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THE

## INDIAN VETERINARY JOURNAL

PUBLISHED BI-MONTHLY

(THE JOURNAL OF THE ALL-INDIA VETERINARY ASSOCIATION)

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Vol. XXVIII

JULY, 1951

No. 1

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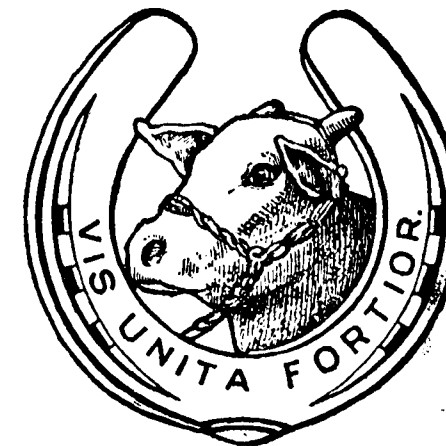
July 1951

No. 1

# THE INDIAN VETERINARY JOURNAL

[THE JOURNAL OF THE ALL-INDIA VETERINARY ASSOCIATION]

PUBLISHED ON ALTERNATE MONTHS



A BI-MONTHLY  
RECORD OF  
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SCIENCE.

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CAUSE OF THE  
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(ESTD. 1924)

EDITOR

**P. SRINIVASA RAO**, G.M.V.C., Madras.

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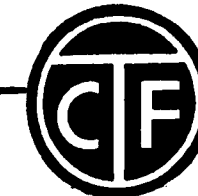
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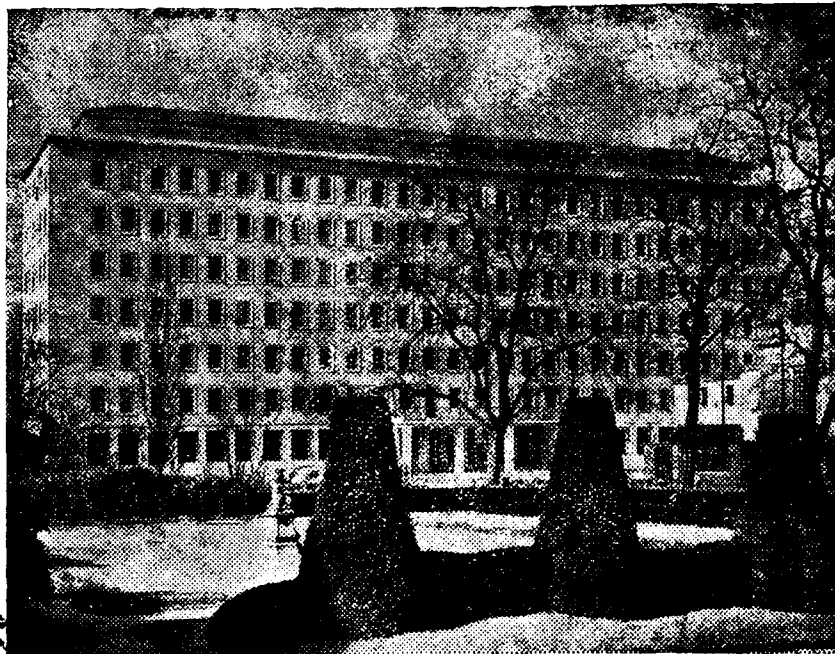
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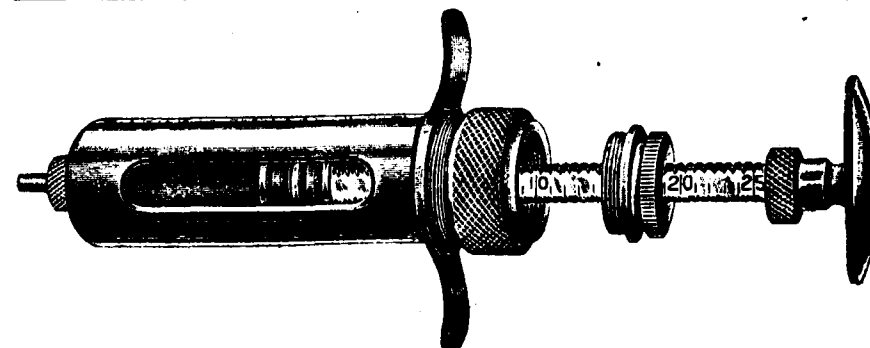
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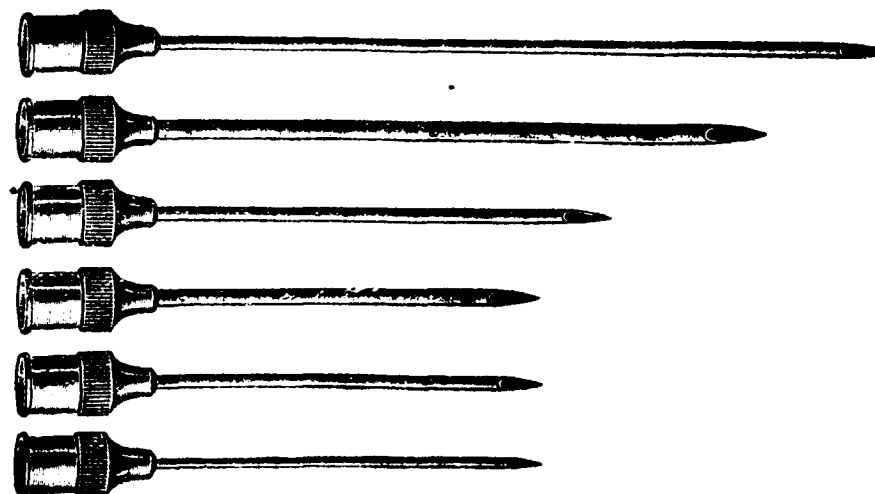


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JULY 1951

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its vaccinating properties, the strain of virus was found to have faded out. Inoue (1934) and Nakamura, Wagatsuma and Fukusho (1938) were successful in adapting and maintaining a strain of virus in rabbits. They observed that, cattle inoculated with the virus after the one hundredth passage, often survived after showing distinct symptoms. Nakamura and Fukusho (1939) observed definite lesions in the Peyer's patches and lymph glands in rabbits infected with lapinised rinderpest virus. Some workers have observed that all field strains of rinderpest virus could not be adapted to rabbits. Baker (1946) observed that in order to increase the pathogenicity of bull virus for rabbits it was necessary to carry the virus alternately in rabbits and susceptible calves. Haddow and Idnani (1947) while passaging rinderpest virus through rabbits observed that for successful adaptation to rabbits it was necessary to select a virus of high virulence as tested in cattle. Working with such a strain of virus they observed attenuation by the 50th rabbit passage after which the virus was used to vaccinate bulls, buffaloes, and goats with no ill effects. This rabbit-adapted rinderpest virus was, however, found to have lost its antigenic properties by the 176th passage.

Further attempts have since been made at the Indian Veterinary Research Institute to evolve an Indian strain of rabbit-adapted and fixed virus for general use in the field. In the meantime a strain of lapinised rinderpest virus Nakamura III, which had undergone 630 rabbit passages in September 1945, was available at the National Research Bureau of Animal Industry, Nanking, China. Investigations on the utility of this strain of virus for the control and eradication of Rinderpest were undertaken in China (Cheng & Fischman, 1949) and other countries with the help of financial and technical assistance from the UNRRA and the Food and Agriculture Organisation of the United Nations.

To assess the efficacy of lapinised rinderpest virus Nakamura III in susceptible animals in India, a lyophilised sample of the 795th rabbit passage was obtained by this Institute in August 1948 from the National Research Bureau of Animal Industry, Nanking. This strain of virus has undergone 170 further passages in our laboratory. Some trials of vaccination of susceptible animals with this strain have been carried out under laboratory and field conditions in India as per details given below.

#### Preparation of Vaccine

- (a) *Supply of rabbits.*—For a successful maintenance of the virus a regular supply of rabbits of more than 6 months of age, free from disease and in good condition, is necessary. Though rabbit breeding is carried out in this Institute, the number available is generally not sufficient to meet all the demands of the various experiments, and hence is supplemented by purchase of young

rabbits bred by local people. We were thus obliged to use any rabbits available for our work on rinderpest and could not stick to one particular breed. A large proportion of the rabbits available were usually infected with coccidiosis which necessitated their treatment with sulphamethazine for a week prior to bringing them under rinderpest experiments.

- (b) *Reaction and sub-inoculation in rabbits.*—The record of temperature reactions maintained for nearly 170 serial passages indicates that rabbits infected with lapinised virus showed a sharp rise of temperature 36-48 hours after inoculation, followed by a sharp decline (Fig. 1.). Though the rabbits used for this work did not all come from the same source, the reaction observed was almost consistent. During fever the rabbits were found to be dull, and off feed and they evinced hurried breathing. The sharp rise and fall in body temperature resulted in the death of a small percentage (4-10 per cent) of rabbits before the virus was harvested. The rabbits, whether infected with coccidia or not, which were not killed for collection of virus invariably died by the fourth to sixth day, whereas Cheng and Fischman (1949), working with the same strain of virus at the National Research Bureau of Animal Industry, Nanking, found that the rabbits recovered as a rule, except when infected with coccidiosis or had other complications. In these cases, a mortality as high as 60 per cent was found.

For the successful maintenance of the virus, the rabbits were killed 60-72 hours after inoculation by bleeding from the heart under sterile conditions. Soon after killing, the abdomen was stripped open and the spleen and the mesenteric glands were collected. A suspension of 1 in 100 of the spleen and lymph glands in the blood of the rabbit was made, and sub-inoculation carried out by intravenous injection of healthy rabbits with 1 c.c. of this suspension.

Post-mortem examination of the rabbits invariably showed numerous dull, whitish and granular foci in lymphoid tissues, especially in the Peyer's patches, caecum and the mesenteric lymph glands. In rabbits infected with coccidia and used for the virus passage, the reaction was found to have damped down and the intestinal lesions were not typical. The virus from such cases was not used for sub-inoculation or vaccination.

- (c) *The vaccine.*—The lapinised rinderpest vaccine used in all the experiments for purposes of immunisation consisted of a 1 in 100 suspension of spleen and lymph glands of the rabbits diluted to five times with normal saline to make a final concentration of 1 in 500, and the dose employed was 1 c.c. for each animal.

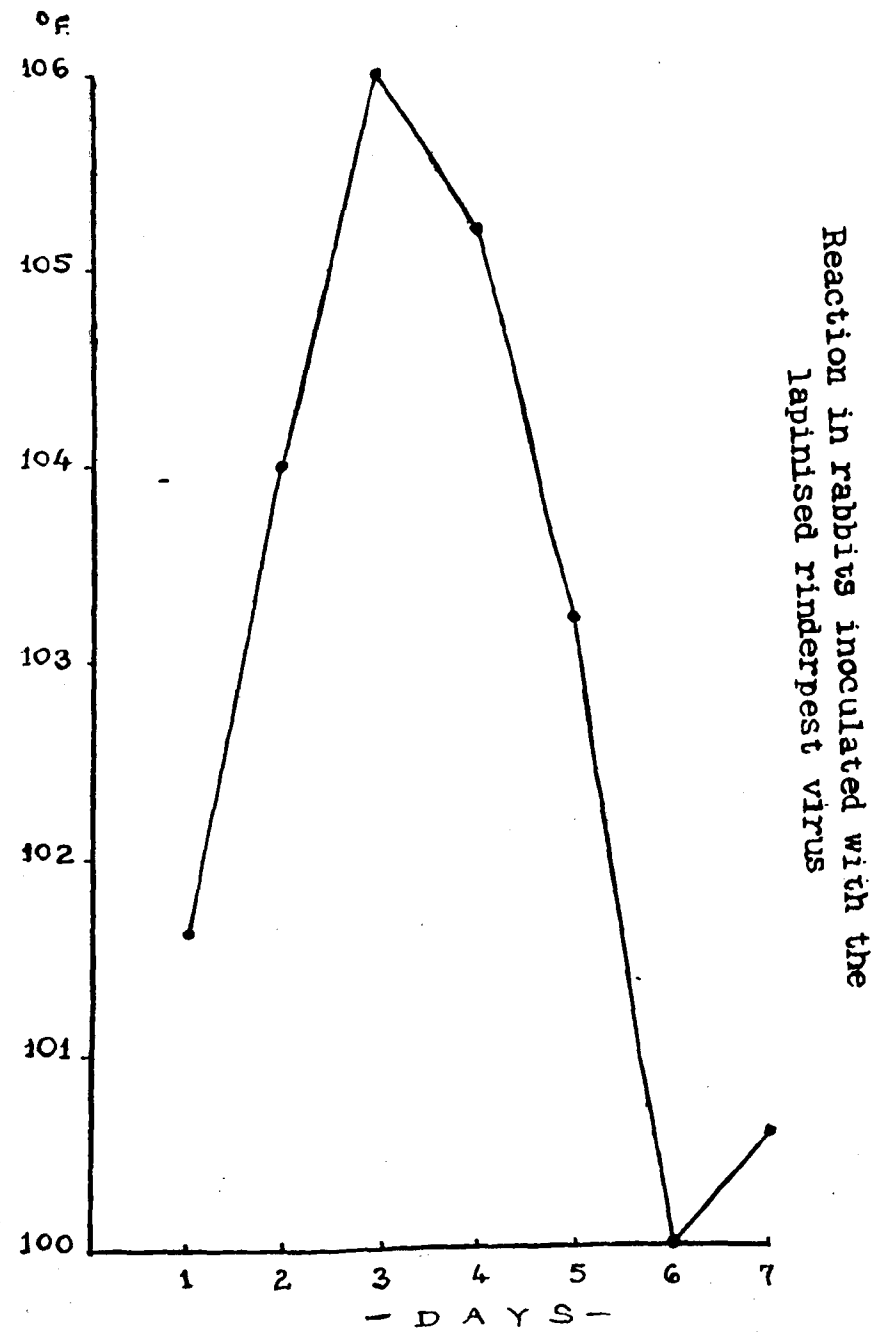


Fig. I

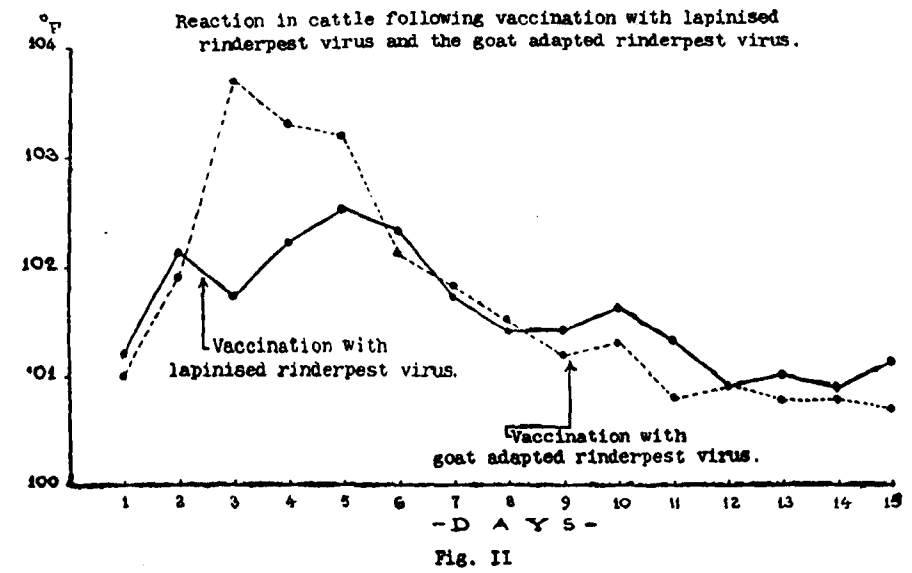


Fig. II

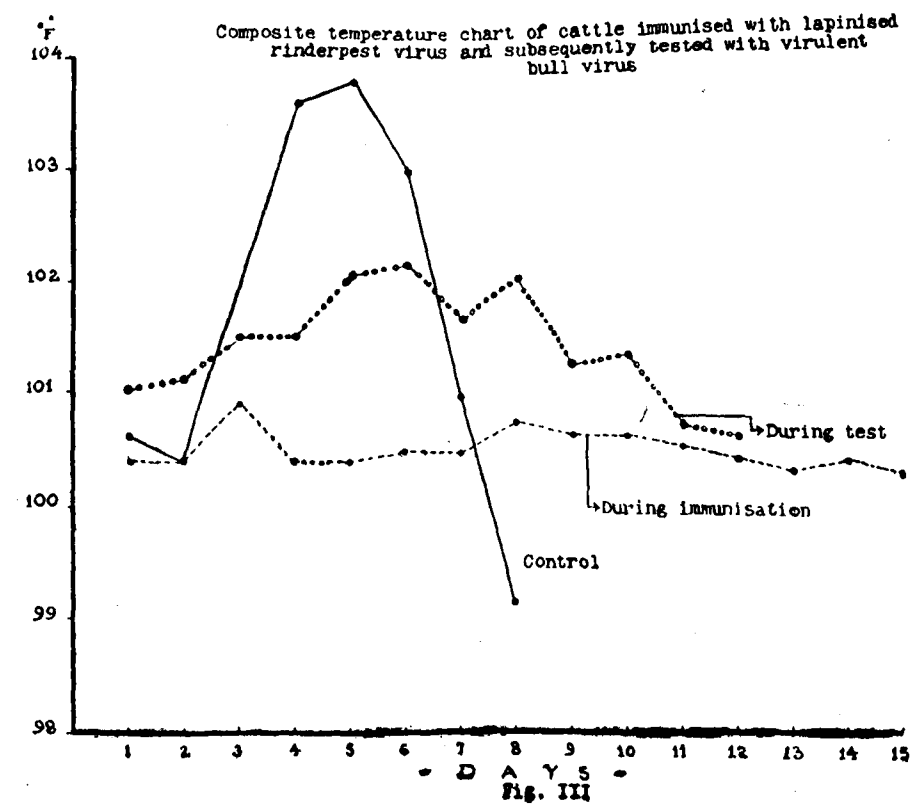


Fig. III

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## General Articles

### THE USE OF LAPINISED RINDERPEST VACCINE (NAKAMURA III) IN INDIA—A PRELIMINARY REPORT\*

BY

S. DATTA, C. SEETHARAMAN AND V. R. RAJAGOPALAN,  
*Indian Veterinary Research Institute, Mukteswar-Kumaun.*

Large scale immunisation against Rinderpest was rendered possible with the evolution of the goat-adapted rinderpest virus (Edwards, 1927). The virus so elaborated, while retaining its specific pathogenicity for goats, was of value for protecting cattle and is still largely in use in India. Although in Indian cattle the goat-adapted virus produces only a mild thermal reaction, imported cattle, water buffaloes and native cattle with an admixture of foreign blood tend to show a severe thermal reaction and, depending on the local conditions, even deaths occur among a small percentage of the vaccinated animals. To prevent the undesirable reaction, resort has to be taken to the serum-simultaneous method of immunisation which, besides being costly, often results in ineffective vaccination and "blocked-out reaction". Further, Crawford (1947) apprehended that the use of goat virus in India might have been responsible for establishing epizootic disease in goats, and that this in turn might have been responsible for the spread of a form of rinderpest in cattle. In elucidation of Crawford's observations, however, the results of experiments on the infectivity of goat virus for cattle and goats proved that through this medium (Seetharaman, 1948) under ordinary field conditions there appeared to be no real danger of the spread of the disease. However, in view of the limitations of the goat-virus, several attempts have been made to evolve a safer and cheap vaccine for use in all breeds of cattle, buffaloes, sheep and goats.

### Historical

Edwards (1924, 1927) demonstrated that rinderpest virus could be adapted to rabbits, but before experiments could be undertaken to assess

\* Paper read at the Indian Science Congress, 1951.

Sri V. R. Rajagopalan is now the Director of Animal Husbandry, Madras.

## Experimental

(a) *Vaccination of cattle.*—Preliminary experimental vaccination was carried out in over six months old calves of various breeds, viz., the Hill, Afghan and the English-cross. In order to compare the reaction produced in calves by the lapinised virus with that produced by the goat virus, two lots of animals each consisting of the same number of animals of the same age and breed were vaccinated, one with the lapinised virus and the other with the goat virus. From the temperature reactions (Fig. 2) it would be seen that whereas immunisation with goat-adapted virus produced an appreciable thermal reaction, with lapinised rinderpest virus only a very mild (rise of 1°F) reaction was produced and the animals recovered uneventfully. These calves were tested for immunity for periods varying from 15 days to 15 months after immunisation (Table 1) and the immunity as judged from the thermal reaction (Fig. 3) was found to be strong.

