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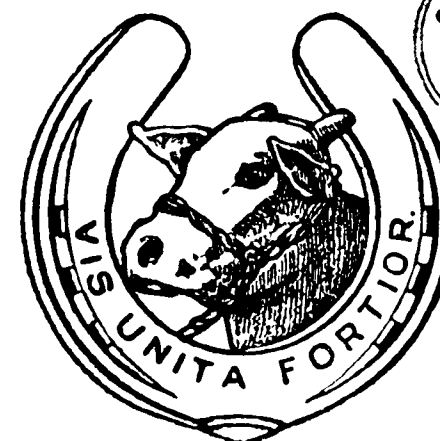
SEPTEMBER, 1956

THE INDIAN VETERINARY JOURNAL

(The Journal of the All-India Veterinary Association)

*A Bi-Monthly Record of
Veterinary Science*

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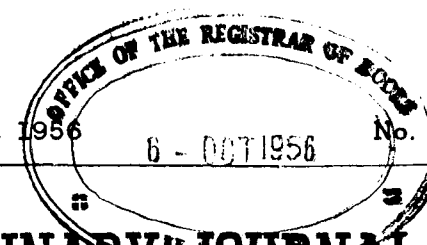
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September, 1956



THE INDIAN VETERINARY JOURNAL

[THE JOURNAL OF THE ALL-INDIA VETERINARY ASSOCIATION]

PUBLISHED ON ALTERNATE MONTHS

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A Bi-Monthly Record of Veterinary Science
Devoted to the cause of the
Veterinary Profession

★

EDITOR

Rao Sahib T. VINAYAKA MUDALIAR, G.M.V.C.,

Office:—23, First Street, Vidyodaya East, T'Nagar,
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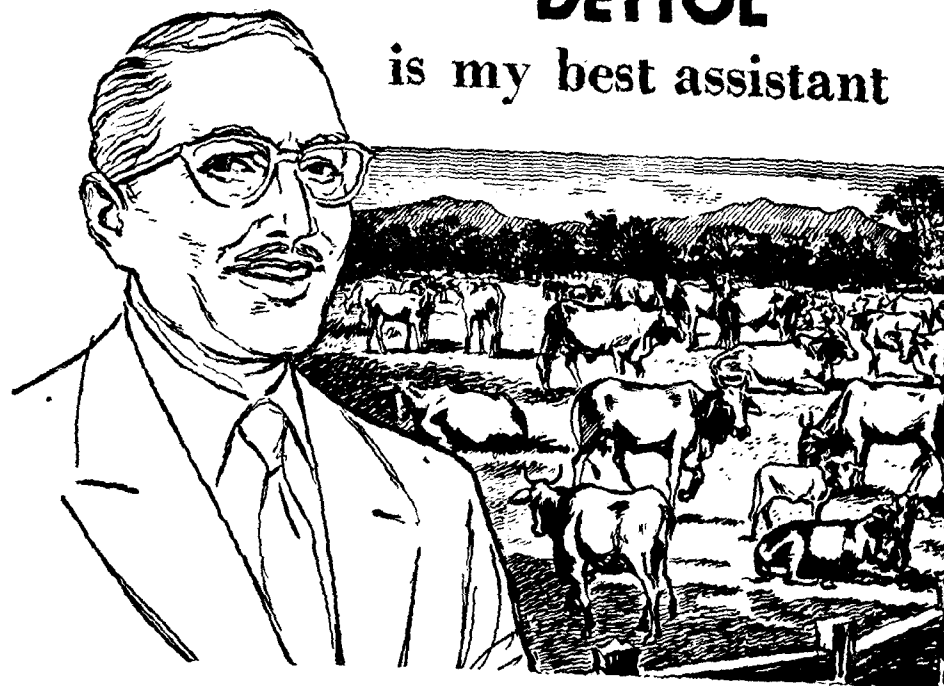
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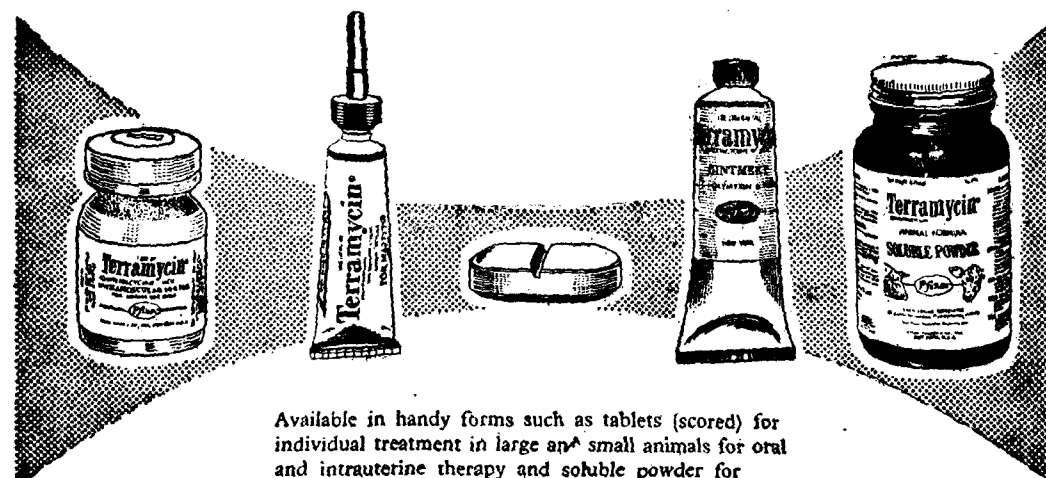
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NOTICE

