on the ground after being thrown a distance of some ten or twenty feet was one of the surest causes. Or if two or three men, who had crept up close without being observed, would suddenly rush toward the flock yelling and waving coats in the air a considerable number of the goats would be sure to fall to the ground and most of the rest would become rigid in the normal upright position for several seconds.

In the writer's experience the entire flock (numbering some twenty or more head) did not on any occasion all become rigid with fright at one time. However, those individuals which ran away freely on one occasion were even more likely than the others to fall into the "fit" if a second scaring of the flock could be arranged twenty or thirty minutes later. The percentage of the flock which would succumb on any one occasion seemed to depend most upon the length of time which had elapsed since the last previous surprise.

Occasionally a goat would have one of these "fits" when no general scaring of the flock was evident. Apparently it would suddenly see some object close to it or (in the case of young kids) would attempt to jump over a stick or small object in the path and would become rigid with fear mid-way in this adventure. Such spells were usually shorter and less intense than those which were produced by intentional noise and commotion. Sometimes a momentary stiffness and dragging of the hind legs would be almost the only outward sign of fright.

White and Plaskett report being told that on rare occasions these goats are

so badly frightened that they die; that is, are literally "scared to death," but did not see this themselves. Dexler obtained no confirmation of this and doubts that it ever occurs. No case of death from fright occurred in this Texas flock in spite of abundant opportunity. The first goats of the Texas flock were brought from Tennessee to Texas solely to uphold the veracity of the Texas farmer who had been telling neighbors about their existence in his boyhood home in Tennessee. Naturally their odd behavior was put to the test again and again. As a form of Sunday afternoon sport the scaring of these "nervous goats" may not have been quite equal to a circus for entertainment and diversion yet it had its attractions and was often practiced.

The man who brought these goats stated, that they were quite unable to jump over fences of ordinary height (a statement confirmed in all accounts) but would find holes through which to crawl under the fences as readily as a hog would. In a hilly region, with stone walls for fences, this peculiarity made these goats more desirable than ordinary goats which of course would delight to scramble on and over stone walls.

Origin of the Nervous Goats

About the origin of these Tennessee goats, the only account I have found is that by R. J. Goode, Gastonburg, Alabama, who states (in a letter to the writer) that the history is about as follows:

About 1880 a stranger came into a community in Marshall County, Tennessee, carrying with him four goats and what he described as a sacred cow. He went to a Dr. Mayberry and asked that he be allowed to keep his goats and cow at Dr. Mayberry's place and he, in return for his meals and keep for the animals, did odd chores for Dr. Mayberry. He stayed at Dr. Mayberry's place several months and later married an old woman in an adjoining community. He stayed during one farming season and at the end of the year came back to Dr. Mayberry and sold him the four goats. He then left with his cow without telling anyone where he had secured the goats or the cow nor anything about his personal history.

The peculiar behavior of these goats is almost unquestionably hereditary. The family history of the case and the fact that it persisted even when the animals were transferred from central Tennessee to the climate and forage of western Texas seem to attest its hereditary basis. From our own observations we can infer nothing as to the manner of its inheritance. All the animals of this flock showed this behavior and they were not crossed on other goats at all. Dexler believed (in 1908) that it Mendelized "— und bei Kreuzungen unregelmassig durchschlagt, also vermutlich mendelt."

Other Instances of Inherited Nervous Instability

Symonds reported[6] a family history in man of paralysis induced by excitement. This paralysis is made possible by an inherited instability of the nervous system. Cole and Ibsen have reported[1] a Mendelian recessive condition in the guinea-pig which they call congenital palsy and which is remotely similar to the condition here described in goats. They refer to certain conditions in other animals which conditions are primarily nervous disorders with an hereditary basis but which are distinct in symptoms from the "congenital palsy." Those include the familiar cases of waltzing mice and tumbling pigeons, epileptic seizures in man, and less well-known cases such as waltzing rabbits and rats. Cole and Steele have reported[2] the case of the waltzing rabbit in greater detail. Lord and Gates reported[5] a hereditary nervous peculiarity in mice which they call "shaker" and which is distinct both in appearance and in inheritance from the familiar "waltzing" in mice. They find that "shaker" is inherited as a simple Mendelian recessive.