In view of the encouraging results obtained with calves, vaccination with lapinised virus was extended to adult bulls and cows of the Institute experimental dairy herd at Izatnagar. In all 14 cows of Afghan and Haryana breeds were immunised and their immunity has so far been tested up to nine months. The milk record of the fourteen animals undergoing vaccination was studied and the statistical analysis (Table 2) indicated no significant difference in milk yield after vaccination. The general condition and the body weight of the animals were also well maintained during the course of vaccination and no change was observed.

(b) *Vaccination of buffaloes.*—Indian Water-buffaloes are very susceptible to rinderpest and inoculation of goat virus alone produces in them a severe reaction followed by high mortality (Gopalakrishnan 1945). As an experimental measure six buffalo calves of more than six months of age were vaccinated with lapinised rinderpest virus and the reaction observed. An analysis of the reaction (Fig. 4) showed that there was only a mild thermal reaction during immunisation. The animals were subsequently tested with virulent virus and found to be immune whereas the control reacted severely (Fig. 4). In a second experiment seven adult buffaloes were vaccinated at Izatnagar with no untoward reaction.

(c) *Vaccination of sheep and goats.*—Owing to its specific pathogenicity for these species, goat-adapted rinderpest virus has been found to be unsuitable as a vaccine for sheep and goats unless a heavy dose of antiserum is also administered simultaneously.

TABLE I  
Vaccination of cattle, buffaloes, sheep and goats with lapinised rinderpest vaccine.

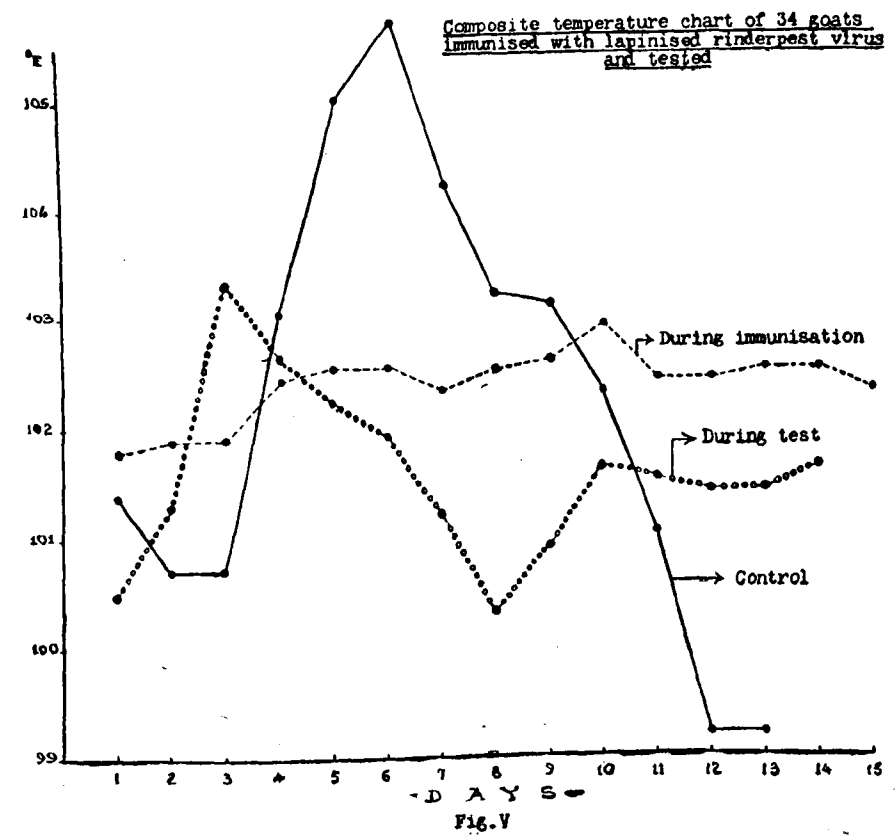
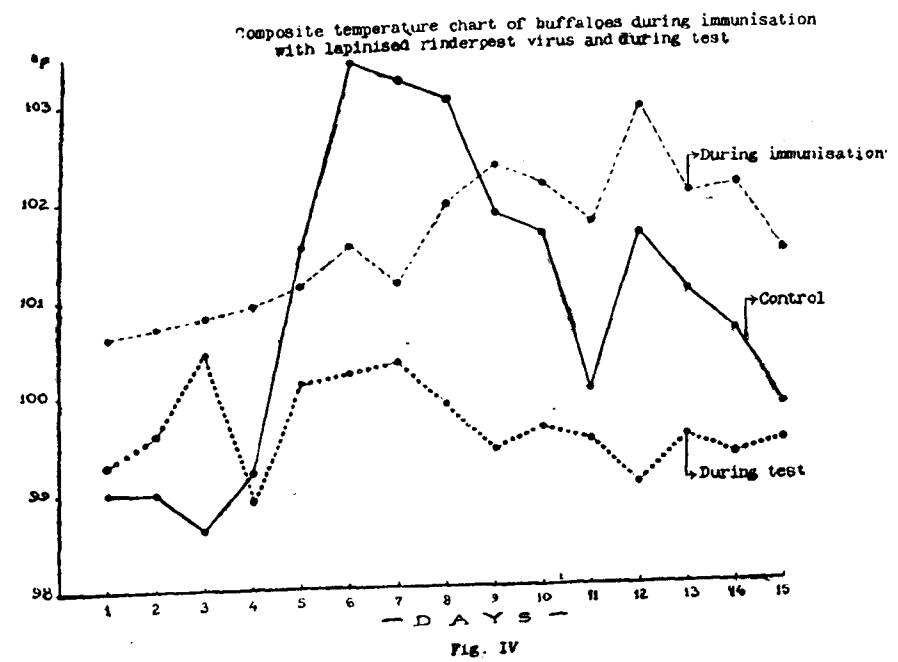
| Rabbit<br>Passage<br>number | Species and<br>number of animals<br>vaccinated | Reaction after vaccination                              | Immunity test |               |        | Remarks                                                |
|-----------------------------|------------------------------------------------|---------------------------------------------------------|---------------|---------------|--------|--------------------------------------------------------|
|                             |                                                |                                                         | Duration      | Number tested | Result |                                                        |
| 1                           | 2                                              | 3                                                       | 4             | 5             | 6      | 7                                                      |
| 1                           | Bulls ... 2                                    | No reaction in one. High thermal reaction in the other. | 15 days       | 1             | Immune | *Died of Theileriasis on the 9th day                   |
|                             | Goat ... 1                                     | No reaction                                             | 15 days       | 1             | Immune |                                                        |
| 9                           | Calves ... 3                                   | No reaction                                             | 7 months      | 2             | Immune | Only 2 calves were available 2 goats died before test. |
| 14                          | Calves ... 5                                   | No reaction                                             | 6 "           | 4             | "      | Not yet tested                                         |
| 19                          | Goats ... 2                                    | Thermal reaction (104°F.) in one and none in the other  | 1 month       | 1             | Immune | One goat died before test.                             |
|                             | Sheep ... 2                                    | No reaction                                             | 1 month       | 2             | Immune |                                                        |
| 20                          | Calves ... 8                                   | No reaction                                             | 12 months     | 5             | Immune | Three awaiting test                                    |
| 26                          | Goats ... 12                                   | No reaction                                             | 5 months      | 6             | Immune | Others awaiting test                                   |
|                             | Sheep ... 12                                   | "                                                       | 6 months      | 6             | "      | "                                                      |
| 30                          | Bull ... 1                                     | No reaction                                             | 17 days       | 1             | Immune | "                                                      |
| 40                          | Cows ... 14                                    | No reaction                                             | 3 months      | 3             | Immune |                                                        |
|                             |                                                |                                                         | 9 months      | 9             | "      | Five awaiting test.                                    |
| 60                          | Calves ... 6                                   | No reaction                                             | 17 days       | 1             | Immune | awaiting test                                          |
|                             | Bull ... 1                                     | "                                                       |               |               |        |                                                        |
| 60                          | Calves ... 6                                   | No reaction                                             | 17 days       | 1             | Immune | Awaiting test                                          |
|                             | Bull ... 1                                     | "                                                       |               |               |        |                                                        |
| 62                          | Cows ... 11                                    | No reaction                                             |               |               |        | Awaiting test                                          |
|                             | Calves ... 11                                  | "                                                       |               |               |        |                                                        |
| 64                          | Buffaloes... 6                                 | No reaction                                             | 15 days       | 6             | Immune |                                                        |
| 70                          | Buffaloes... 7                                 | No reaction                                             |               |               |        | Awaiting test                                          |
|                             | Goats ... 12                                   | "                                                       |               |               |        |                                                        |
| 85                          | Buff. calves 63                                | No reaction                                             |               |               |        | Awaiting test                                          |
|                             | Calves ... 29                                  | "                                                       |               |               |        |                                                        |
| 120                         | Bull ... 1                                     | No reaction                                             | 15 days       | 1             | Immune |                                                        |
| 131                         | Calf ... 1                                     | No reaction                                             |               |               |        | Awaiting test                                          |
| 136                         | Cows ... 4                                     | No reaction                                             | 15 days       | 4             | Immune |                                                        |

TABLE II  
Average daily milk yield (in lbs.) of 14 cows before and after inoculation with lapinised rinderpest virus.

|                      |      |      |      |      |      |      |      |     |     |     |      |     |     |      |
|----------------------|------|------|------|------|------|------|------|-----|-----|-----|------|-----|-----|------|
| Identity No. of cows | 443  | 444  | 445  | 446  | 447  | 448  | 449  | 450 | 451 | 452 | 453  | 454 | 455 | 456  |
| Before inoculation   | 10.6 | 9.4  | 8.6  | 13.7 | 10.0 | 7.4  | 11.5 | 7.5 | 8.8 | 8.4 | 11.2 | 7.4 | 8.8 | 6.3  |
| After inoculation    | 11.2 | 10.3 | 9.9  | 12.2 | 10.0 | 7.6  | 11.3 | 6.8 | 8.2 | 7.3 | 10.0 | 5.8 | 8.3 | 7.7  |
| Difference           | -0.6 | -0.9 | -1.3 | 1.5  | 0.0  | -0.2 | 0.2  | 0.7 | 0.6 | 1.1 | 1.2  | 1.6 | 0.5 | -1.4 |

Mean difference = 0.214 lb., Standard error = 0.265 lb.,  $t = 0.808$ .

DIFFERENCES ARE NOT SIGNIFICANT.



(Srikantiah, 1934). Sheep, depending upon the breed, can be immunised with impunity by the serum simultaneous method using goat virus (Lall, 1947). In view of the possibility that virulent rinderpest ox virus may, under field conditions, lurk in the system of sheep and goats and thus be a source of spread of the disease, it is imperative that immunisation of sheep and goats be undertaken. In the absence of a cheap and efficient vaccine, immunisation of sheep and goats by the serum-simultaneous methods is rendered prohibitive because of its high cost. In order to assess the utility of lapinised virus as a suitable vaccine for sheep and goats, 34 goats and 14 sheep were immunised. The vaccinated animals, during the period of observation, showed only a mild thermal reaction (Figs. 5 & 6). They were tested for immunity after periods ranging from 1 to 6 months and were found to be immune.

#### Field Trials

In view of the promising results obtained under laboratory conditions, attempts were made to extend the use of this virus to the field. The first field trial involving 63 heads of Haryana and Sahiwal cattle and 29 Murrah buffaloes was undertaken at the Bhadrak Dairy Farm, Lucknow, during the month of July 1949. Rabbits inoculated with the lapinised rinderpest virus were taken from Mukteswar and the vaccine was prepared on the spot. The vaccine produced only a slight reaction in these animals and no systemic disturbance was observed.

In order to study the effect of the lapinised virus on different breeds of animals and in various parts of the country, field trials of vaccination were extended to Madras and East Punjab. In Madras 313 cattle were vaccinated under field conditions in January 1950. At the Government Livestock Farm, Hissar, Punjab, 464 cattle (Hissar-Hansi breed), 172 sheep (Hissardale and Lohi breed) and 74 goats (Jamnapari breed) were vaccinated in May 1950. None of the vaccinated animals showed any untoward reaction except a mild thermal reaction. It is proposed to carry out tests for the duration of immunity in these animals in due course.

#### Discussion

From the above results on the use of lapinised rinderpest vaccine and the goat-adapted rinderpest virus, under both laboratory and field conditions, it is evident that the lapinised vaccine produced only a very mild thermal reaction in cattle, buffaloes, sheep and goats, there was no adverse effect on the milk yield of animals undergoing vaccination, and the immunity so far tested has been found to be solid up to fifteen months. This product, thus, has all the requisite qualities for use in the control and eradication of rinderpest.

With the elaboration of the lapinised rinderpest vaccine, the control of rinderpest has become a practical possibility, but before it is adopted as a matter of routine some further extensive field trials will have to be carried out to assess the type of reaction in different breeds of cattle, buffaloes, sheep and goats in different parts of the country. Secondly, since the requisite large numbers of rabbits to meet the needs of this vast country may not be readily available, investigations on the possibilities of evolving "reactor" vaccines have to be carried out. Cheng and Fischman (1949) observed that lapinised rinderpest virus dried in vacuum from a frozen state remained viable for 105 days when stored at 4°C and that the reconstituted vaccine remained potent for at least 48 hours. Desiccation of the product was thus observed to be an efficient method of preserving the virus. The scope of using such lapinised vaccine in India is under investigation.

In consequence of the apparently negligible reaction in animals undergoing vaccination with the lapinised vaccine as compared to the reaction with the goat-adapted rinderpest virus, the field worker has no means of judging the potency of the lapinised vaccine and it is therefore necessary that the vaccine given in his hands should be fully potent, lest he should lose confidence in the product. Two main factors that require attention in connection with the manufacture of the lapinised vaccine are (1) that the manufacture of the vaccine should be in the hands of those who are well-acquainted with the typical lesions produced in the donor rabbits and can interpret them correctly and (2) that each brew and sample of the vaccine reaches the vaccinator in a state of high potency. Indiscriminate use of lapinised rinderpest virus will not in the least help in the control of rinderpest.

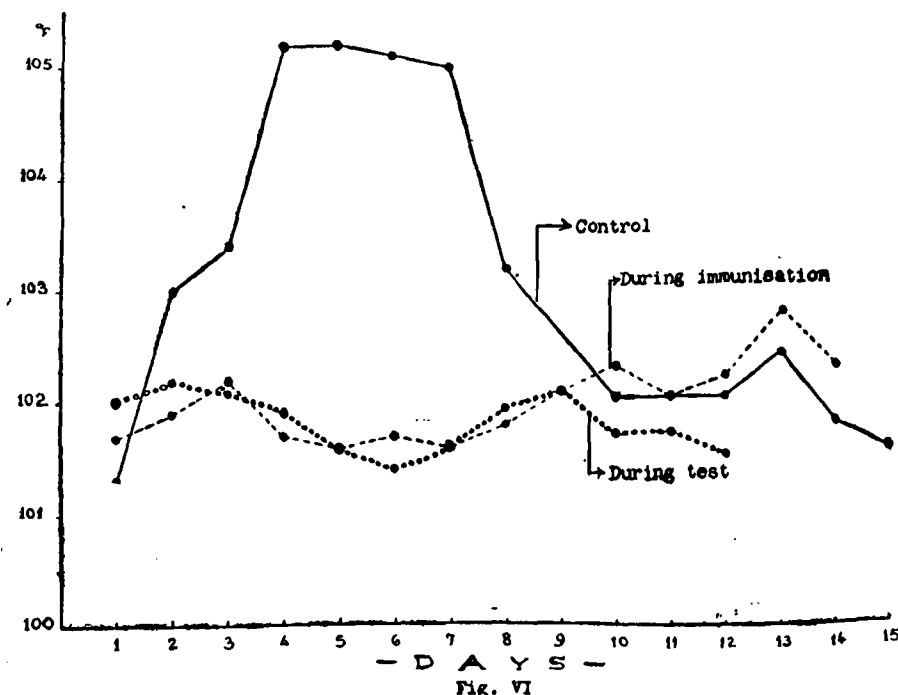
#### Summary

The 795th passage of lapinised rinderpest virus Nakamura III obtained from the National Research Bureau of Animal Industry, Nanking, was found to maintain its antigenic properties even after 170 further rabbit passages. Immunisation of 841 cattle including some cows in milk, 29 buffaloes, 108 goats and 186 sheep with the lapinised vaccine was undertaken. In all these species of animals, vaccination with lapinised virus produced only very mild thermal reaction and did not interfere in any way with the milk yield or general health of the animals undergoing vaccination. The immunity conferred was tested up to fifteen months (so far tested) and found solid.

#### Acknowledgments

The authors wish to thank Dr. K. V. L. Kesteven, Chief of Animal Industry Branch, Agricultural Division, Food and Agriculture Organisation of the United Nations for arranging the supply of the strain of the required virus; the Directors of Animal Husbandry, Uttar Pradesh and Madras and

Composite temperature chart of 14 sheep immunised with lapinised rinderpest virus and tested



the Superintendent, Government Livestock Farm, Hissar, for giving facilities to conduct the field trials; to Mr. S. Sen, Statistician of the Institute for the analyses of data, and to Messrs. P. R. Nilakantan and N. S. Datt for technical assistance.

#### REFERENCES

- Baker, J. A. (1946). *Amer. J. Vet. Res.* **7**, 179-182.  
 Bawa, H. S. (1939). *Indian. J. Vet. Sci.* **9**, 195-207.  
 Cheng, S. M. and Fischman (1949). *Food and Agriculture Organisation, Agricultural studies No. 8*, 47-63.  
 Crawford, M. (1947). *Vet. Rec.* **59**, 537-542.  
 Edwards, J. T. (1924). *Ann. Rep. Imp. Inst. Vet. Res.* 1932.  
 Edwards, J. T. (1927). *Trans. Far. East. Assoc. Trop. Med.* **3**, 699.  
 Gopalakrishnan, V. R. (1945). *Indian. J. Vet. Sci.* **15**, 253-255.  
 Haddow, J. R. and Idnani, J. A. (1947). *Indian. J. Vet. Sci.* **17**, 1-11.  
 Inoue, T. (1934). *J. Jap. Soc. Vet. Sci.* **13**, 113.  
 Lall, H. K. (1947). *Indian. J. Vet. Sci.* **17**, 11-22.  
 Nakamura, J., Wagatsuma & Fukusho, K. (1938). *J. Jap. Soc. Vet. Sci.* **17**, 185-204.  
 Nakamura, J. & Fukusho, K. (1939). *J. Jap. Soc. Vet. Sci.* **18**, 75.  
 Seetharaman, C. (1948). *Indian. J. Vet. Sci.* **18**, 68-76.  
 Srikanthiah, G. N. (1934). *Indian. Vet. J.* **11**, 104-103.

## IMMUNITY IN FOWLS FOLLOWING VACCINATION AGAINST RANIKHET DISEASE

By

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This virus disease of fowls causing heavy losses to poultry farmers was first observed by Doyle (1927) in England. Later, a similar disease occurred in many other countries of the world. In India, the disease was first reported in 1928 by Edwards in Ranikhet, a town in the Uttar Pradesh. Subsequently Cooper (1931) observed that the Indian virus was identical with the English or other strains causing similar disease.

Since 1927 much attention has been paid to evolve suitable methods of prophylaxis. In the absence of a suitable vaccine, the poultry farmers were advised to adopt general hygienic measures. In England, the disease is a notifiable one and requires compulsory slaughter of all ailing and incontact birds and adoption of strict quarantine measures. Since the method adopted elsewhere was not practicable in India, Haddow (1937) suggested the splitting of the flocks into small groups and distributing them as far away from one another as possible and keeping separate attendants and utensils, etc.

The necessity for evolving a suitable vaccine has all along been keenly felt, and intensive work has been done in India and other countries during the last decade or so. The first stage in the development of a prophylactic was the evolution of a vaccine treated with chemicals like phenol, carboglycerine, ether, chloroform, toluol and formalin, etc., and dyes such as crystal violet, methylene blue, etc. Of all the chemically treated vaccines, the formalised vaccine (Nakamura *et al*, 1937), and the alumina gel adsorbed and formalin treated vaccine (Haddow and Idnani, 1941) were found to be somewhat satisfactory, although the duration of immunity conferred by the use of any of these vaccines varied from about 15 days to 4 months (Brandly *et al*, 1946). With the gel adsorbed vaccine, however, another disadvantage was that it would not keep well under atmospheric conditions and had to be kept at refrigerator temperature. However, the formalised vaccine has been found to be of value in creating an immune belt to check the spread of the disease, and it is still used in some of the foreign countries like America (Francis, 1948).