We wish to remind once again that subscribers who have not so far sent in their subscriptions for the current Volume, may please hasten their remittance to ensure continuity of supply. We seek this much of co-operation from our professional colleagues.

Editor,

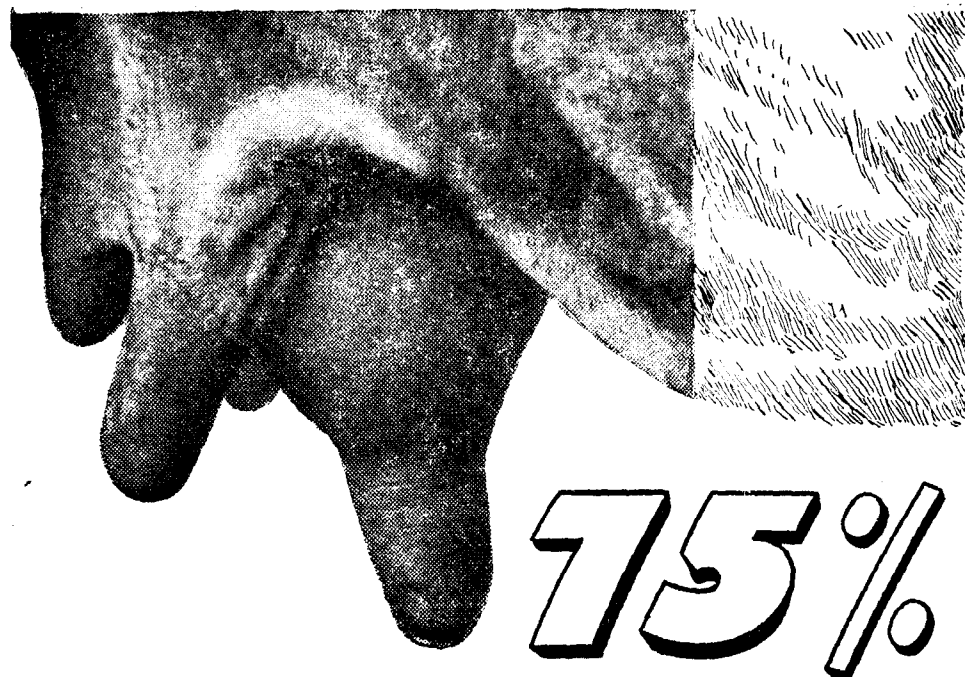
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Vol. XXXIII

, SEPTEMBER, 1956

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Editorial

THE SECOND FIVE YEAR PLAN

"That there should be widespread poverty and misery in a country so lavishly endowed by Providence with man-power, talent and natural resources is an intolerable paradox and a disgrace which should fill us with shame and anger and a burning desire to wipe out this terrible wrong done to our people". So said, Mr. J. R. D. Tata one of the leading Industrialists of this country in 1944. And 12 long years have rolled on, since those burning words, so realistic of the feelings that agitate the breast of every true-born Indian were uttered, and yet we fail to see any change in the lot of the common man in this land.