It is difficult to avoid speculation as to what may be the mechanism in the nervous structures of these goats which causes them to react to fright in so peculiar and definite a way. Such

speculation, although otherwise fruitless, may lead to a deeper appreciation of the tremendous complexity and intricate interrelations of the parts which together make up such an animal as the (more or less) humble goat.

Literature Cited

1. COLE, L. J. and HEMAN IBSEN. 1920. Inheritance of Congenital Palsy in Guinea Pigs. *Amer. Nat.* 54:130-151.

2. COLE, L. J. and DEWEY STEELE, 1922. A Waltzing Rabbit. *Journal of Heredity* 13:290-294.

3. DEXLER, H. 1908. Die Schreckziegen Oder Fainting Goats. *Berlmer Tierarztliche Wochenschrift*, December 21, 1908, page 270.

4. HOOPER, J. J. 1916. A Peculiar Breed of Goats, *Science* n. s. 43:571.

5. LORD, ELIZABETH M. and GATES, WM. H. 1929. Shaker, a New Mutation of the House Mouse. *Amer. Nat.* 63:435-442.

6. SYMONDS, C. P. 1929. A Case of Family Periodic Paralysis with Attacks of Excitement. *Proc. Roy. Soc. Med.* 23:97.

7. WHITE, G. R. and PLASKETT, JOSEPH, 1904. "Nervous," "Stiff-Legged," or "Fainting" Goats. *American Veterinary Review* 28:556-560.

Books Received

BOOKS are acknowledged in this column as received, and such acknowledgment must be regarded as sufficient return for the courtesy of the sender. As far as space permits, books that contain material of special interest to the readers of the JOURNAL *will be reviewed in later numbers.*

PERSONAL AND COMMUNITY HEALTH, *by* C. E. TURNER, Professor of Biology and Public Health in the Massachusetts Institute of Technology. Pp. 443. 62 Illus. 3rd edition revised and enlarged. C. V. Mosby Co., St. Louis, 1930.

Chapters on the Hygiene of Reproduction (including heredity) and on Essential Facts of Immunity are of most interest to *Journal* readers.

SEVENTY BIRTH CONTROL CLINICS, *by* CAROLINE H. ROBINSON. Published under the auspices of the National Committee on Maternal Health. Pp. xx+352. Price $4.00. Williams and Wilkins Co., Baltimore. 1930.

A history of birth-control clinics here and abroad, and a discussion of the results of the birth-control movement to date. It is said to be "becoming eugenic"—rather a naive admission that much of the eloquence to date of the birth-controllers on the subject of eugenics has been rather heavily infected with (pardon the slang) huey.

THE COLOR OF LIFE IS RED, or the Way Up, *by* EDWARD L. HOLMAN. Pp. 104. Price $1.50. Richard G. Badger, Boston, 1930.

One of those inspirational books, in which red-blooded, shaggy-chested, Christ-like men of mixed metaphor rush out and tear large gaping holes in the environment any Monday morning.

MAGAZINE ARTICLE WRITING, *by* ERNEST BRENNECKE, JR., and DONALD L. CLARK. Pp. XI and 388. 9 Figures. Price $3.00. Macmillan Co., New York. 1930.

POULTRY HUSBANDRY, *by* MORLEY A. JULL, Senior Poultry Husbandman, U. S. Department of Agriculture. Pp. 639. 33 Chapters. 229 Illustrations. Price $4.00. McGraw-Hill Book Co., Inc., New York. 1930.

IDEAL MARRIAGE ITS PHYSIOLOGY AND TECHNIQUE, *by* TH. H. VAN DE VELDE, M. D., formerly Director of the Gynaecological Clinic at Haarlem. Translated by Stella Browne. Pp. 323. 4 Parts, 17 Chapters. 5 Color Plates. Price 25s. William Heinemann, Ltd., London. 1929.