The epoch-making finding of Iyer and Dobson (1940) that the serial cultivation of suitable strains of Ranikhet (Newcastle) disease viruses on the chorio-allantoic membrane of 10 day old embryonating eggs attenuated the viruses for fowls has now made the control of the disease practicable.

Working on similar lines with an Indian strain of virus obtained from natural outbreaks in the field, Haddow and Idnani (1946) evolved a dependable egg cultivated vaccine. The vaccine consists of the chorio-allantoic fluid from embryonating eggs in which the vaccine virus has been propagated. The advantages of this vaccine are that it is efficient, cheap and innocuous and immunity is established in 48 hours due to the phenomenon of interference (Haddow, 1946; Beandeth *et al* 1947; Daubney and Mansy, 1948.)

Since the introduction of this vaccine, thousands of birds have been vaccinated in this country and some foreign countries, notably Ceylon, Burma, Malaya, China, Egypt, Israel, etc. To these countries, the vaccine was supplied initially by air from India and later it was produced locally with the Mukteswar strain of vaccine-virus.

A notable feature of Ranikhet disease infection is the strong and lasting immunity which follows an attack. Although the underlying principle in adopting vaccination of susceptible birds with a live attenuated virus is to induce a mild infection producing thus an active immunity, it is of interest to assess the nature and duration of immunity following vaccination. With this end in view, some experiments the results of which are tabulated in this article were planned by Haddow and Idnani (1946).

### Experimental

During the period 1944-45 when this vaccine was just evolved and was in the experimental stage, vaccination of all susceptible birds of more than six weeks of age belonging to the Poultry Research Section at Izatnagar was undertaken. In order to test the duration of immunity, batches of birds which were vaccinated on various dates were properly numbered to enable following them up for immunity tests. Nearly 300 such birds were brought to Mukteswar and kept in the different outkraals to eliminate the possibility of the birds coming in contact with fowls suffering from or recovered from a natural or artificial infection. The birds were brought to the experimental sheds for immunity tests at intervals of six months. The virus used in these tests was a virulent Ranikhet disease virus maintained by regular monthly passages in adult susceptible fowls. The potency of this virus, when grown on embryonating eggs, was such that 1 c.c. of a  $10^{-6}$  dilution would kill a fowl. The test dose used was 1 c.c. of a  $10^{-2}$  dilution of spleen tissue.

*Immunity tests of birds vaccinated against Ranikhet disease.*

| Number of birds tested | Date of immunisation | Interval between immunisation and challenge | Test dose                            | Reaction     | Remarks                                                                           |
|------------------------|----------------------|---------------------------------------------|--------------------------------------|--------------|-----------------------------------------------------------------------------------|
| 22                     | 16-8-1944            | 2 years                                     | 1 c.c. of a $10^{-2}$ virulent virus | 21 S<br>1 D  | Subinoculation -ve for R. D. Control F. 2844. Died 6th day Typical R. D.          |
| 25                     | "                    | 2 years<br>6 months                         | "                                    | 23 S<br>2 D  | Both showed typical lesions of R. D. Control F. 516. Died 5th. day. Typical R. D. |
| 17                     | 28-5-1945            | 3 years                                     | "                                    | 16 S<br>1 D  | Biological test -ve for R. D. control F. 68. Died 6th day. Typical R. D.          |
| 25                     | 16-2-1946            | 3 years<br>6 months                         | "                                    | 24 S<br>1 D  | Showed typical lesions of R. D. Control F. 754. Died 4th day. Typical R. D.       |
| 6                      | 23-4-1946            | 3 years<br>9 months                         | "                                    | All survived | Control F. 8001 Died 5th day. Typical R. D.                                       |
| 34                     | 16-2-1946            | 4 years.                                    | "                                    | 33 S<br>1 D  | Biological test -ve for R. D. Control F. 1744. Died 6th day Typical R. D.         |

The above table indicates that there was a breakdown of immunity in 2 out of 25 birds after 2 years and six months and in 1 out of 25 after three years and six months whereas 34 birds were found to be strongly immune after four years. The small percentage of breakdown of immunity at  $2\frac{1}{2}$  years and  $3\frac{1}{2}$  years, might be due to ineffective primary vaccination in so far as the majority of the birds tested at these periods were immune and all the birds tested at later periods were found to be immune.

### Summary

The duration of immunity following vaccination of chicks of 6-8 weeks of age using the egg propagated attenuated virus (Mukteswar strain) was tested. It was observed that all the 22 birds tested after 2 years, 23 out of 25 birds tested after  $2\frac{1}{2}$  years, all the 17 birds tested after 3 years, 24 out of 25 birds tested after  $3\frac{1}{2}$  years and all the 34 birds tested after 4 years were immune. Although the duration of immunity was tested up to 4 years, it is significant that the birds vaccinated were immune for the full span of their utility period.

### Acknowledgment

The author is grateful to Messrs J. R. Haddow and J. A. Idnani, lately of the Indian Veterinary Research Institute, who initiated the experiment,

to Mr. M. K. Srinivasan, Veterinary Officer, for maintaining the birds in the outkraals and to Dr. S. Datta, Director Indian Veterinary Research Institute for his continued interest.

## REFERENCES

1. Beaudette *et al* (1949). *Cornell Vet.* **39**, 302.
2. Brandly *et al* (1946). *Am. J. Vet. Res.* **7**, 307.
3. Cooper, H. (1931). *Indian J. Vet. Sci.* **1**, 107.
4. Daubney, R. and Mansy, W. (1948). *J. Comp. Path.* **58**, 189.
5. Doyle, T. M. (1927). *J. Comp. Path.* **40**, 144.
6. Edwards, J. T. (1920). *Rep. Imp. Inst. Vet. Res. Mukteswar.*
7. Francis, J. (1948). *Lancet*, **1**, 377.
8. Haddow, J. R. (1941). *Indian Eng.* **2**, 345.
9. Haddow, J. R. and Idnani, J. A. (1941). *Indian J. Vet. Sci.* **11**, 113.
10. Haddow, J. R. and Idnani, J. A. (1946). *Indian J. Vet. Sci.* **16**, 45.
11. Iyer, S. G. and Dobson, N. (1940). *Vet. Rec.* **52**, 889.
12. Nakamura *et al* (1937). *J. Jap. Soc. Vet. Sci.* **16**, 55.

## THE TECHNIQUE OF NEEDLE BIOPSY OF THE LIVER AND ITS USE IN THE DIAGNOSIS OF LIVER DISEASES IN DOGS

BY

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In the study of the diseases of the liver in human beings a large number of tests, some involving elaborate laboratory procedures, have been devised to evaluate the functional status of the organ. These tests, though useful and informative, do not always give us a very reliable diagnosis, especially in the absence of clear and well cut clinical symptoms. This has lead medical investigators to adopt methods to obtain actual samples of the diseased liver and to clinch diagnosis on the basis of histo-pathological examination of the tissue thus obtained. This procedure gives us a reliable and conclusive means of diagnosing any diseased condition of the liver. Thus a new approach to the problem of diagnosis of the liver diseases is found in the technique of liver biopsy and the method is being now used widely in many of the up-to-date hospitals. Really this technique is not a new one, for in the medical literature of the late 19th century, we find mention of this method; but no notice was taken of it, till the publication of a series of 160 aspiration biopsy of the liver by Iversen & Rohlin (1939).

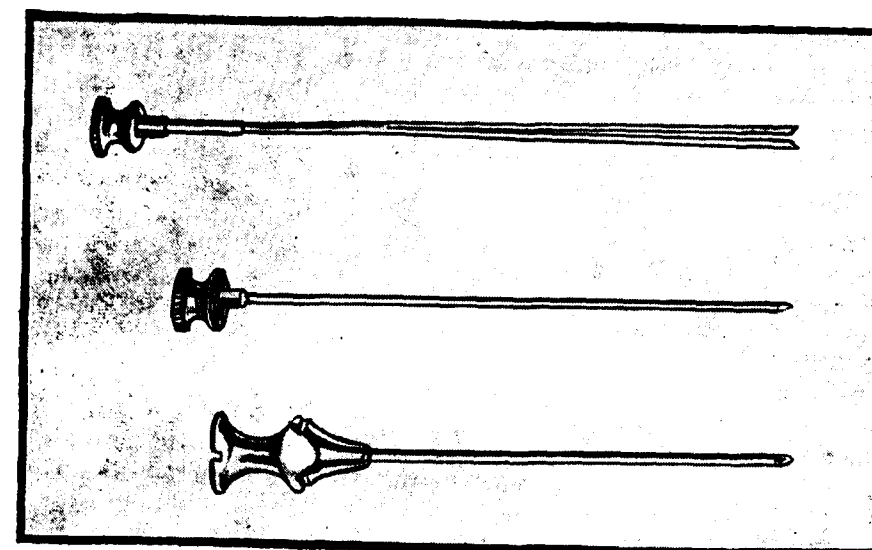


Fig. 1

Figure to show the three parts of the Vim-Silverman Needle.

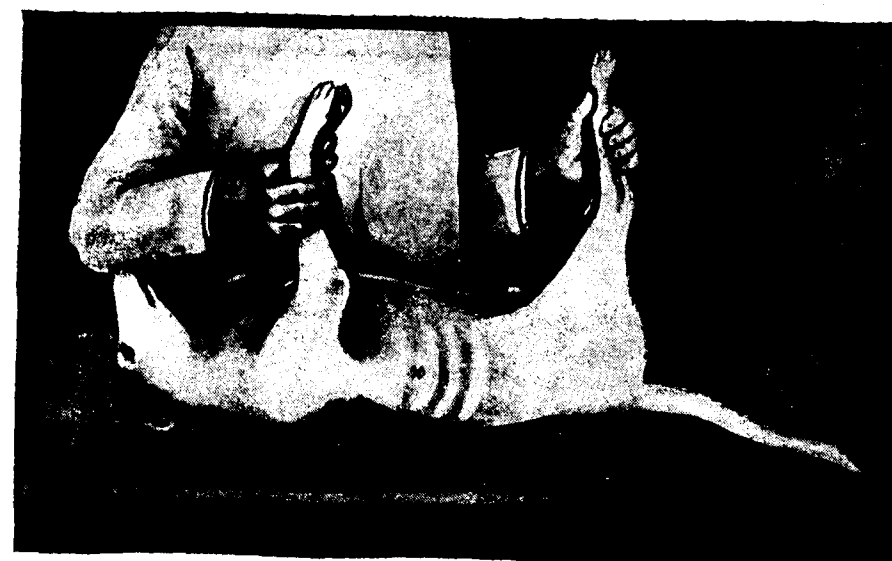


Fig. 2

Diagram to show the site of puncture in the dog.

They used a special needle of 18 cms. length and 2 m.m. bore, having a serrated cutting edge. The needle with the stylet is pushed through the skin, pleural space, and diaphragm into the posterolateral aspect of the liver. The site selected for the puncture is the mid-axillary line on the right side at the level of the 7th intercostal space. After fixing the needle on the organ, the stylet is withdrawn, a syringe attached to the needle and suction applied. During the act of suction, the needle is pushed into the organ with a straight rotatory motion which causes a piece of tissue to be withdrawn into the needle. The needle with the syringe is immediately withdrawn and the tissue obtained is used for diagnosis. The patient should be asked to hold the breath during the process to obviate any chance of tearing the liver capsule. Baron (1939) suggested an anterior approach to the liver. In cases with enlargement of the liver, the site chosen was the mid-clavicular line and in the absence of hepatic enlargement the site of puncture is the right epigastrium immediately below the costal margin and in the general direction of the lower portion of the right axilla. To obtain the specimen, suction has to be applied with a syringe. In a series of 49 cases, one death from haemorrhage was reported.

Since the appearance of the above two publications, a large number of papers on the technique of biopsy of the liver has been published in the medical press. A great deal of interest in the problem was, however, roused by the widespread prevalence of the epidemic hepatitis of World War II.

In more recent years, needle biopsy of the liver using Vim-silverman needle (Fig. 1) has greatly supplanted aspiration biopsy. This method may be looked upon as an improvement over the aspiration biopsy in that more adequate samples could be withdrawn by the use of this method. Also chances of haemorrhages by the use of needle biopsy was found much less. Tripoli and Fader (1941) and Wahi (1946) have described this method in human beings in detail. The latter, at Agra Medical College Hospital, uses it as a routine procedure in the diagnosis of liver diseases and is of opinion that this technique has a definite place in the elucidation of baffling liver diseases. The technique described by him is simple and with ease could be adopted in dogs with slight modifications. The preliminary step consists in finding out the bleeding, clotting and prothrombin time and if the patient shows any tendency to bleed, a suitable dose of Vit. K should be administered. According to the site selected whether intercostal or sub-costal approach to the liver, the skin over the area is cleaned and anaesthetised with 2% Novocaine or Procaine. The injection of the local anaesthesia is made further down on the peritoneal surface of the liver as well. Usually 5—10 c.c. of the local anaesthesia will be sufficient for the purpose. The Vim-silverman needle consists of 3 pieces. The outer one is a 14 gauge needle, 12 cms. in length with the usual hypodermic bevel tip. It is fitted with a stylet and has in addition an inner-split needle which is about 2 cms. longer than the outer. For obtaining the liver tissue, the outer needle with the stylet attached is pushed through the anaesthetised tract to just within

### Figures illustrating the article on BIOPSY OF THE LIVER

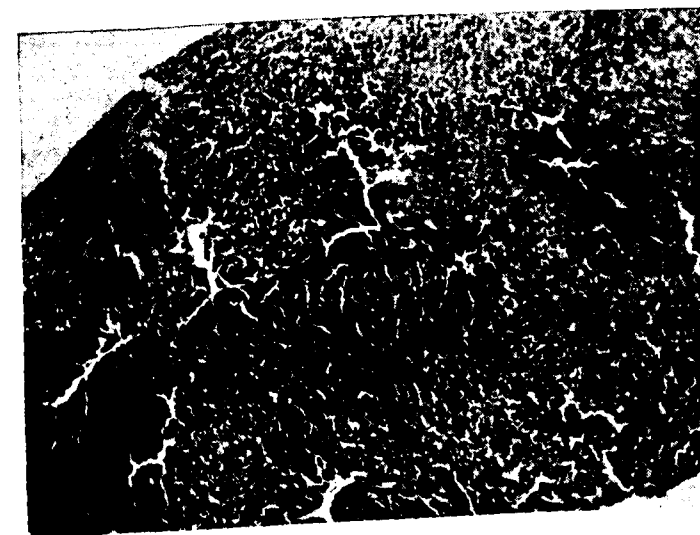


Fig. 3.  
Section of normal liver of a dog removed by using biopsy needle.  
H. & E.  $\times 40$ .

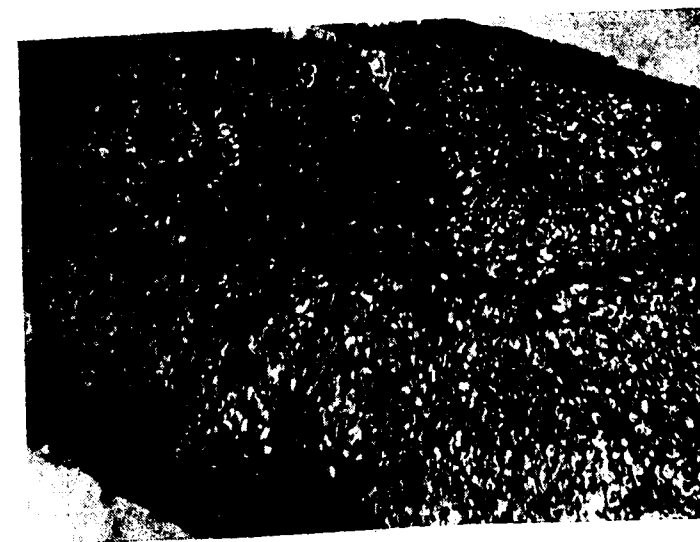


Fig. 4.  
Section of Cirrhotic liver of a dog removed by using biopsy needle.

## THE INDIAN VETERINARY RESEARCH INSTITUTE, IZATNAGAR.

## ANIMAL GENETIC SECTION

Advanced Course in Artificial Insemination &amp; Physio-Pathology of Reproduction, 1950.



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Sardar Balwant Singh, Shri Mukerji D. P., Shri Advani J. D.  
*Standing 1st Row* :—K. D. Bhaya, N. S. Kushwaha, S. N. Chatterji, U. D. Sharma, S. R. Guha, Sardar Sunder Singh,  
M. K. Dutt, A. N. Gutum.  
*Students Row* :—P. Rao, Hyderabad (Dn.) D. L. Paul, Assam. D. S. Bhatnagar, D. R. Gokhale, Bombay. B. P. S. R. Singh,  
K. V. Divekar, Bombay. Capt. M. S. Thatur, A. N. Acharya, Saurashtra, Bihar.

## THE TECHNIQUE OF NEEDLE BIOPSY OF THE LIVER

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the surface of the liver. The stylet is then withdrawn and the inner-split needle pushed to its full length through the outer needle. The outer needle is now advanced with a slight rotatory motion over the inner one, thus separating the plug of liver tissue held between the prongs of the inner needle from the rest of the liver tissue. The outer needle is now rotated once, keeping the inner stationary, as this helps to cut the plug of the liver tissue from its base. The two needles are now withdrawn together. The split needle is then removed and the tissue found between its two prongs, usually about 1—2 cms. in length and about 8 m.m. in width is fixed in 10% formalin. The punctured wound caused by the thrust of the needle is sealed with collodion.

*Technique in the dog.*—The site that we have found satisfactory in the dog is the 10th or 11th intercostal space on the right side in the mid-axillary line (Fig. 2). The dog is placed in a supine position on a table. After the preliminary preparation as cleansing, infiltration of the subcutaneous tissue and the peritoneal surface of the liver with the local anaesthetic as described above, the outer needle with the stylet attached is pushed straight upto within the substance of the liver tissue. It may be convenient before pushing the needle to make a very small incision on the skin at the site of puncture. By practice, it will be possible to note from the degree of resistance offered to the needle, whether the latter is in the liver tissue or not. To facilitate fixing of the needle, the animal may be brought to the edge of the table and then pushed a little to the right so that the liver is in close apposition to the chest wall. In cases of ascites, paracentesis abdominis should be performed before doing needle biopsy. When once we are sure that the needle is in the liver, the trocar may be withdrawn, the inner-split needle is pushed into the canula straight to its full length. The inner split needle being about 2 cms. longer than the outer canula, cuts about that length of the liver tissue. Now the outer needle is advanced over the inner-split for about 2 cms. thus completing the severance of the core of the liver tissue in the inner-split needle. Next the outer needle is rotated without disturbing the inner one, and immediately both the needles together are withdrawn. The tissue obtained will generally be 1—2 cms. in length and about 0.8 to 0.5 cms. in width and should at once be fixed in 5—10% formalin for histological examination. The skin wound should be sealed by collodion. The accompanying photo-micrographs are from some of the cases from which we have obtained the liver tissue by this technique. Fig. 3 shows normal liver tissue and Fig. 4 is from a case of cirrhosis of liver with ascites.

The sub-costal route wherein the liver is approached via the rib margin, although not tried by us, is said to be the site of choice in human being when there is pronounced hepatomegaly.

The after care of the patient consists in keeping the patient quiet for at least 24 hours and noting during that time signs of haemorrhage, if any. In case the animal shows pain or discomfort, a sedative may be found necessary.

In the routine application of this technique in the diagnosis of liver disease, workers have reported failure in obtaining adequate samples of the specimen in a few percentage of cases. Often this happens as has been our experience in the early trials when one is not fully conversant with the technique. As one gains mastery over the technique, the operator gains a knack and failures are few and far between. Sometimes, when the organ is atrophic especially with ascites, it may be difficult to obtain adequate liver sample.

The great danger that is reported in medical literature is the haemorrhage caused by tear of the liver parenchyma. It is because of this fact while performing the operation in human beings, the patient is asked to hold the breath. Obviously such a procedure is not possible in dogs, but our experience shows that such precaution is not at all necessary, at least in dogs. In fact we have tried this technique in our experimental dogs a good number of times the same day with no ill effects or danger to life. However, in all cases, as stated elsewhere, the patient should be watched for at least 24 hours from the time of puncture.