But India is a late starter in the comity of nations and she has been making frantic efforts, after independence, to make up for the time lost. Barely within 2½ years of her independence, she came out with her First Five Year Plan, which ended in March 1956; and she is ready again with her Second Five Year Plan and looks forward to an era of further progress and prosperity. Her 'great expectations' may or may not be realised but she will not be lacking in her efforts. For she knows that great objectives require great sacrifices and she is prepared for them in her own quiet way. It is this call for *service* and *sacrifice* that we wish to place before the Animal Husbandry workers even before we present the details of the Second Five Year Plan. For, be it remembered that a plan is only a means to an end and it is the spirit of the workers that counts to achieve

that end. Let it not be said that we as a profession were found wanting at this hour of India's supreme need.

Any planning is indeed a highly complicated affair; for it demands a thorough knowledge of the past, present and the future, with their currents and cross currents and more so is national planning of a country of such magnitude, diversity of races and peculiar economic conditions. We admire the lion-hearted efforts of our master-planners. They deserve all co-operation and admiration.

The First Five Year Plan was no doubt a success even from a lay man's point of view. The food-deficit has been met, with the help no doubt of seasonal rains, so mercifully vouchsafed by Providence and prices have come down to a reasonable level, though recently they again show a tendency to rise, due to, it is alleged, un-social elements. It is claimed that 17 million acres of land have been brought under irrigation in those five years and the generation of 'power' has been increased from 2.3 million k. w. to 3.4 million k. w. Large industrial plants have been set up and the national income has gone up by 18%. These are no doubt very encouraging but we have been searching in vain in the report published, about the exact improvement brought about in the First Five Year Plan in the Animal Husbandry field. Is there any improvement noticed in the average yield of milk per cow per lactation; average yield of eggs; wool yield; marketing of milk; marketing of eggs; marketing of wool, etc.

We realise that Animal Husbandry work does not lend itself to easy assessment and that within so short a period as five years. Further a marked improvement in the quality of livestock is a pre-requisite before we undertake a comparative study of income from livestock and their products. Even so, a yard-stick has to be evolved to measure the improvement from time to time and it will also serve as a check on the workers in the field.

But our own fear is that the Animal Husbandry work is not likely to receive the attention it deserves as long as it is clubbed with Agriculture. It must be treated as a separate major subject and more attention focussed on it.

The Plan rightly points out "Studies of Animal Nutrition indicate that the available supplies of cattle feeds, fall considerably short of requirements". What then were the steps taken to meet the shortage in cattle feed, under the First Five Year Plan? What is the good of our preaching to the ryots to feed their cattle *adequately* when we don't make that cattle feed easily available to them and at reasonable price? What are the definite steps taken to increase the milk production—both as a short-term policy and as a long-range programme? It is a well established fact that we could increase the milk yield of even the present low-grade cows by nearly 50 to 60 per cent through proper feeding and management. Has anything been planned in that direction? Will we be far wrong if we say that the present 'milk-famine' is partly man-made? We feel a separate Agency to watch the production, importation, distribution and control of prices of cattle food and fodder under the Second Five Year Plan, will go a long way to solve this knotty problem. Otherwise we will be wallowing in a vicious cycle. We would have liked a definite scheme for increased fodder production, involving Legislative measures, if need be. Unless this is done, Animal Husbandry work is not going to make much head-way in the near future.

Let us now see what exactly the Second Five Year Plan holds out to Animal Husbandry workers. Double the number of Key Villages (1200); double the number of Artificial Insemination Centres (300), which are expected to produce 3000 improved bulls, 936000 improved bullocks and 10000 cows; more Veterinary facilities; more gosadans and goshalas; increased facilities for training of necessary personnel; strengthening of administration; poultry, sheep and wool development are some of the items proposed. The estimated outlay is over 40 crores for Animal Husbandry and 22 crores for dairying.

The report visualises "doubling milk production over the next 10 to 15 years", and it is very emphatic when it says "Such a target is clearly within the bounds of practical possibility". It also says "Large increase can also be secured in the yield of buffaloes". We agree; but where are the definite steps taken?

Again the report says egg production could be doubled "over the next 10 years through improvement of the indigenous stock by grading up and control of disease". Quite so; such work should have by now expanded to a marked extent, but we see no signs of such expansion.