To determine the extent of damage done to the liver tissue, two experimental dogs were killed immediately after the biopsy. In one, the site chosen was the intercostal space between 11th and 12th ribs and in the other 10th and 11th intercostal space. The puncture in the liver in the first case, was found at about the middle of the caudate lobe and about 10 cc. of blood was found in the peritoneal cavity. Evidently this has happened due to damage done to liver capsule in more than one place owing to the inability to fix the needle on the tissue at the first instance. However, previous experience has shown that this amount of haemorrhage and damage to the liver tissue is not fatal, as dogs have survived even 3 or 4 needle punctures at a time and 18—20 needle punctures in a period of 1½ to 2 months. In the second case, where the anterior site was chosen, the liver was pierced at the middle of the right lateral lobe and the amount of blood seen in the peritoneal cavity was less than 5 cc. This animal was destroyed with the needle in situ, and practically no bleeding from the site of puncture was seen. This experiment has shown that site of choice in dogs is the intercostal space between 10th and 11th ribs and that, in negotiating the posterior site, one goes dangerously near the kidney.

A few contra-indications for needle biopsy of the liver are suspected cases of severe congestion of liver and abscess of the liver. Also it is not safe to undertake the operation in patients with a haemorrhagic tendency.

It is obvious from what has been stated that needle biopsy of the liver is a safe and reliable procedure that could be adopted in very many diseased conditions of the liver. The method enables us to see the actual pathological state of the liver. It is useful to the clinician in that it helps the institution of rational therapeutic measures in proper time. It is of estimable value in gauging

the value of treatment in some of the obstinate affections of the liver. Lastly, the procedure could be a very useful one in the hands of the experimental pathologist, who could at intervals obtain satisfactory samples of the liver tissue in the study of pathogenesis of some of the hepatic disorders.

#### Acknowledgment

We record our appreciation to the Principal, Dr. I. M. Azizuddin, B.A., G.M.V.C., B.V.Sc., Ph.D. (Edin.) for his suggestions and interest shown in this work.

#### REFERENCES

1. Baron, E (1935) *Arch. Intern. med.*, 63, 276.
2. Ivercon, P., Roholin, K (1939) *Act. med. Scandinavia*, 102, 1.
3. Tripoli, C. J., & Fader, D. E. (1941) *Am. J. Clin. Path.*, 11, 516.
4. Wahi, P. N. (1946) *Ind. med. Gaz.*, 81, 130.

### A PRELIMINARY NOTE ON THE CUTANEOUS METHOD OF IMMUNISATION OF POULTRY AGAINST RANIKHET DISEASE

By

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Since the introduction by Haddow and Idnani (1946) of the hen egg adapted attenuated strain of vaccine, thousands of poultry are being vaccinated every year against Ranikhet disease in this country. The routine method of vaccination is the subcutaneous injection of 1 c.c. of a 1 in 1000 dilution of the vaccine in normal saline solution, and this gives a more or less life-long immunity to the vaccinated birds. The following work was undertaken with the object of simplifying the technique so as to avoid the use of syringes and other paraphernalia.

In virus diseases it is not uncommon to employ cutaneous route for vaccination. It was successfully adopted for vaccination of human beings against small pox after the memorable work of Jenner (1800), who was the first to demonstrate the production of immunity against small pox after local infection of skin with the virus. Later, Besredka (1927) using anthrax, and Tuft (1931) using typhoid bacilli demonstrated the value of this method of immunisation. At present the cutaneous or scarification method is used extensively in the veterinary field also for immunisation of animals and bird against pock diseases. Siddiqi (1944) showed that cattle could be successfully vaccinated against rinderpest by the scarification method.

#### Methods

Though the principle underlying the production of immunity is the same, three different methods of scarification were tried to find out their relative efficacies. In this experiment the vaccine commonly supplied from this Institute was used.

1. *Scarification by feather follicle method*:—Feathers from the internal aspect of the legs of the fowls were plucked and a swab soaked in a 1:100 dilution of the vaccine in normal saline solution was rubbed over the injured follicles till a slight redness over the area was produced.

2. *Scarification by means of a scarifier*:—The drilling end of a trephine of about 0.5 cm. in diameter was used, the site of scarification being the comb of fowls. This was found the most convenient site as the comb is tough and the skin over it does not rotate with the scarifier. Undiluted as well as 1:10 dilutions of vaccine were used. The fowl was held by an attendant in the usual way. The dented end of a trephine dipped in the vaccine was pressed lightly on the comb and turned once on its axis, care being taken not to press the trephine too hard so as to cause bleeding. The process was repeated on three sites in a row on the comb.

3. *Stick method*:—This method is being commonly used in some countries for immunisation of fowls against pox. An improvised 'stick' for this method consisted of a forked or 'V' shaped needle mounted on a small handle. The arms of the 'V' were fairly sharp and were about 1 to 2 mm. in length and about 1 mm. apart. A tiny droplet of vaccine was held in between the arms of the 'V' when dipped in the vaccine and taken out. A few feathers were plucked on the external aspect of the thigh of the fowl and three pricks were given on the exposed area with the free end of the 'stick' which was dipped in the vaccine before every prick. Undiluted as well as 1:10 dilutions of the vaccine were used.

#### Results

Twenty-seven fowls including 9 two-week old chicks were immunised by feather follicle method using a 1:100 dilution of the vaccine. Two of the chicks died on the 3rd and 10th day after vaccination due to causes other than Ranikhet disease. The rest on test proved immune except one fowl which died during the period of observation. Biological test with the material collected from this bird proved negative for Ranikhet disease.

Of the 23 fowls vaccinated by scarification on the comb with scarifier using undiluted vaccine, two showed paralysis of the leg on the 8th day and one showed slight leg weakness and recovered. Of the 12 fowls vaccinated with 1:10 dilution of the vaccine two developed paralysis on the 3rd and 6th day. On test all proved immune to Ranikhet disease.

Twenty-five fowls were vaccinated with undiluted and 12 with 1 in 10 dilution of the vaccine by the 'stick' method. Two of the former showed slight leg weakness and recovered and one of the latter developed paralysis on the 6th day. All proved immune to test.

All the 12 fowls used as controls with the immunity test on the vaccinated birds died of typical Ranikhet disease in 3 to 5 days after infection.

The results are tabulated in the following table:—

| Method of vaccination                          | Dilution of vaccine | Number of fowls       | Post vaccination reaction          | Numbers tested and the days of test after vaccination |        | Reaction after test                        | Remarks                                                                                               |
|------------------------------------------------|---------------------|-----------------------|------------------------------------|-------------------------------------------------------|--------|--------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 1. Scarification by feather follicle method    | 1:100               | 27 including 9 chicks | *2 chicks died on 3rd and 10th day | 18                                                    | 8 days | *died on the 8th day and the rest survived | *death due to causes other than Ranikhet Disease                                                      |
|                                                |                     |                       |                                    | 7                                                     | 14 "   | Nil                                        | Immune                                                                                                |
| 2. Scarification on the comb using a scarifier | Undiluted           |                       | 2 P- 8th day 1 W.R.                | 14                                                    | 8 "    | "                                          | "                                                                                                     |
|                                                | 1:10                | 12                    | 2 P- 3rd & 6th day                 | 12                                                    | 13 "   | "                                          | "                                                                                                     |
| 3. 'Stick' method                              | Undiluted           | 25                    | 2- W.R.                            | 10                                                    | 8 "    | "                                          | "                                                                                                     |
|                                                |                     |                       |                                    | 15                                                    | 15 "   | "                                          | "                                                                                                     |
|                                                | 1:10                | 12                    | 1 P- 6th day                       | 12                                                    | 13 "   | "                                          | In all 12 control fowls were used for test; all of them died in 3-5 days of typical Ranikhet disease. |

P = Paralysis of the leg.

W. R. = Slight weakness of the leg and recovery.

*Field trials*.—A comparative study of the efficacies of the 'stick' method and the usual subcutaneous method of vaccination of poultry against Ranikhet disease on a large scale was undertaken in the Institute Poultry Farm at Izatnagar. A lot of 125 white leghorn and 125 Rhode Island red chicken of six to eight weeks of age were vaccinated by 'stick' method using a 1 in 10 dilution of the vaccine in normal saline solution. A similar number of chickens of similar ages of each of the breeds were vaccinated by the usual subcutaneous method employing a dose of 0.5 c.c. of a 1 in 500 dilution of the vaccine. Each group of chickens was kept in separate pens and maintained in the usual manner. The vaccinated chickens were observed closely for 14 days. One of the white leghorns vaccinated by the 'stick' method showed slight lameness of one of the legs on the 8th day after vaccination and recovered in about a week; 3 chicken of the same lot died due to causes other than Ranikhet disease while all the Rhode Island red

chickens remained well. Of the 125 White Leghorns and 124 Rhode Island Red chicken vaccinated by the subcutaneous method, one of each breed died due to causes other than Ranikhet disease, while one Rhode Island Red chick showed paralysis of the neck on the 6th day and became normal by the 14th day. Immunity test of these birds will be done in due course of time.

### Discussion

It may be observed from the table that all the three methods are satisfactory in that all the vaccinated birds survived the test dose while all the control fowls died in 3 to 5 days of typical Ranikhet disease.

Paralysis in 4 out of 41 fowls vaccinated by scarification on the comb, in comparison to 1 out of 37 vaccinated by the 'stick' method, was probably due to the fact that the site of inoculation in the former was in close proximity to the central nervous system, and the virus is known to be a neurotrophic one. But no paralysis was observed in scarification by the 'feather follicle' method when 1 in 100 dilution of the vaccine was used.

The disadvantages of the scarification as compared to the feather follicle method are that it is more time consuming and more vaccine is required on account of some wastage. Unless the vaccine is applied soon after the feathers are plucked, the exposed area dries up rapidly and the percentage of 'takes' is less. Moreover, this method renders the birds a bit unsightly as it leaves a large reddened area on the leg and the feathers on the denuded area take a long time to grow.

The scarification on the comb with a scarifier also presents certain difficulties as there is bleeding if the scarifier is pressed rather deep in, which may prevent the virus coming in contact with the receptor of the virus in the cells. Further, if the birds are exposed to hot sun soon after vaccination by this process, the virus may be destroyed before absorption, and not all the fowls have a well developed comb suitable to handle.

The 'stick' or "prick" method appear to be the best of the three methods tried, as the appliance required is very simple, small quantities of vaccine can be used for vaccinating a good number of birds, it is quite quick and there is no danger of bleeding. The vaccinated birds also do not become unsightly as with the feather follicle method.

In field trials the 'stick' method has been observed to compare favourably with the routine subcutaneous method of vaccination. Out of 250 chicken vaccinated by the former method one (0.4 per cent) showed lameness and recovered while one out of 249 chicken vaccinated by the latter method showed paralysis and recovered. Such a nervous symptom in a small percentage of birds is usually met with during the routine vaccination of birds against Ranikhet disease. Immunity tests of these birds will be carried out at a later period with a view to ascertain the duration of immunity.

In a recent publication Beaudette *et al* (1949) have observed that the 'stick' method was as good as intramuscular method of immunising poultry against Newcastle disease. Trials are also being carried out regarding the simultaneous immunisation of poultry against Ranikhet disease and fowl-pox by a combination of both the vaccine, by 'stick' method, since the 'take' produced by the former is earlier and different from that produced by the fowl pox virus.

### Summary

Three methods of cutaneous vaccination of poultry against Ranikhet disease are described, viz. (1) Scarification by feather method, (2) Scarification on the comb with a scarifier and (3) 'stick' method. Though the 'take' in all the three methods is similar, the 'stick' method offers scope for extensive trials because of its certain apparent advantages over the others.

On a comparative test on a large scale with about 500 chicken, it was seen that the 'stick' method was as good as the usual subcutaneous method.

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### REFERENCES

1. Beaudette, *et al* (1949) *Cornell Vet.* 39, 302.
2. Besredka, A. (1927) *Local Immunisation* (Eng. Trans.), 145, Bailliere, Tindal and Cok. London (Orig. not seen).
3. Haddow, J. R. & Idnani, J. A. (1946) *Indian J. Vet. Sci.* 16, 45.
4. Jenner, (1800) as quoted by Fairbrother, R. W. (1934) *Hand book of fowl viruses*, William Heiremann Ltd., London.
5. Siddiqi, T. A. (1944) *Indian J. Vet. Sci.* 14, 159.
6. Tuft, L. (1931) *J. Immunol.* 21, 85.

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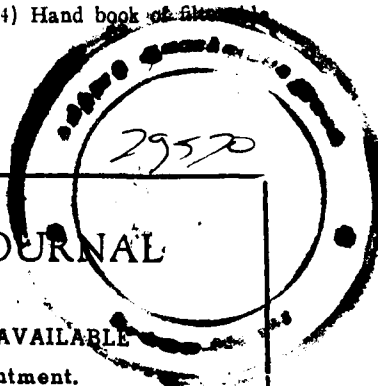
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## LIVESTOCK IMPROVEMENT—THE KEY TO NATIONAL REGENERATION\*

BY

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Until comparatively recently, food did not figure much in general conversation and amongst the urban professional people there was a snobbery which made any discussion of such matters as outside the domain of people of taste and fashion. Thanks to the situation that has been developing since the world conflicts and the recent upheavals of partition and the Bengal famine, food problems have forced themselves on the attention of all, whether in high places or low, in villages or towns. The gradual dawning of realism is manifest all round. If there is any subject in the country today which is outside the pale of controversy and arguments, it is the urgent necessity of maximising food production without the least delay.

Yet, the general ignorance that exists about the nature and vastness of different aspects of the food problem and of the rational approaches through which only this can be solved has been raising most unending controversies and divided counsels militating against even the success of the Grow More Food Campaign. Anyone with the least knowledge of the conduct of war operations must have to agree to certain essential requirements, if the food problem is really to be fought on a war basis, such as the objective, methods of tactical approach, general mobilisation of disciplined army specially trained for the purpose to carry out operations with the commanders having a full and correct up-to-date knowledge on the disposition and character of the enemy. It is thus most opportune that the *Hindustan Standard* is bringing out an Agricultural Supplement with a view to produce a better understanding of the multipronged operations which have to develop and gain in momentum and in intensity over the coming years.

A great deal of stress has been laid on the stepping up of production of cereals. This has been done to meet the obvious quantity shortage based on *per capita* consumption of fixed quota of cereals, being totally oblivious of the minimum essential requirements of a balanced diet. Mere filling of the stomach allows nothing more than mere human existence. Life, however, if it has really to be human must be on a higher plane of nutrition with a certain minimum of essentials of protective foods, like milk, meat and eggs, etc., in replacement of a substantial portion of the cereals in the daily diet. Science will no doubt eventually reveal the full picture of the factors which

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go to produce apathy, indifference and even fatalism a general feature of Indian life or of life in other underdeveloped regions, but the unbalanced diet may have to account for this in no small measure.

The existing gap between the requirement and the actual quantities of cereals available has been said to be not more than 10%, while that of protective foods of animal origin at a modest calculation is not less than 250 to 400 per cent. It should be clearly realised that this ten per cent of shortage in cereals is an one-sided estimate only, and can be wiped out by proper balancing the diet with more concentrated non-cereal foods, such as those of animal origin. In the Grow More Food Campaign attention has been exclusively given to bridging the gap of cereal production by reclamation, irrigation, manuring and mechanized cultivation without reference to the special requirements of the Indian cultivators, the large majority of whom will have to continue on slender means possessing fragmented holdings with no tangible hope of either taking to tractors or maintaining and working them under present conditions within any foreseeable future. The Indian agriculturist from time immemorial has been used to farming on a cottage industry basis with one or two pairs of cattle. And unless agricultural planning mobilises this vast and only manpower charged with delivering the goods in the shape of increased productions, the Grow More Food Campaign cannot become real and successful. The only correct method of effecting mobilisation must be on the basic fact that land, cattle and human beings are inseparable and the development of one is not possible without an integrated plan for the development of all the three. It is well-known that Indian livestock industry is one of the most important in the world in spite of the fact that our cattle under the present conditions are the most degenerate, with the poorest productivity. This degeneration is not wholly due to any basic defect in the Indian breeds of cattle, which with proper feeding and management have proved in other parts of the world as one of the best of its kind for the tropics. Ravages of disease, chronic underfeeding and indiscriminate breeding have resulted in their lowered efficiency. This condition is being aggravated now with the clearing of land and gradual shrinking of animal pastures and animal feeds by the allocation of additional land for cereal production and the utilization of oil cakes as manures, and the burning of the cereal straws. It appears that, while endeavouring to step up cereal production, the farmer's economy, which for its success had mixed farming as its bed-rock, has been put out of gear in an insidious manner. The illiterate farmer has known for centuries that the maintenance of one or two pairs of bullocks increases the production from land by fifty per cent due to a proper utilization of resulting manure. Thus, without any detriment to over-all production of his cash-crops he can allocate certain portion of the land for raising fodders to maintain a couple of cows which supply him with valuable supplementary food for his family and also bring him additional income through sale of surplus milk.

The present day temptation to grow and sell cash crops only due to their prevailing high prices has led to the abandonment of this policy by the ordinary farmer who has been concentrating more and more on cereal production alone to the detriment of his dependent animals. This policy is short-sighted and has resulted in a vicious circle of lowered efficiency not only of animals but also of the farmer himself through increased nutritional imbalance. In consequence, the main objective of increased food production has badly suffered.

To revitalize the work of cultivators it is necessary to reorient our approach to the whole problem by putting due emphasis on livestock improvement. There is a feeling that livestock regeneration is a long-term process and must be relegated to a place secondary to that of cereal production. Actually, this is far from true, as it has been observed by Lord Boyd Orr, former Director - General of the Food and Agriculture Organisation of the United Nations, that prevention of animal diseases alone will result in more than ten per cent increase in the agricultural produce. Secondly, by better feeding alone the yield of meat and milk can be increased to over fifty per cent which will go a long way towards meeting the food shortage. It is not generally realised that much more nutrient can be obtained from one acre of land provided its produce is diverted through the mouth of animals in yielding foods of higher nutritive and greater calorific value, as has been seen from the experience of certain countries, notably Great Britain. Restricted as she has been her total acreage in relation to the population, it has been more economic and practical for her to reserve the major portion of her land for cattle pasturage and fodder production rather than aim at attaining self-sufficiency in the matter of cereals. To achieve a rapid improvement in our livestock it is necessary to provide incentives to our agriculturists so that they can market their animal products at lucrative prices, both internally as well as in external markets. At one time, India used to enjoy substantially large export trade in livestock and livestock products. This trade dwindled since the importing countries one after another refused to run the risk of reintroducing diseases with imported animals which they had already eradicated from their own country. In 1933-34 the return from export trade in livestock and livestock products was 32.3 crores of rupees, while that for 1949-50 was slightly higher, namely 35.5 crores, notwithstanding the present inflated price structure.

Coming to the internal trade, it has been estimated that the livestock of India form a basic wealth which contributes annually nearly five thousand crores to national economy in the form of animal labour, foods of animal origin, supply of manure, hides and skins and wool, etc. It has been estimated that, according to the prices prevalent in 1936, milk and milk products alone were valued at 3,00 crores (present valuation is about 1,000 crores). This

was roughly equivalent to the then total output of rice in undivided India, or three or four times the value of the output of wheat. According to the recent estimates of the National Income Committee, the proportion of national income attributable to agriculture and livestock comes to 48 per cent. The national per capita income though showing a much higher value on paper as compared to the pre-war estimates has been shown by Dr. Rao and other economists to have really fallen since 1931-32. Thus, the present high prices do not appear to have brought about any improvement in the standard of living.

The task of national regeneration is many sided and colossal, having for its objective the removal of poverty, dirt, disease and ignorance. Besides the proposed welfare State will have to be ushered in so that the teeming millions of the rising population will not only have the present deficiencies and shortages met but a higher economic status and improved standard of living will have to be provided and greater happiness and satisfaction ensured. The food problem has already put the severest strain on India's economy, and not only are farmers and Governments and transport agencies of several countries being engaged to render urgent assistance in finding temporary solutions but even the whole future of the country and the destiny of its people have been menaced by this hydra-headed monster. 53.8 per cent of the national income is spent on food. The National economy of several countries, e.g. Australia, Denmark and Canada, has been built very successfully by greater emphasis being given to livestock breeding and industries. This suggests a clue to the solution of many of India's ills and requires a revision of the conventional lines of frontal attack on cereal deficiencies hitherto followed. National regeneration is an evolutionary continuous process in which there can be no finality, whatever may have been the recorded progress of each stage. The experience of the past few years cannot be ignored and it has become expedient now to overrun as quickly as possible, territory (of national regeneration) large enough to increase the chances of consolidation of all advances. If the first priority is to be given to the key to national regeneration represented in the potentialities of livestock wealth, the incentives and rewards for the peasants should vest in livestock, in balanced agricultural planning and the lop-sided development of cereal production be adjusted to the obvious hard facts and practical knowledge. The largest territory or sector to be consolidated is most obviously the livestock industry, which is by far the most important economic activity of India, even agriculture and food production being wholly dependent on it. Healthier and better producing animals are vitally required for the greatest welfare of the masses, as providing not only a real method of raising their standard of living and forming the basic key to building their health, prosperity and happiness. All projects of public welfare, whether relating

to protection against tuberculosis, the control of malaria and epidemics, etc., or greater literacy and better housing, can have no real significance to a people condemned to a sub-human level of nutritional existence. The main problem is thus the allocation of the highest priority to livestock improvement as the key method for solving all problems of India's regeneration. Livestock improvement is not necessarily a matter of long-term project. The judicious selection of aspects to be pursued and the manner of approach will certainly yield definite and quick results. The provision of adequate nutrition to the animals in the first instance must certainly raise the yields substantially, just as the control of animal diseases will step up food production, while with the use of sufficiently large numbers of the electrically-operated mammoth incubators, animal proteins from poultry can be mass-produced in an astonishingly rapid rate. Oils and hydrogenated oils industry have already attracted capital of about 225 crores of rupees. In United Kingdom the Duke of Devonshire and other noblemen are known for the national service they have rendered in establishing famous breeds of livestock. Livestock Development Finance Corporation or an Animal Health Trust has been organised on large scales in some countries with the object of achieving national regeneration through the establishment of a thriving livestock industry. Should not these facts and such records from other parts of the world strike the imagination of patriotic Indian leaders and people to give a practical shape to the veneration that the cow has enjoyed throughout the centuries, and where cow-protection and the provision of pinjrapoles and 'Gosadans' are still the unique feature of thought?

### SOME ANATOMICAL CURIOS

By

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The object of this short note is to record some unusual and peculiar abnormalities which have been met during the course of my work for the interest of the fellow veterinarians. From discussion and discourse with a number of them having wide experience, it appears that some of these abnormalities are extremely rare, and quite possible they are being recorded for the first time. The available record here does not throw light on their occurrence elsewhere.

#### 1. *Barless Donkey* (Fig. I and II).

The donkey attracted attention at a horse show at Bateswar Fair, Agra, because of its peculiar appearance due to absence of external ears,

### Plate No. 3

### Photos illustrating the article on SOME ANATOMICAL CURIOS



Fig. 1  
Earless donkey  
(Front view.)



Fig. 2  
Earless donkey  
(Side view.)



Fig. 3  
Cow with five teats.



Fig. 4  
Goat with four teats.

Photos illustrating the article on  
SOME ANATOMICAL CURIOS

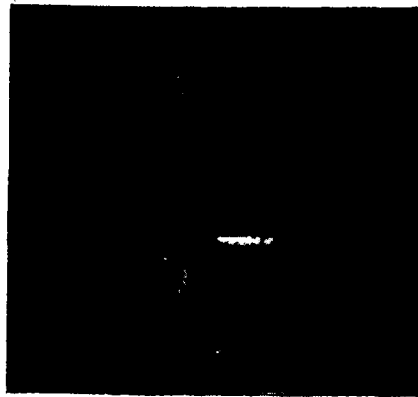


Fig. 5  
Four-legged chicken.



Fig. 6  
Hornless buffalo



Fig. 7  
Cow with a leg on shoulder.



Fig. 8  
Pig monster.

On enquiry it was found that the donkey was born earless. The donkey had normal hearing capacity as it responded well to the usual calls made to such animals. This testified the existence of normal hearing apparatus, except the ear pinna. This mutation is interesting specially in view of the fact that donkeys have abnormally long ears.

## 2. Teat abnormalities

### (a) A buffalo with two teats

This was observed at Saiyan in Agra district at the time of cattle show there. The quantity of milk produced by two teats according to the figures given by the owner was normal for the size of the animal. From the enquiries made, this abnormality is also rare, though perhaps not so rare as the above-mentioned one.

### (b) Cow with five teats (Fig. III).

It is quite usual to see cows with number of supernumerary teats, but not so common to see a cow having five milking teats, all giving the normal quantity of milk. This animal was observed at the U.P. State Livestock Show, Agra. This abnormality also seems to be rare.

### (c) Goat with four teats (Fig. IV).

In a number of cases, 4 teats, two normal and two supernumerary are observed in goats, abnormality being common in some breeds than in others, but the existence of four normal milking teats is rather uncommon, though by no chance rare. This picture is one of a Jamnapari goat brought at Chakkernagar Show in Etawah district. This is probably a hereditary factor as this character is more common in some strains than in others.

## 3. Four-legged chicken (Fig. V).

This specimen was observed at the Central Veterinary Laboratory, Lucknow, where this was photographed. This is perhaps one of those instances, where development of cells responsible for wing development was not normal and, instead of wings, legs were formed. It is also possible that this is one of the retrogressive characters which existed due to defective metamorphosis in the embryo.

## 4. Hornless buffalo heifer (Fig. VI).

This was seen at Jhatkari fair in Meerut district. From the information gathered from various persons who have wide experience of field work, it appears that this abnormality is also extremely rare, if not extinct. This also seems to be another example of mutation.

## 5. Cow with an extra leg on the neck (Fig. VII)

My curiosity was aroused a number of times when I saw a street *sadhu* with a cow having 4 extra legs sticking from its belly or two leg

protruding just behind the udder but was never clear in my mind about the mode of development of such abnormalities in fetus. It seemed very problematical that embryonic tissue, responsible for development of legs should get so badly misplaced during the process of growth and a normal parturition and later on normal development should take place. At Mathura I saw a street cow with an extra leg protruding from the shoulder and neck region. Information gathered locally revealed that Kanjars, a low caste tribe living on nefarious trade and also experts in grafting, grafted extra limb from a still-born calf or a calf about to die on a normal animal. After the operation was successfully completed, they sold such an animal to so-called street *sadhus* who made capital out of this by appealing to the sentiments of unwary public, who took these animals to be freaks of nature, rather than to be creation of malicious and evil human beings. I had a talk with number of people, including veterinarians, about this and found that this fact was rarely known. This short note may help to remove the misgivings of many.

6. A *Pig monster* (*Cyclops, migalostomous rhynchaenous?*) (Fig. VIII)

This specimen was collected from Aligarh, where it had reached as the result of investigation of a report that an elephant baby had been born to a sow. Detailed examination revealed the length of foetus to be 8½ inches, length of the hair on back 5 mm., and snout one inch. It gave an appearance of a 'cyclops', on account of the protruding eyes which were partly fused, but it was not a typical cyclops because there were distinctly two eyes, much too large for the size of the foetus and were protruding on account of the incomplete development of the sockets. On dissection it was found that nerve supply to both was from one nerve (optic). Overhanging the eyes was 1½ inches long process, resembling a miniature elephant trunk. This was probably the frontal process, which had not joined the naso-medial and naso-lateral process in the usual course of development on account of the abnormal growth of eyes.

A study of other parts revealed that two tusks and 4 teeth were well-developed. Lung development, however, was also abnormal as only the right one was present.

#### Acknowledgments

I wish to express my thanks to Sarvri N. R. Michael and A. A. Farruqi for providing the specimens of four-legged chicken and pig monster respectively.

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**Editorial**

**'GOSAMVARDHAN'**

From the very commencement of the Grow More Food Campaign which was started some years ago, we have been earnestly pleading for the inclusion of livestock development as part of that campaign. We have explained in detail that, in a pre-eminently agricultural country like ours, it was practically impossible to develop agriculture without improving the efficiency of the bullock-power behind the plough. We have been also reminding the Government that, while the over-all deficit in cereals was only about 10 per cent, the deficit in essential protective foods like milk, meat and eggs was as much as 300 to 400 per cent and that the people have been suffering for decades from unbalanced diet and malnutrition owing to the absence of these protective feeds. We were supported in this by the entire Veterinary profession which, in its annual gatherings, requested the authorities to bestow more attention to the improvement of livestock as an essential pre-requisite for the success of the Grow More Food Campaign. Unfortunately, our pleadings went unheeded. There was not enough or adequate appreciation of the role of cattle wealth in the general economics of the country. Consequently, the Grow More Food Campaign was not much of a success. That proved once again that the attempt to develop agriculture unilaterally, *i.e.*, without a simultaneous development of Animal Husbandry, was a practical impossibility. Still, in spite of all these, the Government did not turn their attention to the defect in the food campaign and rectify it by including in it schemes for the development of livestock. Even as early as February this year, when, in the course of a discussion in Parliament on a non-official bill for Preservation of cattle, an

Hon'ble Member of Parliament wanted to know what share of the Grow More Food Campaign funds were directed for improving cattle, the Hon'ble Minister for Food and Agriculture replied that Animal Husbandry did not come under the purview of Grow More Food rules. He, however, promised to examine the question of making alterations in the rules to make them applicable to cattle improvement. And, now, we have the heartening news that this has been done. The Hon'ble Mr. Munshi, the Minister for Food and Agriculture has announced that a sum of Rs. 20 lakhs of the Grow More Food grants had been set apart for Gosamvardhan. He has also moved that the bill to promote Gosamvardhan be referred to a Select Committee. We have not got the full details of this bill before us but we are told that the main features of the bill are the setting up of a Central Council, registration of Goshalas and the levy of a certain cess on the sale of bovine cattle in order to have Gosadans. We reserve our comment on this bill until we gather the full details of it but the fact that the Government are taking active steps for the preservation of cows by earmarking a sum—be it so little—out of the Grow More Food funds is in itself a welcome change in the angle of vision of the Government. There is now a clear indication that the Government have become alive to the importance of livestock in the Grow More Food Campaign. In this connection, we would like to remind the Government that the role of livestock in the economy of our country is of immense potential value as elaborated in an article published elsewhere in this issue from the pen of Dr. Datta, the Director of the Indian Veterinary Research Institute. According to this author the economics of our livestock is as follows: By providing transport for agricultural produce, cattle contributed annually approximately 160 crores of rupees; by way of cattle labour for agriculture, India gets about 300—400 crores of rupees every year; by way of manure 1000 million tons of dung per annum, which from its manurial value was worth about 1000 crores even though a good portion of it was burnt as fuel; by way of milk and milk products 750 crores; by meat and eggs 160 crores; by hides and skin and wool about 43 crores. With the addition of other items of smaller value, the total cash value of

livestock and livestock products amounts to about Rs. 3000 crores per year. And this when the industry is still in an undeveloped and neglected state! What it would be worth when properly organised and developed can be left to one's imagination. It is on account of this appreciation of the potentialities of our livestock and of their absolute necessity for our success in agriculture we have got the following embodied in our constitution: 'the State shall endeavour to organise Agriculture and Animal Husbandry on modern scientific lines and shall, in particular, take steps for preserving and improving the breeds and prohibiting the slaughter of cows, calves and other milch and draught cattle'. We are therefore very glad that the Central Government, by its avowed interest for Gosamvardhan, has given a direction to the different States to take greater interest in our livestock and their development and we do hope that ere long there would be increasing signs of such interest in each and every constituent member of the Indian Union.

## Notes and News

### Protection of Cows

On 5th June 1951, Parliament took up the Food Minister's motion to refer the bill to promote Gosamvardhan to a Select Committee.

Mr. Munshi announced, amidst cheers, that Rs. 20 lakhs out of the 'grow more food' grants had been set apart for 'Gosamvardhan'. "Whether that amount is spent or not", he said. "will not depend upon me, but on the despatch with which you put this bill on the statute book".

The Select Committee was due to report by the last day of the first week of the next session, but, said Mr. Munshi, he would like the committee to report within the next week so that the bill could be passed in the current session. There was no controversy about it. The main features of the Bill were the setting up of a Central Council, registration of 'Goshalas' and the levy of a certain cess on the sale of bovine cattle in order to have 'Gosadans'.

Dr. Punjabrao Deshmukh moved that the Bill should be circulated till the "last day of the next session".

Dr. Deshmukh wanted circulation of the Bill to elicit public opinion. The provision relating to control of "goshalas" he said, did not go far enough. He also asked why animals should be excluded from the scope of the Bill if it was based on humanitarian considerations.

Referring to the provision for levying cess, Dr. Deshmukh said this was a taxation measure and should not have been introduced "in such an indirect manner." The people of the Part C States should be consulted on such a proposal for taxation.

Pandit Mukund Behari Lal Bhargava wanted the Select Committee to consider the question of banning of cow slaughter, since "this important provision" was not in the Bill. *'Hindu'* 5-6-51.

\* \* \*

#### Turf Club for South India

Bangalore, July, 3

The move to form a separate turf club for South India which will embrace within its ambits the Madras, Bangalore, Secunderabad, Ootacamund and Mysore Race Clubs, took shape when the representatives of these institutions met together for informal talks yesterday morning at the Bangalore Race Club premises. It would appear that there was unanimity amongst all those present on the feasibility and advisability of having a separate turf club to control the sport in these centres.

It is learnt that a resolution was adopted by the representatives of the race clubs present that a separate racing authority be formed in South India styled, "the South India Turf Club", under whose rules racing would be conducted in these five places when this turf club came into being.

Another resolution, it is gathered, was adopted that a deputation, consisting of the Raja of Bobbili, Justice P. Medappa, Messrs. S. A. A. Annamalai Chetti, G. Narasimhan and Nawab Sultan Ali Khan Bahadur, be formed to wait in deputation on the Prime Minister and the Home Minister with the Indian Union Government during their ensuing visit to Bangalore in connection with the All-India Congress Committee Session in the second week of July with a view to impressing on them the imperative need there was for a central racing authority for India.

It is also learnt that, later in the day, the stewards of the five race clubs mentioned above met the Maharajadhiraja of Burdwan, Senior Steward, and Mr. G. S. Johnston, Steward of the Royal Calcutta Turf Club, and discussed with them the question of the formation of a South India Turf Club and also a central racing authority for the whole of the country.

The view, it is believed, was expressed by one of the representatives of the Royal Calcutta Turf Club that the Jockey Club of the England would grant recognition to the proposed South India Turf Club if all the race clubs in the South were agreeable to its formation and to race under its jurisdiction.

Regarding the question of a central racing authority for India, it is gathered that some of the stewards of the Bombay and Calcutta Turf Clubs

at present here had discussed the proposal and their view would appear to be that, if the initiative came from proper quarters, meaning presumably the Central Government, they would give it every consideration.

*'Hindu'* 4-7-51.

#### \* Touring Veterinary Billets in Madras State \*

The touring veterinary billets in the Madras State are now being converted into minor Veterinary dispensaries and the following short note on this subject has been furnished to us by the Director of Animal Husbandry, Madras.

The Touring Veterinary Assistant Surgeons in the State are required to tour for attendance of outbreaks of contagious diseases occurring within their jurisdiction and, when there is no outbreak, they have to tour systematically and hold camp dispensaries for about 10 days in each village for treating ordinary cases. With a view to give better facilities for the Touring Veterinary Assistant Surgeons to treat cases while at headquarters, it was considered necessary that their touring work should be curtailed when there is no outbreak of contagious diseases to be attended to and they should run Minor Veterinary Dispensaries at their headquarters and that each Touring Veterinary Assistant Surgeon should be provided with a building and a compound so as to enable him to locate his office and treat the animals. Proposals were accordingly submitted to Government and they agreed to the proposals and ordered, in January 1950, the conversion of all the then existing Touring billets into Minor Veterinary Dispensaries. In selecting the place for the location of each Minor Veterinary Dispensary, the needs of the place and willingness of the local bodies or of the people of the area to provide a building for the dispensary and/or to contribute towards the cost of running of the institution will be taken into consideration. Under these orders, 120 touring billets have so far been converted into Minor Veterinary Dispensaries. (till the end of April 1951).

Latterly, however, it was felt that until the staff position improves it is not desirable that all touring billets in the districts should be converted into Minor Veterinary Dispensaries. For efficient work, some degree of flexibility should be maintained and it will be advisable to keep atleast one or two Touring Veterinary Assistant Surgeons in each district handy for the following purposes.

- (i) to effectively and promptly arrest the spread of contagious diseases of cattle whenever there is an outbreak.
- (ii) to be able to post substitutes and make local arrangements within the District so that the Minor Veterinary Dispensaries once opened may not be closed even for a short period; otherwise the popularity of the institutions may be affected and

- (iii) to divert staff for carrying out large scale preventive inoculations with a view to establish immune belts and pockets in the bordering districts and other threatened areas and trade routes and to prevent outbreak of contagious diseases through the migrating cattle etc.

Accordingly, therefore, with the approval of Government, revised instructions have recently been issued to the District Veterinary Officers to the effect that the conversion of Touring Billets into Minor Veterinary Dispensaries in future will be regulated with a view to keep 2 Touring Billets in each of the border districts, and 1 Touring Billet in each of the other districts. In districts, where all the sanctioned touring billets have already been converted into Minor Veterinary Dispensaries, the concerned District Veterinary Officers have been asked to take immediate action to have one or two of the Minor Veterinary Dispensaries, as the case may be, reconverted into Touring Billets.

\* \* \*

#### Nutritional value of Vanaspati

The Diamond Jubilee Number of the *Indian Farming* contains the following note on the nutritional value of Vanaspati.

Due to shortage of *ghee* in this country, the use of hydrogenated vegetable oils or Vanaspati is becoming more and more popular. Opinion is, however, sharply divided whether the prolonged use of Vanaspati has any harmful effect. A long term investigation with this problem has recently been completed here (I.V.R.I.). It has been proved that when basal ration contains superadequate quantities of minerals and vitamins, there is no harm in substituting *ghee* by Vanaspati in a diet. When, however, the diet contains sub-adequate or just marginal quantities of vitamins and minerals, *ghee*-fed animals (rats) were more healthy than rats fed on similar diet but containing Vanaspati in place of *ghee*. This was found due to the fact that, in the presence of Vanaspati, the vitamin and mineral requirements of animals are increased. There was, however, no difference in the nutritive values of Vanaspati and the common edible oils.

\* \* \*

#### Boots Veterinary Price List

Boots Pure Drug Co. (India) Ltd., have issued a Price List for the Veterinary Profession. The list gives brief notes on BOOTS Products for use in Veterinary Practice, together with their retail prices. Veterinary Surgeons and Hospitals who have not yet received a copy, are requested to write to Boots Pure Drug Co. (India) Ltd., Asian Building, Nicol Road, Bombay 1.

\* \* \*

#### California State Veterinary Medical Association

Over a hundred veterinarians from all over the state of California gathered at Santa Barbara to hear Dr. Nathan B. Friedman, M.D., Director

of Laboratories, Cedars of Lebanon Hospital, Los Angeles speak on "The Comparative Pathology of Testicular Tumors".

Dr. Friedman said: "There are striking differences in the type of testicular tumors which occur in various animal species. In dogs teratoid growths are practically non-existent while in man almost all neoplasms are teratoid. Interstitial cell tumors are common in dogs and rodents and rare in men. The tubular adenoma or Sertoli cell tumors of dogs are estrogen producing and have advanced our knowledge of the testis. The administration of estrogen to experimental animals will produce interstitial cell tumors which are androgenic in effect. Experimental teratomas can be produced only in roosters and are similar to those occurring spontaneously in men."

#### OBITUARY

**N. C. Chikmath, G.B.V.C.** It is with regret that we have heard of the death of Sri N. C. Chikmath, formerly Chief Veterinary Officer, Kolhapur, on the 31st January 1951.

After graduating from the Bombay Veterinary College he was appointed as Veterinary surgeon, Shri Vijayamala Maharani Free Veterinary Hospital, Kolhapur, where he became a very popular officer. He became the Chief Veterinary Officer, Kolhapur State in the year 1944 when the Department was organised. When that State became merged with Bombay in the year 1948 he became Veterinary Inspector, Kolhapur and Deccan States.

He leaves behind a wife, four sons and one daughter to whom we offer our condolences.