It is clear therefore there has been an inadequate provision for Animal Husbandry work in the First Five Year Plan. We feel the responsibility was perhaps as much of the profession as that of the Government. The profession should be ready with definite schemes and programmes for every item of work and keep on pressing its claims. Let us hope the Second Five Year period will leave a better and more spectacular record of Animal Husbandry work in every State.

THE INDO-AMERICAN REPORT-II

It is interesting to note that this Indo-American Team has in its report dealt with such highly complicated subjects as laying out policies in the matter of pay and prospects; departmental promotions; salary levels; staffing patterns; recruitment rules; retirement rules; delegation of authority, etc. Whether all these were within the terms of reference of that Body or not, need not worry us now. They are there in the report, evidently as highly *involved* subjects, for proper development of Agriculture and Animal Husbandry in this land and let us consider a few of them as they relate to some fundamental principles to be observed in any administration.

Under 'Administration and Personal Management', the report says "The increasing tendency in India in some States or Institutions to place *non-technical* (Italics are ours) Administrative Officers in charge of Agricultural Research, education and other technical services is a move towards mediocrity in technology. This particularly applies to key positions of State Directors of Agriculture". We are happy to state that we have been pioneers in the matter of asserting that only duly and fully qualified Veterinary men should be the heads of Departments of Animal Husbandry in this land. This wholesome principle

applies equally to Veterinary Colleges as well, as has been pointed out in the report. The College or the Department should be "provided with the highest calibre of technical guidance". Otherwise the report is right in saying that much time is lost in "educating the non-technical Administrative superiors" by a handful of subordinate technical workers with attendant evils. We wish the Government takes steps to set matters right in such of those States which have erred grievously in this direction. Otherwise it does no credit to all concerned to receive such lessons in 'home-truths' from foreign experts.

The report suggests appointment of two officers of the cadre of Joint Directors of Agriculture (we presume Animal Husbandry also) in each State. One to be in charge of education and research, as Principal of the College and the other to be in charge of Animal Husbandry Extension service. This is a sound proposition as it would not disturb the Principal of a College and a seasoned Research worker too often on grounds of seniority or of higher status.

Similarly the report condemns the present "tendency of shifting scientists from one field to another" merely on grounds of seniority and higher emoluments and thus spoiling the continuity and throwing away the experience gained in a particular field of work because there are not equalent categories of pay and prospects in specialised fields of scientific work. This anomaly has caused greater harm to science than any other single factor.

Next "the disparity between the salaries of Scientists and Administrative positions" says the report "is un-realistic" and has the tendency "to decant off intellectual competence into the administrative field". We agree. So long as Scientific men are called upon to wear this mantle of *inferiority complex* through their lower grade of pay and prospects, Science will never advance in India.

Another point of importance raised in the report is the institution of Post-graduate studies both at State-level and at the centre. This is the best of the propositions we like in this report.

But these studies should be made realistic and placed in charge of "Scientists of sufficient stature". That should be the first step. Find men to teach and initiate research of a high order. Comb the country to discover local talent, import if necessary and send out batches of suitable young men for foreign training if required. A bold and dashing policy is clearly indicated with regard to this matter.

"The failure to delegate adequate responsibility to heads of various organisations or units, results in inefficiency through delay" says the report. This clog in administrative efficiency is too well known to need any comment. But the pity of it is that it persists through ages, in spite of repeated condemnation.

The last, but not the least, of the recommendations of this report is that "in view of the critical shortage of technical specialists in Agriculture (we presume Animal Husbandry also is included under this term) every effort should be made to retain those individuals who are well-qualified, in good health and willing to continue in active service beyond the current retirement age of 55". It would certainly be a sound policy if they raise the retirement age to 60 with necessary provisos, as they seem to have done in the case of Medical personnel of Central Government service. This should be a matter of general policy and not of individual preferment, as it often happens. Otherwise it is nothing but utter lack of vision and imagination to throw away so much of talent and experience at their zenith on scrap heap, when the country needs them most.

The report recommends strengthening and activation of professional societies and provision of facilities and funds for Scientists to attend National and International meetings. None can deny the wisdom of this proposal, which we have ourselves been pleading for years on end now.

Such is this historic report, for it is nothing less, full of perils in parts and full of merit in others—an odd mixture, that evokes awe and admiration in the reader. We have offered our criticism not in any spirit of cavil but of serving the best interests of the country and nothing more and nothing less.

THE VETERINARY RECORD AND MAJOR HAMILTON KIRK.

We draw attention to a letter written to the *Veterinary Record* by a doyen of our profession in England, Major Hamilton Kirk, which we publish as an enclosure to this editorial, as it is more than of passing interest to the profession.

We have ourselves been feeling on similar lines with regard to the *Indian Veterinary Journal* in recent times and of the "high-brow" nature that it was assuming in spite of our effort, to include articles of interest to general practitioners as well. But science has to advance and the budding Scientists have to be encouraged to come out in the open and learn through trial and error methods. There cannot be any hard and fast rule on a matter of this kind and what Major Kirk evidently means is that there should be a 'balanced-fare' in a professional journal to meet the requirements of all strata of the great community. We agree. But in actual practice it becomes difficult to keep up this balance, due to paucity of articles from general practitioners. The wealth of clinical articles that goes un-recorded is a matter for regret. We appeal to the general practitioners to freely indent on their case-books and give the benefit of their experience to other members of the profession through the pages of a professional journal.

It is also to be noted that there are not enough number of professional journals to receive and record the various papers that have started to flow now-a-days from the Laboratories, Research Institutes, Field Investigation Centres, Health Units etc. The few journals that are in the field struggle hard to cope with this increased volume of work and of such varied nature. It is true the present-day journals are full of tables and graphs, as pointed out by Major Kirk and one sometimes gets allergic to them! One can never get away from these tables and graphs in scientific publications but it is well to remember they must be kept within limits wherever possible. These graphs and tables no doubt help comparative study at a glance but sometimes they make difficult matter to get through. But they are inevitable in articles of special nature but the tendency to exploit them in season and out of season, should be avoided. An elegant

narrative form is sometimes more effective than pages of drab graphs and tables. This habit of presenting anything and everything in the form of tables and graphs is fast developing into a scientific monotony. A certain model is no doubt good but there is the danger of its abuse, which should be guarded against.

Major Hamilton Kirk has also drawn attention to the fact that Veterinary Journalism should not miss dealing with subjects of general news value on Animal Husbandry matters, that appear in the lay press from time to time. But one has to do it with great discretion as "much of the land in the delta is water".

However, Major Kirk has done a distinct service in coming out boldly with his suggestions.

COPY OF THE LETTER ADDRESSED TO THE VETERINARY RECORD,

Sir, For many years, members of Council (and particularly of Editorial Committee) have tried to devise means of improving *The Veterinary Record*. This publication has in recent times become—might I say—very "high brow", devoting what I think to be far too much space to highly involved and technical articles with, almost invariably, pages of tables in each issue.

Such articles are written, and read, by experts in some particular sphere, and I am bound to say, are often of little interest to a busy general practitioner.

From a close association with so many of my colleagues over the years, I know this to be a fact. Men have said to me: "I have little time for reading; hardly see the daily paper. So when *The Record* arrives I usually turn at once to the correspondence and the scanty bits of news".

The purpose of this letter, is to emphasise the importance (as I view it) of making *The Record* more alive, and of greater appeal to the busy practitioner, in fact of greater news value.

How many times clients, having read some item of veterinary interest in the national papers, have come to me and asked what are the views of my profession on the particular matter. I have had to say that the profession has expressed no view. I find many items in the daily

papers which are of particular interest to practising veterinary Surgeons, but never do I find any reference to them in *The Record*. A few weeks ago a whole page of a Sunday newspaper was devoted to discussion of some electrical box or gadget which quite responsible people have affirmed was capable of curing certain ailments at a distance. It sounded incredible to me, but animal owners who had used it, insisted it had a great value. Some brief description and comment might well have appeared in our journal, if only for the sake of putting our members on possession of the facts. Then there was the case of the poisoning of two horses at sea by strychnine, a case which was of particular interest to those of us who frequently act for underwriters in investigating claims. The veterinary evidence as reported in one paper was to the effect that the horses died of constipation.

Just recently I read that race-horses derive great stimulus from injections of vitamin B₁₂. It is probably being increasingly used to make horses win.

Such cases as these are good subjects for discussion, as also are the many legal cases in which we are concerned but which hardly ever get even a notice. I would like to see a news section of *The Record* in which all matters of veterinary interest occurring in our everyday life are freely reported and discussed.

28, Park Hill,
Ealing, W. 5.
January 28, 1956.