**M. Appiah, G.M.V.C.** We learn with deep regret of the untimely death of Sri M. Appiah, Veterinary Inspector, Doddaballapur, Mysore State, on 12-4-51 in his 41st year of age. He was a very popular figure in veterinary circles and we extend our condolences to the members of his family and also to his brother Mr. G. N. Srikantiah G.M.V.C., Lecturer in Animal Husbandry, Agricultural College, Bangalore.

**Krishna Rao Nilkar, G.M.V.C.** We regret to learn of the death of Dr. Krishna Rao Nilkar on July 1, 1951 at Saidapet, Madras. Dr. Nilkar retired from the Madras Civil Veterinary Department 15 years ago after a good record of service. Of a quiet and amiable disposition, Dr. Nilkar was a popular figure amongst the early veterinary graduates of Madras. We extend our sympathies to his son Dr. S. R. Nilkar who is practising as a Dentist in Madras.

## Clinical Articles

### NERVE BLOCK OF THE BRACHIAL PLEXUS

BY

F. D. WILSON, G.M.V.C., B.V.Sc.,

Department of Surgery, Madras Veterinary College.

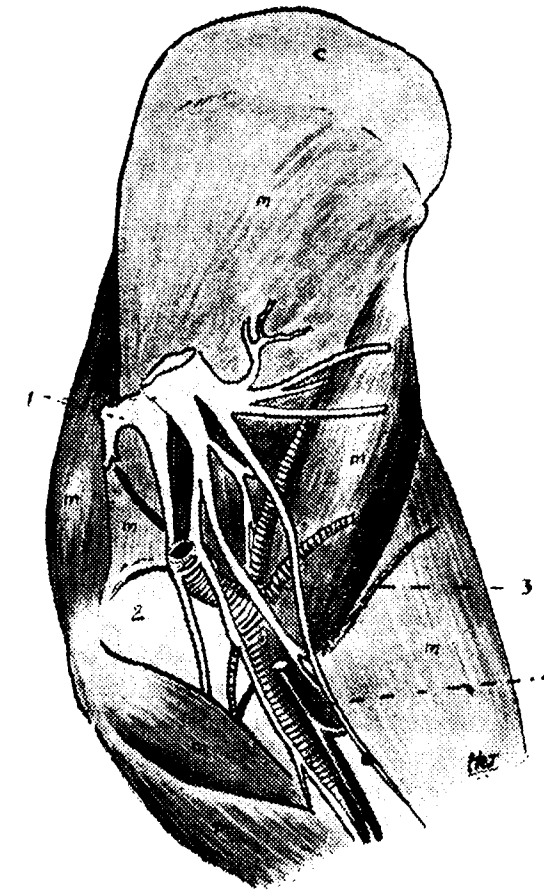
**Introduction.**—Anaesthesia has been described in its broadest sense as "suspension of sensation", which may be due to disease, injury or various agents known as anaesthetics. The chief objects of anaesthetics in Surgery are the abolition of pain during operation, prevention of reflex movements and production of muscular relaxation.

Anaesthetics are divided into two classes—local and general, the former acting only on the part to which they are applied and the latter acting on the central nervous system and causing complete loss of sensibility. Local anaesthesia is therefore indicated for surgical operations on limited areas and also when it is considered deleterious to produce general anaesthesia. Though general anaesthesia was formerly used for all major operations, such as amputations, reduction of dislocations, fractures etc., local anaesthesia, of late, is being preferred on account of its safety, convenience, and economy.

Local anaesthesia may be brought about by (1) Topical application of an anaesthetic (2) Infiltration of the anaesthetic into the tissues along the site of incision; and (3) Nerve blocking, where the anaesthetic is deposited over the nerve or nerves supplying the area to be operated on.

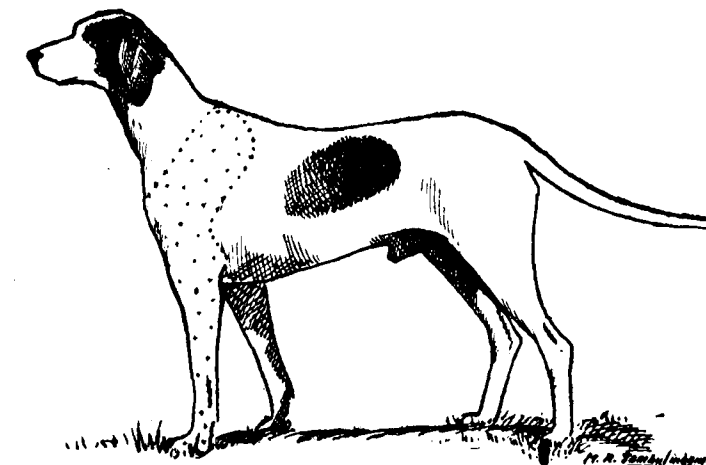
Various authors have described various nerve blocks and these include the Paravertebral Lumbar Block, Horn Block and the Blocking of the digits in Bovines, the Infra-orbital, Mental and Mandibular in Equines and Canines and the Median, Ulnar, Plantar, Digital and Supra-orbital blocks in equines. But so far nobody appears to have described a nerve block of the Brachial Plexus. This article, therefore, is written to record the nerve block of the Brachial Plexus in Bovines, Caprines, Ovines and Canines.

**Anatomy.**—The muscles and integument of the forelimb and some of the muscles of the shoulder girdle and chestwall are supplied by the brachial plexus. This is an enormous flat fasciculus of nerves placed between the shoulder and the thoracic wall. The plexus appears as a wide band at first between the Scalenus and Longus Coli and later between the divisions of the Scalenus (Vide sketch 1.). It is covered by the Sub-Scapularis and Deep Pectoral Muscles. Dissections on small animals like dogs, goats, and sheep and bovine calves revealed that the fasciculus of



Sketch 1

- |                                   |           |              |
|-----------------------------------|-----------|--------------|
| 1. Brachial Plexus                | 3. Artery | M. Muscle    |
| 2. Internal Tuberosity of Humerus | 4. Vein   | C. Cartilage |



Sketch II

Figure of a dog—dotted portion indicates area of anaesthetisation in nerve block of the Brachial Plexus.

nerves is situated about 2" to 3" internal to the internal tuberosity of the Humerus, about 2" posteriorly in the dog and about 3" in goats, sheep and bovine calves.

**Site and Technique.**—With the animal standing squarely, the particular forelimb is flexed and abducted by an assistant. The operator, who should be facing the subject directly, should then place the palm of his hand on the shoulder joint, when the internal tuberosity of the Humerus could be readily palpated with the thumb of the same hand. This is the site of injection and the point for insertion of the needle is internal to the thumb. A hypodermic needle roughly 4" long should be used and directed posteriorly between the shoulder joint and the thoracic wall keeping as close as to the internal tuberosity as possible, till it traverses a distance of 2" in the dog and 3" in ruminants. The syringe is attached and 5 to 10 c.c. of a local anaesthetic solution injected. To facilitate insertion of the needle an insensitive skin weal may first be induced.

**Symptoms of Anaesthesia.**—With the injection of a 4% solution of Novocaine Hydrochloride the following symptoms were noticed. In the stationery position, the first symptom noticed was dishing of the knees of the injected limb followed later by extension of the limb and attempts to adjust body-weight on the other three normal limbs. The limb appears longer and the animal has no inclination to move. If at this moment the animal is lifted up bodily, the anaesthetised limb dangles about, helplessly. During forced progression, the limb is dragged and when rested, symptoms of radial paralysis, as dropping of elbow, flexion of knee joint, fetlock joint etc., are noticed (vide Figs. 2, 4, and 6. Figs. 1, 3 and 5, are snaps of the same animals taken before anaesthetising). Should the animal be made to move about immediately after the injection of the anaesthetic, the animal stumbles on that particular limb after about a minute and this is followed by a tendency to hop about on 3 legs for a while. Sketch II shows the area of skin anaesthetised as determined by pin pricks.

The following table gives the time taken for anaesthesia to set in, its duration and effects :

| Animal.         | Time.     | Time of dishing of knee. | Extension or Flexion | Setting in of complete anaesthesia as determined by pin pricks. | Duration of anaesthesia. | Ill effects |
|-----------------|-----------|--------------------------|----------------------|-----------------------------------------------------------------|--------------------------|-------------|
| Dog             | 0.00 Mts. | 1 Mt                     | 2 Mts.               | 3 Mts.                                                          | 1.30 Hours.              | Nil.        |
| Sheep and Goats | 0.00 ..   | 2 Mts.                   | 3 ..                 | 5 ..                                                            | 2.00 ..                  | Nil.        |
| Bovines         | " "       | "                        | "                    | 5 "                                                             | 2-15 "                   | Nil.        |

Photos of animals showing the pre-anaesthetic and anaesthetic stages in nerve block of the Brachial Plexus.

(Illustrating the article by Dr. F. D. Wilson)



Fig. 1



Fig. 2



Fig. 3



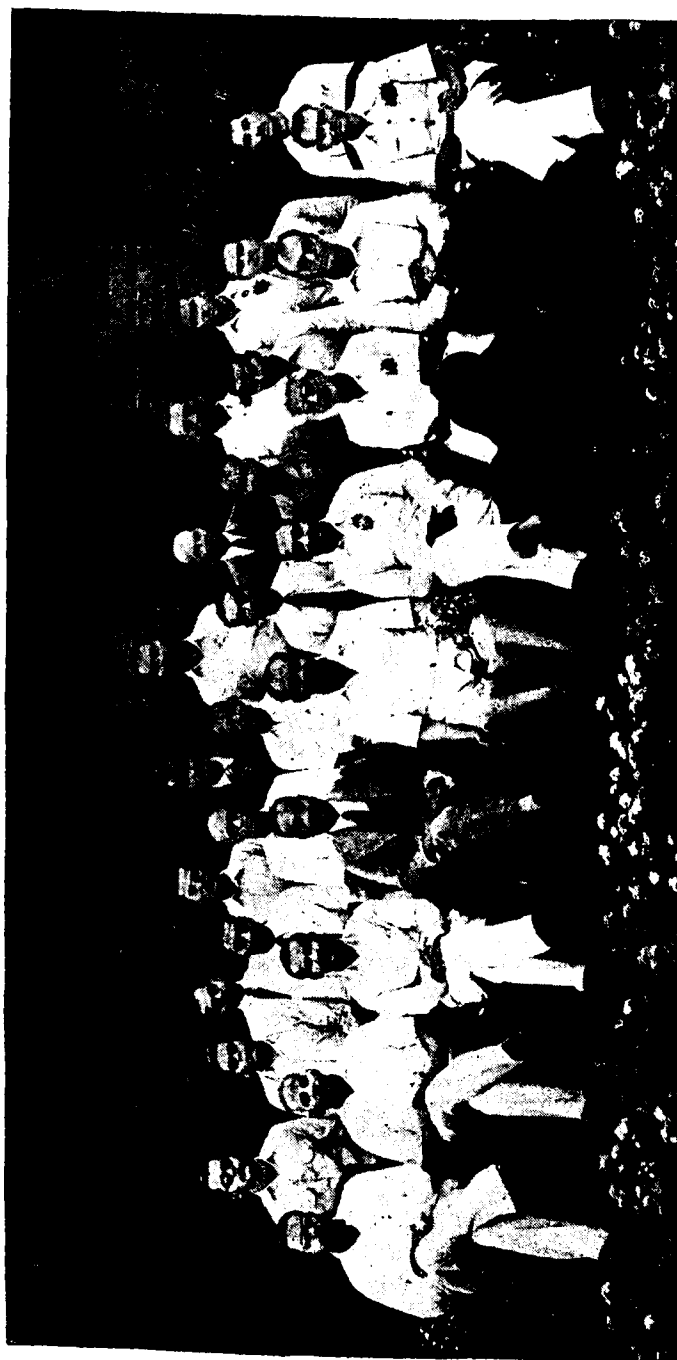
Fig. 4



Fig. 5



Fig. 6



1st Row Sitting:—(L. to R.)—Dr. S. Bose, Dr. H. D. Srivastava, Dr. P. Bhattacharya, Shri S. G. Iyer, Dr. S. Datta (Director),  
Dr. N. D. Kehar, Shri B. R. Ramachandani, Dr. S. S. Prabhu, Dr. T. S. Krishnan,  
2nd Row Sitting:—(L. to R.)—Shri S. N. Luktuke, Shri D. R. Ramnani, Shri T. D. Mahadevan, Shri S. R. Ganguly,  
Shri K. N. Joshi, Shri P. B. Menon, Mr. C. T. Peter, Dr. D. P. Mukherjee, Shri H. P. Tandon,  
Shri B. M. Thakral, Shri A. S. Sicha (Bihar), Shri Ram Deo Singh  
3rd Row Standing:—(L. to R.)—Shri Ram Narain, Shri J. Das (Res. Scholar), Shri K. M. N. Srivastava (U.P.),

# ANAVENOL—A SHORT-ACTING ANAESTHETIC FOR EQUINES 43

**Indications for use.**—This type of block will be very useful for amputations, reductions of dislocations and fractures, neurectomies and excision of tumours in the forelimbs of animals. It would be possible to anaesthetise the limbs of larger animals as adult bovines and equines if needles about 8" long are used. But this has not yet been tried.

## Summary

- (1) A new nerve block for the forelimb, the nerve block of the brachial plexus, is described.
- (2) The site is between the internal tuberosity of the humerus and the chest wall.
- (3) The block is cheaper, convenient and safer than general anaesthesia.
- (4) This block can be utilised for all major operations of the forelimb.

## Acknowledgments

I wish to thank the Principal, Dr. I. M. Azizuddin, B.A., G.M.V.C., B.V.Sc., Ph. D. (Edin) and Dr. Mariappa, G.M.V.C., Lecturer in Anatomy for their valuable suggestions.

# ANAVENOL—A SHORT-ACTING ANAESTHETIC FOR EQUINES

BY

S. R. HATTANGADY G.M.V.C., B.V.Sc.,

and

M. H. NAGAMIA G.B.V.C.,

Assistant Professors of Surgery,  
Bombay Veterinary College.

Anavenol, a product of Imperial Chemical Industries (Pharmaceutical) Ltd., Manchester, presented as a somewhat viscous, milky-white, fine, aqueous suspension, was supplied to us for clinical trial at the Bombay Veterinary College Hospital. Anavenol is claimed to be a short-acting, ascending type of anaesthetic for horses given intravenously, producing a light plane of anaesthesia, in operations like docking, castration etc. The distinct advantages claimed for this product over the other anaesthetics in use are

1. the absence of necessity for preliminary preparation of the patient and
2. the absence of excitement and struggle as is characteristic of chloroform anaesthesia during its initial stages.

Our trials were therefore designed 1. to check on these claims, 2. to obtain an idea of the dosage to an Indian subject and 3. to determine the depth and duration of anaesthesia.

**Subjects.**—Anavenol was first tried as the sole anaesthetic on two aged debilitated horses, otherwise healthy, for the purpose of castration. One of these underwent operation for roaring within a space of a month. Except for a slight suspicion of tolerance to the drug when used subsequently, Anavenol was well tolerated.

**Technique of administration.**—In the absence of the positive-pressure apparatus with attachment direct to the container designed for continuous injection, we employed a series of 50 c.c. syringes, on account of which there was a slight interruption in injection while the transfer of syringes took place. It was injected in the jugular vein of the horse in a standing position, the restraint being only a head collar. The rate of injection was one c.c. per second as recommended by the makers.

**Dosage.**—The full anaesthetic dose recommended by the manufacturers ranges between 12 to 25 c.c. per cwt. of body-weight. As the tolerance of the Indian subject was unknown, we decided to start at the minimum dosage scale, namely 12 c.c. per cwt. and then to increase the dose as required.

**Induction.**—When approximately half this calculated dose was given the animal became unsteady on its feet, with a slight swaying on its hind-quarters. On further injection of the drug it moved to a side and came down quietly. An alternative method was to wait until swaying became pronounced and then to push the animal back sharply to bring it down. The animal was pushed to the desired recumbent posture, which was easy as it was then quiet. The remainder of the calculated dose of the drug was then given at the same rate of 1 c.c. per second. Progress of anaesthesia was gauged by response to pin-pricks at the site and gradual increased limpness of the tail. In our cases, the dose calculated at the rate of 12 c.c. per cwt. was found to be inadequate to produce the desired depth of anaesthesia and 25 to 50 per cent more had to be injected. Thus on an average 15 to 18 c.c. per cwt. was probably the normal total anaesthetic dose for Indian horses.

**Observations.**—The only changes were alteration of the pulse rate and respiration. Pulse rate increased reaching on an average a maximum of 96 per minute. It came down when injection was discontinued and remained around 60 per minute for some time.

The respiration was quick and shallow increasing up to 62 per minute. This remained so during the period of anaesthesia and took some time to return to normal after the operation.

Temperature was practically unaffected. Bleeding was not excessive during operation.

**Duration and depth of anaesthesia.**—The depth of anaesthesia attained was sufficient for the operation performed. The average duration was 20 to 25 minutes, which was ample for our requirements.

**Recovery.**—Recovery was completely uneventful. The animals got up without any aid approximately 15 to 20 minutes after the operation. They ate readily and appeared none the worse for the ordeal. The wounds healed up rapidly.

**Effects of overdosage.**—Anavenol was experimentally given to a third horse which was to be destroyed, in order to study the effects of a too rapid an injection and of an overdosage. This animal weighed 600 lbs and a dose of 300 c.c. (50 c.c. per 100 lbs) was injected as rapidly as possible.

In the first instance respiration became shallow and quick and then changed to slow, deep and laboured amounting to dyspnoea till it finally stopped. The pulse rate was as high as 110, then it fell to a steady 100, gradually reducing in intensity becoming slow and imperceptible till it stopped. Death, which occurred 30 minutes after the injection, appeared to be the result of respiratory failure.

**Summary.**—1. The animals were not subjected to the usual pre-operative preparation, yet the anaesthesia was satisfactory without excitement or struggle. Recovery was entirely uneventful.

2. Mode of administration was simple and called for no special skill or equipment—a horse could be readily anaesthetised by a veterinary surgeon unaided.

3. A dose of 15 to 18 c.c. per cwt. given at the rate of 1 c.c. per second produced light plane of anaesthesia having a duration of 20 to 25 minutes suitable for castration and other operations.

**Conclusion.**—Use of Anavenol obviates accidents incidental to casting. Its use favours quick decisions to operate in emergencies without the use of hobbles, on any soft ground. It thus appears to fulfil conditions for an anaesthetic of choice for field conditions. We consider that it is a valuable addition to the armamentarium of a practising veterinary surgeon.

Our thanks are due to Dr. S. R. Chadha B.Sc., M.R.C.V.S., Principal, Bombay Veterinary College, for his personal interest and guidance in the matter; and to Mr. W. J. Hodge of Imperial Chemical Industries (India) Ltd., Bombay Office, for the supply of free samples of Anavenol for the trials.

## CAESAREAN SECTION IN A GOAT

BY

R. T. TALAWALKAR, G.B.V.C.,

*Veterinary Assistant Surgeon, Jaysingpur, Kolhapur Dt.*

On Monday, the 18th December 1950, at 8-30 A.M., a reddish goat, aged about 5 years, was brought to the hospital with the following history:—

*History and symptoms.*—The goat which was pregnant had completed the gestation period a fortnight back. She then showed labour pains but as she did not deliver for two days, some shepherds were consulted by the owner. They, after examining the goat in their usual ways, expressed the opinion that she would deliver within a week or so and that there was no abnormality. The owner waited not only for one week but for two weeks. Even then nothing happened. The animal was all the while straining and, though she took her feed in the first week, she ate very little in the second week. The swollen condition of the vagina had by now fully disappeared and there was a foetid discharge with straining. It was at this state that the animal was brought to the hospital.

On examination it was found to be a case of dystokia due to the complete retention of both the fore feet of the foetus in the uterus. As it was absolutely impossible to take out the foetus in the usual way, with the consent of the owner, a caesarean section was immediately decided.

*Operation.*—All the preliminary precautions by way of sterilisation and antiseptic precautions were strictly taken. A dose of Chloral Hydras, two drachms, was given orally mixed with treacle. The site of the operation was shaved, carefully washed and painted with Tr. Iodine and 5 c.c. Planocaine with 2 c.c. of Liq. Adrenaline Hydrochlor was injected subcutaneously at six different points along the course of the incision. When the animal was fully under the effects of Chloral Hydras, a bold downward incision of six inches was taken on the right flank. The skin, the muscles and the peritoneum were incised in one and the same direction. The uterus was then exposed and an incision in the same direction was taken. On the whole, there was very little bleeding. A full-grown, dead, male foetus with the attached and decomposed membranes was taken out. The uterus was mopped with Dettol solution completely and was liberally dusted with Sulphonamide powder and was sutured with catgut. The peritoneum, the muscles and finally the skin were sutured after dusting with Sulphonamide powder. Except skin sutures which were interrupted all were continuous ones. The operation was completed with a seal of Tr. Benzoin Co and cotton wool and finally a bandage was applied. The animal regained consciousness after full three hours from the beginning.

*After treatment.*—A dose of 10 c.c. Camphor-in-oil was given subcutaneously and a stimulant dose of Tr. Digitalis was given orally. The whole day and the next day as well she was fed on rice gruel and coffee. She slowly started taking food from the third day. The temperature was 102° F. only. On the 5th day of the operation she showed a temperature of 103.4° F and was a bit dull with a foul smelling discharge from vagina especially when she strained at the time of urination. She was then given 3 c.c. Cibazol with 15 c.c. of Glucose intravenously. A douche of Pot. Permang. solution was then given every day for the next five days and one tablet of Sulphanilamide was put in the uterus with the help of a long artery forceps every day for five days. On the fifth day, the abdominal bandage was removed for the first time and to my great satisfaction the wound was found absolutely dry. The subsequent progress was uneventful except for a slight suppuration at the seat of operation. That also responded to treatment with mercurochrome. On the 7th day of January 1951 the wound had completely healed up and the general condition of the animal also had much improved. The case was then discharged as cured.

## A CASE OF SCHISTOSOMUS REFLEXUS IN A BOVINE FOETUS

BY

D. K. DAMLEY, G.B.V.C.,

*Veterinary Assistant Surgeon, Achalpur City, M.P.*

On the 1st August 1950, while at Achalpur City (Berar), I was called upon to attend on a case of dystokia in a cow. The cow was lying prostrate on the ground and it was tympanic. General condition was unsatisfactory.

On vaginal examination, three legs and head of the foetus were felt in the passage. On further detailed examination, it was felt that, out of those three legs, one fore leg was folded backward at the knee joint, the other fore normal and the third was the hind leg. The whole foetus was felt as if it were a round mass. Efforts were made to correct the abnormality to facilitate its removal but with no success. I came to the conclusion that it was an abnormally deformed foetus which could not be removed *per vagina*. Caesarian section was the only thing indicated, but the patient's condition was unfavourable. The cow died after an hour or so.

Out of curiosity, I requested the owner to have a look at the foetus before the disposal of the carcase and the enclosed photograph may give an idea of its abnormal nature. It may be described as follows:—

1. Posterior half was folded over the anterior half;
2. One of the fore limbs was folded backwards at the knee,



Photo of the foetus.

3. The other fore limb had a forward bend at the knees simulating the flexing of the hock ;
4. Both hind limbs had the confirmation of knee-joint ;
5. All internal organs were attached to the ribs and were unprotected ;
6. Tail and scrotum on the back in the fold.

My sincere thanks are due to Shri G. G. Oka, Deputy Director of Veterinary Services, Berar Division, for his timely guidance.

## Correspondence

### FOR THE BUFFALO

"The water buffalo has amply demonstrated its value in the tropics as a milk producer and as a draft animal particularly in the rice fields. It is therefore worthy of much more attention than it has so far received by agencies interested in livestock improvement" is the opinion expressed by Dr. Ralph W. Phillips in F. A. O. Agricultural Studies No. 1 (August 1949). Makhijani (*Indian Farming* Vol. VIII No. 12 December 1947) lists 25 indigenous breeds of cattle and 3 Pakistan breeds domiciled in the Indian Union. Naturally, the buffalo has not found a place in his enumeration. Syed Iqbal Ali Shah (*Indian Farming* Vol. III No. 6 June 1942) speaks of the two types of buffaloes, the macrocerus—the long horned, and spirocerus—the curved horned.

But he describes four clear breeds viz., the Murrah, the Jafarabadi, the Surti and the Nagpuri. It is safe to assert that all the buffaloes have not been fully classified and defined.

There is a vague dislike for the buffalo in certain scientific circles. The Gandhian philosophy does not approve of the buffalo as the buffalo is supposed to oust the cow. But let us not forget the fact that sentiments and economics are difficult to be harmonised. This prejudice has got to disappear and Government have to come forward in establishing nucleus pedigree herds. Men of science and resources are with Government and it is the elementary duty of any Government to help breeders to breed profitable stock.

Buffaloes as a class thrive on fodders that are considered to be innutritious for other cattle. This means that the buffalo is able to convert cheap food into milk. As the buffalo yields richer milk with 7% and over of butter fat, any surplus liquid milk left over can be converted into butter at economic rates. As a rule Indian buffaloes are docile and the she-buffalo can be easily induced to let down milk without being coaxed by the calf. The she-buffalo is neither temperamental nor fastidious as the ordinary cow. These are qualities of great value in a dairy animal. But buffaloes require some attention to keep them fit. The heat-regulating mechanism is not so well developed as in other cattle so much so the buffalo is not able to adjust itself fully to hot weather conditions. For this reason wallowing in cool waters is required and the draught buffalo cannot work during the hot part of the day. There is no better class of animal than the buffalo that can plough through the stiff mud of Malabar and other monsoon fed areas of India. It is a fact that the she-buffalo is not very demonstrative during oestrus. A common practice in dairies where large number of buffaloes are kept is to let the buffalo bull walk between the lines and pick out cows in heat.

It is very disheartening that no organised effort is being made to breed buffaloes scientifically. I consider it to be wrong policy to try grading long horned with curved horns as the only method of improvement. There are areas where this can be done successfully. There is no use grading up in all places, the hardy, small, long horned buffaloes with the large comparatively fewer curved horned buffaloes. The new generation animals require more and better food. They do not appear to be too successful for field operations. Again replacements of stud bulls are becoming difficult. It is well-known that grading has to be kept up for 5 or 6 generations with the "superior" breed to fully ameliorate the local breed. Therefore grading long horns with curved horns should be tried only in such areas where environmental conditions are suitable for such grading.

The attempt by the Government of Madras to open a buffalo farm at Vishakapatnam is praiseworthy. It is spectacular to supply a town with cheap and wholesome milk. But when a livestock farm takes the shape of a

commercial dairy—as it has in this case—the value of the breeding farm is very much diminished. Commercial dairying and breeding good stock cannot go hand in hand. This is particularly so in buffalo breeding. The large percentage of mortality among buffalo calves is due mainly to under-nutrition of the calves. The ease by which the she-buffalo allows herself to be milked without her calf has unfortunately been exploited to the disadvantage of the baby calf.

I suggest that first and foremost every State should build up nucleus herds of pedigree stock. As advocated in a previous paragraph intelligent selection within the type should be undertaken as a preliminary measure. Next is to bring about a great deal of homozygosity in this herd. This can be achieved by judicious inbreeding; culling should be rigorous to purify the stock. Breeding for performance should be the aim. In this case milk yield should be the sole criterion. Breeding for colour pattern, shape of horns, length of tail, a Roman nose or any other so called aesthetic show points should not be allowed to have a place in this breeding programme; with consistency of aim, in the space of 15 to 18 years, foundation stocks of buffaloes could be built up in any State which would be of immense value to any one desiring to start breeding farms of buffaloes of their own.

K. S. NAIR, M.R.C.V.S., D.T.V.M.

*Prof. of Animal Husbandry, Osmania University.*

#### GENERALISED TUBERCULOSIS IN A MONKEY— (*Macaca species*).

Sir,

It appears from the last sentence of para 2 of note on "Generalised Tuberculosis in a Monkey—(*Macaca species*)", in page 381 of March 1951 number of the *Journal* ((Paper presented to the Medical & Veterinary Section of the 37th Indian Science Congress, 1950, at Poona,) that the writers have been emphatic in their assertion of "No other records are available in India of Tuberculosis in primate under captivity" without properly searching previous publications. References cited by them are comparatively of recent dates—1924, 1928 & 1940. It has perhaps escaped their notice to look into the "Journal of Tropical Veterinary Science" published by the Government of India during the years of 1906—1911, and was edited by Colonel Henry Thomas Pease, the then Inspector General of the Civil Veterinary Department in India in collaboration with the Officers of the Indian Civil Veterinary Department.

A note similar to above under caption "Generalised Tuberculosis in a *Macacus*" in Volume V, 1910, No. 2, page 281, with coloured Plate No. XXIII, of the *Journal of Tropical Veterinary Science* also another note on "Tuberculosis in the Liver and Spleen of a Lemur" (nocturnal mammals

allied to monkeys), as well as reports on tuberculosis in animals other than primates in captivity, received from the Calcutta Zoological Gardens and elsewhere, were published periodically in different other Journals from the Raymond Research Laboratory of the Bengal Veterinary College, Calcutta, in the past. Specimens prominently showing tubercular lesions in lungs, spleen, pleura, kidney, skull, brain etc., from the above cases reported from the Raymond Research Laboratory have been kept preserved in the Pathological Museum of the Bengal Veterinary College at Calcutta.

The tendency, not infrequently noticed, on the part of certain enthusiastic modern veterinarians to indulge without a demur in renouncing the findings of the past in matters they consider to have themselves made a discovery—is regrettable. A remark in this connection also by Major R. W. Knowles, I.M.S., in para 4 of "Discussion" in *Indian Medical Gazette* June 1926, page 271, will be found interesting.

("Macacus" seems to be a 'Generic' name and not "species" name—as has been stated in the title of their note under reference.)

"Rojoni-Kuteer" }  
Calcutta.  
25th June 1951. }

H. C. GANGULEE,  
196A, Lansdowne Road,  
Calcutta-29.

#### IMMUNISATION AGAINST RINDERPEST WITH LAPINISED VIRUS

It was reported in *The Veterinary Record* of September 2nd, 1950, that 50 dairy cattle, highly susceptible to rinderpest, were vaccinated in Hong Kong with lapinised virus immediately after their arrival from Scotland in April 1950; at the same time it was suggested that from time to time some of those animals would be challenged with bovine virus.

After the lapse of one year, the animals selected for this experiment were as follows:—

A. An Ayrshire bull calf, six months old, not previously immunised against rinderpest.

B, C. and D. Three Ayrshire cows vaccinated (as pregnant heifers) with lapinised virus immediately after arrival from Scotland in April 1950; B. and C. at that time had shown thermal reactions of 104.4°F. and 104.6°F. respectively on the fourth day after inoculation: the reaction in the case of D. was 104.4°F. on the sixth day.

E. A yearling Ayrshire heifer which, born at sea shortly before arrival in Hong Kong, was vaccinated in April 1950, at the tender age of between one and two weeks. The only fever exhibited at that time by this calf was 102.8°F. on the third day after inoculation.

By courtesy of Mr. R. P. Jones, M.R.C.V.S., bovine virus was flown from Bangkok on April 25th 1951, and inoculated into those five animals on April 25th, 1951, with the following results.

A. The temperature, which commenced to rise on the fourth day, was maintained at about 105.0° F. to 106.0° F. until the eighth day, when the calf was destroyed. During this interval, typical symptoms of rinderpest—profuse nasal discharge, mouth lesions, inappetence and haemorrhagic diarrhoea—were observed.

B. C. and D. None of those animals showed any signs of illness. On the morning of the sixth day, B developed a temperature of 102.4° F: this receded in the afternoon. The only fever shown by C was 102.4° F and 103.2° F, respectively on the morning and evening of the fifth day: in the case of D the temperature remained normal throughout.

E. This heifer also showed no signs of illness: the temperature rose to 103.4° F. on the afternoon of the fifth day, and became normal on the following day.

It is evident that the immunity conferred on the four challenged animals by the use of lapinised virus in April, 1950, is still durable in April 1951. It is hoped to challenge further animals from the group of 50 referred to above (which will not in the meantime receive any further vaccination) in April of succeeding years.

H. D. WATSON,

Dairy Farm, Ice & Cold Storage Co., Ltd., Hong Kong.

Vety. Rec. Vol. 63, No. 20.

## College News

### Punjab Veterinary College, Hissar.

#### Examination Results—1949.

The following candidates of the Punjab Veterinary College, Hissar, passed the Annual Final Professional B. V. Sc. Examination of the Punjab University, Solan, held in April, 1949 :—

| Serial No. | Name                       | Marks obtained (Max. 900 marks.) | Serial No. | Name                 | Marks obtained (Max. 900 Marks) |
|------------|----------------------------|----------------------------------|------------|----------------------|---------------------------------|
| 1.         | Krishan Gopal              | 618                              | 8.         | Ajit Singh Grewal    | 586                             |
| 2.         | Sohan Singh Sahni          | 601                              | 9.         | Indarjit Singh Yadav | 579                             |
| 3.         | Canesh Prasad Singh        | 591 (U.P.)                       | 10.        | Brind Bahadur Singh  | 578 (U.P.)                      |
| 4.         | Satya Pal Ohri             | 590                              | 11.        | Om Parkash Malhotra  | 570                             |
| 5.         | Jogindar G. Singh Mohindra | 590                              | 12.        | Bharath Singh Sindhu | 554                             |
| 6.         | Jagdish Singh Aneja        | 589                              | 13.        | Sukhdayal Singh Gill | 548                             |
| 7.         | Indar Singh Cobli          | 588                              |            |                      |                                 |

The following candidates of the Punjab Veterinary College, Hissar, passed the Bi-annual Final Professional B. V. Sc. Examination of the Punjab University, Solan, held in July, 1949 :—

|                       |     |                          |     |
|-----------------------|-----|--------------------------|-----|
| 1. Balbir Singh Kalia | 587 | 4. Pushkar Raj Kapuria   | 579 |
| 2. Kanwal Dev Vaid    | 587 | 5. Jagdish Chandar Koali | 546 |
| 3. Vashesh Chandra    | 583 |                          |     |

#### Examination Results—1950.

The following candidates of the Punjab Veterinary College, Hissar, passed the Annual Final Professional B.V.Sc. Examination of the Punjab University, Solan, held in February-March 1950 :—

| Serial No. | Name                        | Marks obtained (Max. 900 marks.) |
|------------|-----------------------------|----------------------------------|
| 1.         | Balir Krishan Soni          | 660                              |
| 2.         | Faqir Chand Malhotra        | 655                              |
| 3.         | Gyan Chand alias Gian Singh | 629                              |
| 4.         | Gopi Chand Taneja           | 619                              |
| 5.         | Gopi Chand Negi             | 601                              |
| 6.         | Badan Singh Sindhu          | 581                              |
| 7.         | Sube Singh Dhankher         | 579                              |
| 8.         | Mohinder Singh Oghra        | 566                              |
| 9.         | Jaswant Rai Sharma          | 566                              |
| 10.        | Gurbakhsh Singh Dhaliwal    | 565                              |
| 11.        | Kantilal D. Padhya          | 556                              |
| 12.        | Ram Parkash                 | 564                              |
| 13.        | Puran Chand Dogra           | 556                              |
| 14.        | Roop Narain Saxena          | 539                              |

The following candidates of the Punjab Veterinary College, Hissar, passed the Bi-annual Final Professional B. V. Sc. Examination of the Punjab University, Solan, held in May, 1950 :—

| Serial No. | Name               | Marks obtained (Max. 900 marks.) | Serial No. | Name                 | Marks obtained (Max. 900 Marks) |
|------------|--------------------|----------------------------------|------------|----------------------|---------------------------------|
| 1.         | Virindar Lal Mehta | 610                              | 4.         | Jagjit Singh Gadhoke | 543                             |
| 2.         | Satya Pall Arora   | 596                              | 5.         | Sunder Das Dawra     | 534                             |
| 3.         | Baldev Sachdeva    | 564                              |            |                      |                                 |

#### Examination Results—1951.

The following candidates of the Punjab Veterinary College, Hissar, passed the Annual Final Professional B.V.Sc. Examination of the Punjab University, Solan, held in February—March, 1951 :—

| Serial No. | Name                   | Marks obtained (Max. 900 marks) | Serial No. | Name                 | Marks obtained (Max. 900 marks) |
|------------|------------------------|---------------------------------|------------|----------------------|---------------------------------|
| 1.         | Om Parkash Gautam      | 640                             | 13.        | Brahm Swarup Kaushal | 568                             |
| 2.         | Amrik Singh Chowdhry   | 635                             | 14.        | Kalyan Singh Chauhan | 567                             |
| 3.         | Rattan Chand           | 628                             | 15.        | Gurdev Singh Parmar  | 562                             |
| 4.         | Surat Singh            | 610                             | 16.        | Balbir Chand Kohli   | 558                             |
| 5.         | Harihar Swarup         | 606 (Patiala-PEPSU)             | 17.        | Jai Singh            | 556 (Rajasthan)                 |
| 6.         | Gurcharan Singh        | 597                             | 18.        | Shambhu Prasad Sinha | 555 (U.P.)                      |
| 7.         | Chuni Lal Sehgal       | 585                             | 19.        | Gurbachan Singh Sohi | 554                             |
| 8.         | Gurbachan Singh Sachar | 584                             | 20.        | Ram Das              | 549                             |
| 9.         | Jaint Ghulati          | 580                             | 21.        | Sewa Singh Sekhon    | 547                             |
| 10.        | Sat Pal Singh          | 575                             | 22.        | Gurwant Singh Bajwa  | 535                             |
| 11.        | Panna Lal Chadha       | 571                             | 23.        | Om Parkash Jhanja    | 532                             |
| 12.        | N. R. Parmar           | 568 (Baroda)                    |            |                      |                                 |

The following candidates of the Punjab Veterinary College, Hissar, passed the Bi-annual Final Professional B.V.Sc. Examination of the Punjab University Solan, held in May, 1951 :—

| Serial No. | Name                | Marks obtained (Max. 900) | Serial No. | Name               | Marks obtained (Max. 900) |
|------------|---------------------|---------------------------|------------|--------------------|---------------------------|
| 1.         | Om Bakhsh Agnihotri | 572                       | 4.         | Omkar Nath Maitra  | 544                       |
| 2.         | Jagdish Mittar      | 565                       | 5.         | Raminder Pal Singh | 539                       |
| 3.         | Jagjit Singh Mann   | 552                       | 6.         | Ranbir Singh Malik | 534                       |

#### Examination Results—1951.

The following candidates of the Punjab Veterinary College, Hissar, already holding the L.V.P. Diploma of the Lahore Veterinary College, passed the Annual Final Professional B.V.Sc. Examination of the Punjab University, Solan, held in February–March, 1951, under Special Regulations :—

| Serial No. | Name                             | Marks obtained (Max 1300 marks)          |
|------------|----------------------------------|------------------------------------------|
| 1.         | Major Sunder Singh IRVFC         | 1162 (Distinction in Veterinary Surgery) |
| 2.         | Major Roshan Lal Bhatia IRVFC... | 1008                                     |
| 3.         | Major Harmit Singh Rai IRVFC...  | 977                                      |
| 4.         | Major Bal Singh Sandhu IRVFC     | 936                                      |
| 5.         | Major Bahadur Singh IRVFC        | 899                                      |
| 6.         | Mohinder Lal Mehta               | 892 *                                    |
| 7.         | Major Harnam Singh IRVFC         | 866                                      |
| 8.         | Hari Mohan Bhatia                | 859 *                                    |
| 9.         | Om Parkash Babbar                | 833 *                                    |
| 10.        | Nahar Singh Garewal              | 811 *                                    |
| 11.        | Nagina Singh                     | 791 *                                    |
| 12.        | Ved Parkas Mittal                | 737 *                                    |

\* The total marks exclude marks in English.

The following candidates the Punjab Veterinary College, Hissar, already holding the L. V. P. Diploma of the Lahore Veterinary College, passed the Bi-annual Final Professional B. V. Sc. Examination of the Punjab University, Solan, held in May, 1951, under Special Regulations :—

|    |                   |      |
|----|-------------------|------|
| 1. | Ram Lal Ghulati   | 1114 |
| 2. | Tek Chand Sehgal  | 978  |
| 3. | Kishan Chand Bahl | 801* |

\*The total marks exclude marks in English.

MAJOR A. C. AGGARWALA,

B.Sc., (Hons), M.R.C.V.S., A.I.R.O., P.V.S. (Class 1)

Director, Veterinary Services & Warden of Fisheries,  
Punjab G.H.Q. Middle Block, Simla. W & Dean of  
Veterinary Faculty Punjab University, Solan.

Simla, }  
4th July, 1951 }

In the examination results wherever (Max. 900 Marks) is printed please read (Max. 1000 Marks).

#### Assam Veterinary College, Gauhati

##### Examination Results.

The following students have passed the Final Diploma Examination (Graduate in Veterinary Science and Animal Husbandry) of the Assam Veterinary College.

The result given is in order of merit.

|     |                         |     |                            |
|-----|-------------------------|-----|----------------------------|
| 1.  | Chandra Kanta Goswami.  | 12. | Zokhuma.                   |
| 2.  | Abdur Raquib.           | 13. | A. A. Lagendhengba Ao.     |
| 3.  | Bhola Nath Tamuli.      | 14. | Ratna Ram Das.             |
| 4.  | Harendra Nath Rajkhowa. | 15. | Irshad Hussain.            |
| 5.  | Parikhit Chandra Das.   | 16. | Mafijuddin Ahmed Hazarika. |
| 6.  | Tulsi Nath Dutta.       | 17. | Indra Nath Bhuyan.         |
| 7.  | Madhab Chandra Sen.     | 18. | Harendra Nath Sarma.       |
| 8.  | Tarun Chandra Bhuyan.   | 19. | Dhanesh Lal Mazumdar.      |
| 9.  | Prem Nath Saikia.       | 20. | Girish Chandra Phukan.     |
| 10. | Baroda Kanta Goswami    | 21. | Gopal Chandra Kakati.      |
| 11. | Mahboob Ali.            |     |                            |

Gauhati, }  
30-5-51. }

G. K. MEHRA,  
Principal.

#### Madras Veterinary College

##### Results and final B.V.Sc. Examination held in June 1951.

Out of 77 candidates who took the B.V.Sc. Degree Final (N. R.) Examinations, June 1951, 26 have passed and they are as shown below :—

|     |                           |     |                           |
|-----|---------------------------|-----|---------------------------|
| 1.  | Adinarayanan, N.          | 14. | Parvatisam, A. R.         |
| 2.  | Bhasker, C. G.            | 15. | Prabhakar, S.             |
| 3.  | Devendranath Das.         | 16. | Raghavan, K. C.           |
| 4.  | Jayaraman, N. R.          | 17. | Ramachandran, B. V.       |
| 5.  | John Selvaraj Moses.      | 18. | Ramachandran, V.          |
| 6.  | Kotayya, K.               | 19. | Ramamirtham, S.           |
| 7.  | Krishnamurthi, C. R.      | 20. | Ramu, M.                  |
| 8.  | Krishnamurthi, N.         | 21. | Sasibhushana Nayudu.      |
| 9.  | Krishna Rao, P.           | 22. | Seneviratna, K.A.D.P.S.   |
| 10. | Kunhi Kannan Nambiyar, P. | 23. | Seshadri, V. K.           |
| 11. | Lakshminarayanan, K. S.   | 24. | Sivaramakrishnamurti, S.  |
| 12. | Muthanna, P. G.           | 25. | Venkatakrishnan, R.       |
| 13. | Natarajan, R.             | 26. | Venkatasisitarama Rao, B. |

Madras }  
13-7-51 }

I. M. AZIZUDDIN,  
Principal.

**Diploma examination result of Veterinary Livestock  
Inspectors course held in June 1951.**

- |                            |                          |
|----------------------------|--------------------------|
| 1. Krishnamurthy, A. S.    | 24. Achuthan, K.         |
| 2. David, S. E.            | 25. Ramakrishna Shetty.  |
| 3. Srinivasa Chetty, S. N. | 26. Chellian, R.         |
| 4. Sampangi Chetty.        | 27. Brahamana Gowd.      |
| 5. Subbiah, D.             | 28. Swaminathan, N.      |
| 6. Gajendran, V. K.        | 29. Gopal Raju, G.       |
| 7. Venkatasubba Rao, K.    | 30. Sivasankaran, M.     |
| 8. Cholaipandian, S.       | 31. Kanna Rao, V.        |
| 9. Devasagayam, G.         | 32. Kannappan, K.        |
| 10. Muthuraman, P. A.      | 33. Venkatarama Rao, T.  |
| 11. Ramasubramanian, T. A. | 34. Hanumanthan, N.      |
| 12. Radhakrishnamurthy.    | 35. Ramachandran, R.     |
| 13. Daniel, N. K.          | 36. David Purushothaman. |
| 14. Balaiah Chetty.        | 37. Sadguna Rao, F.      |
| 15. Ramankutty, N.         | 38. Dorairaj, S.         |
| 16. Krishnan, K.           | 39. Jayaraman, M.        |
| 17. Nagarajan, K.          | 40. Balanarayana Chetty. |
| 18. Venkatasubbiah, G. M.  | 41. Shaik Abdul Khader.  |
| 19. Vasudevan, N. S.       | 42. Lakshmanan, C. K.    |
| 20. Ramaprasada Rao, A.    | 43. Madhavan, A.         |
| 21. Vidhyadharan Nair.     | 44. Purushothaman, M.    |
| 22. Ramaniah, V. V.        | 45. Ramana Rao, B.       |
| 23. Radhakrishnayya, R.    | 46. Venkateswaralu, V.   |

Madras }  
10-7-51 }

I. M. AZIZUDDIN,  
Principal.

## Extracts

**Pregnancy Diagnosis Tests in Farm Animals (Using the Common Indian Toad, *Bufo Melanostictus* Schneid.)**—By J. L. BHADURI, D.Sc., F.N.I., Department of Zoology, University of Calcutta.

A reference to Cowie's recent publication<sup>1</sup> will show clearly that no successful pregnancy tests of any diagnostic value have been found in any farm animal excepting the mare, relative to the hormonal investigations into such body fluids as urine, blood (serum), saliva and milk. Since the publication of this book and within the past three years an entirely new test—the male Salientian (frogs and toads) test—has been instituted and has stimulated a brisk investigation into this field in both human and veterinary medicine, more especially because of its very encouraging attributes in regard to speed of reaction, accuracy, sensitiveness and economy. Following success by the use of male Salientian tests in human medicine, a few attempts have been made on veterinary subjects, but negative results have so far been reported from the urine and serum tests<sup>1,4</sup>, although Neto<sup>5</sup> claimed to have obtained some apparent success in mares. The present writer, in collaboration with his student, Mr. Bardhan<sup>1</sup> has been able to show recently that the pregnancy diagnosis test is possible in cows from processed faecal solution, utilizing the common Indian male toad, *Bufo melanostictus*, as the test animal. It was reported in their preliminary note

Reprinted from *The Veterinary Record*, 62, [1950] 618. November 4.

that diagnosis could be made in cows from the 55th day of pregnancy, but their subsequent studies on a further series of tests run at this laboratory detected pregnancy as early as the 22nd day of gestation, and even in one instance at only 15 days gestation (unpublished data). To the best of my knowledge no actual demonstration of this gametokinetic reaction of faecal solution in the male Salientia has been reported before. Encouraged by this finding, experiments on similar lines were designed by me in collaboration with my students, Messrs. S. L. Bose and H. Kundu, for the investigation of pregnancy diagnosis in buffaloes and goats. It may be noted that in these two species no successful pregnancy test has been described, although Csiki claimed to have obtained positive results from the Cuboni test with the urine of buffaloes after the 100th day of pregnancy (*vide* Cowie<sup>3</sup>).

**BUFFALO:** Success with the cows warranted an expectation of a successful diagnostic pregnancy test in buffaloes. But this expectation was not fulfilled. The exact procedure as adopted in the cow test was found unsuitable, since it always gave a negative result. After a protracted trial, however, the following modification in the procedure was adopted and found suitable for the present.

The urine-free faeces of buffaloes were collected from local private cattle pens where buffaloes are kept and bred. The period of pregnancy was calculated from the dates of their services as reported by their owner. Twenty-five grammes of faeces were mixed with 100 c.c. of distilled water and kept overnight in the frigidaire. On the following day the solution was centrifuged and filtered in a manner suitable for injection into the toad without any apparent detrimental effect on it during experimentation. Three to four successive doses of 5 c.c. each of this processed solution were administered subcutaneously into the lymph sac of the male toad at intervals of half an hour. Before each injection was given, the samplings of toad's urine were made available for examination under the microscope for the presence of sperms, the process being continued for two hours after the last injection was given. Generally at the end of the fourth injection a positive reaction was evoked. The end result was very clear, *viz.*, the presence of sperms in the voided urine. Other details of procedure were more or less the same as in the case of the cow described previously<sup>1</sup>. It was possible in this way to diagnose pregnancy in buffaloes from as early as the 35th day.

Broadly speaking, the main difference between the cow and buffalo pregnancy tests lies in the quantity of faecal matter used and the time taken for processing the solution. It took a couple of days to run the test successfully in the case of the buffalo. Such a discrepancy in the matter of processing the solution cannot be explained at present. Nevertheless, the gametokinetic hormonal reaction of the solution in the toad is the same as that in the cow. In the case of the buffalo, however, the hormone titre seems to be at a slightly lower level than that of the cow. From our preliminary

investigation it would appear that the diagnostic pregnancy test in the buffalo, relative to the uses of faeces and the male toad, as the suitable material and animal respectively, might prove of value. The results obtained from ten different buffalo pregnancy cases seem so far to be reassuring in respect of accuracy and economy. A full report of the work is in the course of preparation by the signatory and his student, Mr. S. L. Bose, and soon will be published elsewhere.

GOAT: While a 100 per cent success was obtained in buffaloes, only a few sporadic positive results were achieved in a series of more than 50 tests in goats. Here again goat faeces were used for processing the solution in much the same way as in cows and buffaloes. Three, 5 and 10 grammes of faeces were tried. Each quantity yielded both positive and negative results on different days, the latter being more in evidence. It was pointed out in a previous note<sup>1</sup>, on the basis of Turner's statement, that there is slightly more gonadotrophic hormone activity in goat's faeces than in the cow's. The present studies, however, tend to indicate not only a low hormone titre but the capricious nature of hormone excretion in the goat's faeces. Nevertheless, the mere fact that positive reactions could be evoked from processed faecal solution in a few cases of both early and late pregnancy is encouraging enough to justify a continuation of this work. It is hoped that the faecal solution, as such, with different proportions of faecal material or its extraction, ultimately may prove this test to be of diagnostic value in this animal.

Although I have not dealt with other farm animals for which no adequate pregnancy diagnosis tests are available, my preliminary studies on faecal matter as a suitable test material seem to promise well for future researches in this line. Unfortunately, I could make no attempt to pursue them owing to the fact that in Calcutta such breeding farm animals as the horse, sheep, etc., are not available for the purpose. The present author thinks that gonadotrophic hormonal tests based on faecal material should be given a fair trial for pregnancy diagnosis in all those farm animals which have so far yielded either negative or unconfirmed positive results from experiments with such body fluid test material as serum, urine, milk, sweat, etc. The simplicity of the technique, as much as its economy, renders the tests of real value.

*Acknowledgment.*—The collaboration of my students, Messrs. S. L. Bose, H. Kundu and N. R. Bardhan, in this study is gratefully acknowledged.

#### REFERENCES

1. BHADURI, J. L., & BARDHAN, N. R. (1949.) *Sci. & Culture*, Calcutta. **15**, 78.
2. BRATANOV, P. P. (1949.) *Clinica Bulg.* **7**, 1-14.
3. COWE, A. T. (1948.) *Pregnancy Diagnosis Tests: A Review. Commonwealth Agric. Bur. Publ.*, No. 13, Great Britain.
4. GALLI-MAININI, C. (1948.) *J. Amer. Med. Ass.* **138**, 346 and **136**, 121.
5. NETO, J. F. T. (1949.) *Amer. J. vet. Res.* **10**, 74.

#### Male Toad (*Bufo Melanostictus*) Test for Bovine Pregnancy by Filter Paper Dialysis of Hormone Extraction from Faeces.\*—

By J. L. BHADURI, and N. R. BARDHAN, *Pregnancy Diagnosis Laboratory, Department of Zoology, University of Calcutta.*

In a previous note we<sup>1</sup> reported how it was possible to diagnose pregnancy in cows from the simple cow dung solution, utilizing the common Indian male toad, *Bufo melanostictus*, as the test animal. The gametokinetic reaction in the male toad (*i.e.*, emission of spermatozoa via the urine) which takes place under the hormonal influence of the faecal solution constitutes the main criterion of the cow pregnancy diagnosis test. This simple procedure has also enabled us to obtain very satisfactory results even in earlier cases of pregnancy in cows (8 days pregnant and onwards) than in those reported previously<sup>2</sup>. It may also be of interest to mention here that the processed solution prepared from the faeces of buffaloes and goats has also yielded the same satisfactory, but interesting results, especially in the case of buffaloes, by following a slightly different procedure (Bhaduri<sup>3</sup>).

In the preparation of the cow-dung solution there are a few obvious difficulties, however. An attempt has of late been made to modify our previous procedure, and this seems to promise more effective and satisfactory results without loss of accuracy. The present communication relates to this new procedure.

*Technique:*—The urine-free cow dung obtained from the Bengal Veterinary College, Calcutta, was used in this study. Thirty grammes of manure, instead of fifteen, were divided into three equal parts. Each quantity was put in filter paper and done into small rectangular cake-like package. It was securely stringed to prevent leakage, when placed in water. The three packages thus made were then completely immersed in 100 cc. distilled water and kept undisturbed in the refrigerator for an overnight period.

In the stirring and shaking of the faeces in the water<sup>1</sup>, the hormone is quickly extracted in the solution. Since the hormone is permeable through the filter paper and slowly extracted in the water if kept undisturbed, the quantity of manure was doubled and sufficient time was allowed to elapse for its proper extraction. Next day, *i.e.*, after at least 20 hrs. of immersion the three packages were carefully taken out. The opalescent transparent homogeneous solution thus obtained was filtered once again to make it ready for injection. In a preparation like this it is expected to obtain 60cc of the solution which is quite sufficient for successfully running two experiments, if necessary. As a matter of fact, we hardly ran a second test, since the first gave us the decisive result. The solution processed in this way may be described as the filter paper dialysis method of extraction of hormone from the faeces.

\*Reprinted from *Science and Culture* Vol. 16, pp. 264-266, December, 1950.

In this study we used, as usual, the males of the common Indian toad, *Bufo melanostictus*, as the best suitable test animal. In each test, before an injection of the aforesaid solution was given, the toad's urine had been checked for the presence of spermatozoa, under the microscope.

A little change was also introduced in the injection procedure. Since the initial 5cc dose never evoked any positive reaction in the toad within an hour as reported previously<sup>1</sup>, we started with a 10cc initial dose in the hope of cutting down the time of reaction. Generally, a response was elicited within half an hour of the first dosage. But when it failed in an hour's time a second dose of 5cc was forthwith administered. In the event of failure to evoke a response within an hour's time of the second dose, a third 5cc dose was finally administered. If positive results were not obtained after the third injection within the two following hours the test was declared negative. In this way we injected a total of 20cc in three successive split doses of 10cc, 5cc and 5cc each at intervals of one hour till the end-point was clearly shown by the presence of spermatozoa in the toad's urine. Injections were made alternately into the dorso-lateral lymph sacs of the toad.

Samplings of urine for microscopic visualization of sperms were, however, spaced every half hour for a total of four hours in all. A positive result indicates the presence of spermatozoa in any quantity, one or more, motile or non-motile and their absence indicates negative.

**Results:** Thirty tests were run in all of which 21 cases came from cows in different stages of pregnancy and the results were shown in Table I.\* The remaining 9 tests from non-pregnant cows gave negative results and formed the basis of control series. All the cases were confirmed by clinical follow-ups and found to be correct.

A further analysis of the results in reference to the time of re-action is shown in table II.\* Now it may be appreciated from this table that out of 21 cases, 12 reacted positively within half an hour after the first injection. This indicates no doubt a great improvement upon our previous procedure. The remaining 9 gave reactions at different hours ranging from 1 to 2½ hours. It may be noted that for only 3 and 2 cases, the second and third injection were employed respectively (*vide* Table I). This discrepancy in the time of reaction as well as the number of doses cannot be adequately accounted for at the present moment. We cannot also say whether it would have been possible to obviate the delayed reactions in a few instances by either increasing the faecal quantity or by prolonging the immersion of the faecal packages in water.

A reference to Table I will further show that in some instances a positive reaction turned negative at the third hour. Seven such cases are

\*Tables I & II have been omitted for want of space.

apparent from Table I, and they are confined up to 98 days of pregnancy. The reaction in these instances are no doubt weak, and this means a low hormone titer in the faecal solution. With the available data we cannot say this weak feature is confined to early pregnancy.

**Concluding remarks:**—Though it takes a two-day period *i.e.*, about 24 hours for the performance of this test, the advantages are obvious. The solution prepared in this modified way (filter paper dialysis method), though not bacteria-free, is clear enough to be absorbed more quickly by the toad and thereby minimises the death rate of the test animals. The results so far obtained indicate a hopeful feature from the point of view of speed of reaction. It further appears that the hormone titer could somewhat be enhanced by prolonged immersion of faeces in water. Experiments in this line with different quantities of faeces have been designed for our further studies.

We record with pleasure our grateful thanks to Drs. A. Sanyal and B. Bose of Bengal Veterinary College, Calcutta, for giving us specimens of cow-manure and also for reports of clinical confirmation of our tests.

#### REFERENCES

1. Bhaduri, J. L. and N. R. Bardhan. *Science & Culture* 15, 78, 1949.
2. Bhaduri J. L. and N. R. Bardhan, (*In preparation*).
3. Bhaduri J. L. *Vet. Rec.*, 62, 618, Nov. 4, 1950

### Review

**Questions and Answers—Veterinary.**—Edited by J. V. LACROIX, D.V.S., and H. PRESTON HOSKINS, V.M.D., Published by the, American Veterinary Publications, Inc. Evanston, Illinois, U.S.A. \$ 4.00 in the U.S.A., and \$ 4.25 elsewhere. [Copies of the book can be had through the Editor, *I. V. J.*]

This is rather an unusual publication but all the same a very good one which would be welcomed by the busy Veterinary Practitioner who wants a ready reference for solving some of his complex problems and also by the Veterinary Students, especially by those doing the Final Year, who want their doubts cleared in a concise and a 'tabloid' form.

The book is a collection of the 'Questions and Replies' which appeared regularly in the pages of *The North American Veterinarian* from the year 1945 onwards. They have been classified and arranged in six

chapters according to the species of animals like Bovine, Equine, Porcine, Ovine-caprine, Canine-feline and Avian with a seventh chapter on Miscellaneous subjects. All these chapters contain very interesting questions on common and uncommon diseases met with in Veterinary practice. They number over 500 and cover a wide variety of subjects. The contributors of the answers are well-known members of the Veterinary profession who may be considered to be authorities in their respective fields and, consequently, the answers to the queries are very comprehensive and contain the latest information. There is no hesitation in admitting our imperfect or inadequate knowledge of certain diseases wherever their etiology is unknown and this enhances the value of the information contained in the book.

On certain diseases, our experience in this country differs from the answers given in this book. For instance, in Acne (incidentally the indexing of this is a mistake—Instead of 116, it is 2) we get good results from a course of auto-vaccine and colossal manganese injections. Similarly for running fits in dogs, we have found Thiamine Hydrochloride, intramuscularly, very effective. These of course do not detract from the value of this publication and we recommend it wholeheartedly to the Practitioner and Student alike.

### Erratum

In the Table of contents, section VI, of the *Indian Veterinary Journal* for May 1951 the author of the article "Studies on Myiasis and its treatment" has been wrongly mentioned as Lt. G. V. Short. The correct designation of the author is Col. G. V. Short, M.R.C.V.S.

### Editor's Note

The Editor regrets very much that, owing to great scarcity of paper, and its high cost, it had not been possible to include in this issue some of the articles received for publication and had to reserve them for a subsequent issue. The late publication of the *Journal* is also due to the same causes.

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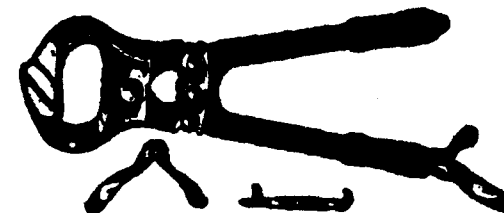
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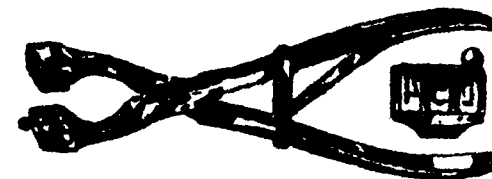
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