Yours faithfully,
HAMILTON KIRK.

SHRI M. I. MALIK RETIRES

We learn from an account published elsewhere that the Director of Animal Husbandry, Bihar, Shri M. I. Malik, B. Sc., M.R.C.V.S., has gone on long leave preparatory to retirement. He was a quiet and unostentatious worker who held the direction of Animal Husbandry work in Bihar for nearly 18 years continuously and was responsible for the steady progress which the State has made in recent years.

A grand farewell party was given at the Secretariat on 21—2—'56, which was well attended by the Ministers of the State, heads of Departments, Officers of the Animal Husbandry Department and leading citizens of the town.

We wish Shri M. I. Malik a long and quiet retired life!

Original Articles

SEROLOGICAL EVIDENCE OF "Q" FEVER IN IMPORTED INDIAN SHEEP AND GOATS

By

D. W. AMERASINGHE, D.V.M.,
Chief Municipal Veterinary Surgeon, Colombo,
and

C. L. WISIDAGAMA, G.V.Sc., P.G. (I.V.R.I.),
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Derrick in 1935 investigated a febrile illness of unknown aetiology among meat workers in Brisbane. He found the disease negative for tests:—Typhus, Undulant Fever, Typhoid, Paratyphoid, Leptospirosis and other common pyrexial diseases. Hence, he named the disease "Q" fever till the aetiological agent of the disease could be determined. Later, Burnet and Freeman (1937-1938) found the causative agent to be Rickettsial. Davis and Cox (1938) in Montana, U.S.A., isolated from ticks (*Dermacentor Andersoni*) a similar organism, which on comparative study by Burnet and Freeman (1939) was found to be immunologically indistinguishable from the Australian strain. The organism was finally named *Coxiella Burneti* to honour the original work of Burnet and Cox.

During World War II, "Q" fever came into prominence as a Mediterranean disease (Robins, Gauld and Warner, 1946.) Up to this time the natural occurrence of the disease was observed to be limited to Australia. Since then the disease has been reported from all parts of the world:—Greece: Caminopetres (1943); United States: Irons *et al* (1946); Panama: Cheney and Geid (1946); Morocco: Blanc *et al* (1947); Chicago: Shephard (1947); Turkey: Payzin and Golem (1948); Switzerland: Gaell (1948); California: Lennette *et al* (1948); Italy: Terzani *et al* (1948); Israel: Klopstock *et al* (1949); Rumania: Combiesco *et al* (1949); Austria: Mleczoch (1949); India: Soman, (1949); Great Britain: Stocker (1949); Spain: Prada *et al* (1950); Yugoslavia: Murray *et al* (1950); France: Decour *et al* (1951); Germany: Fonseca *et al* (1951); Africa: Le Gac and Giroud (1951); China: Chang *et al* (1951); Libiya: Fellers (1952); Ceylon: Schmid *et al* (1952); India: Kalra (1953).

"Q" fever is more or less a world wide endemic disease with the animal as the main reservoir of infection. Humans contract the disease by inhalation of dust contaminated with infected faeces, by consumption of infected milk, handling live or recently slaughtered infected

animals, mostly that of sheep and goats. Transmission is also possible through the bites of infected ticks.

The organism *Coxiella burneti* has been found to be very resistant to physical and chemical bactericides. It has also been observed (Huebner *et al* 1949) that even some methods of pasteurisation ordinarily employed do not completely destroy the organism.

The disease in man runs a febrile course. The usual symptoms observed at the onset of the attack are malaise, anorexia, headache, pain in the back and limbs, with occasional pneumonitis and involvements of the central nervous system. As the disease develops, headache becomes a prominent symptom. "Q" fever resembles Typhus but it is distinguishable by the characteristic absence of the rash and negative reaction to the Weil-Felix test. The disease is often serious and occasionally fatal. According to published literature by Derrick and others, "Q" fever is common among veterinarians, butchers, farmers, dairymen, laboratory workers and those connected directly or indirectly with animals.

Among animals "Q" fever does not bring about a definite symptomatology but at the onset of the disease, high fever is observed, sometimes pneumonia and abortion. Animals susceptible to the disease are cattle, buffaloes, sheep, goats, horses, mules, camels, dogs, cats, rats and bandicoots among those recorded.

Our object is to review the earlier literature on the serological surveys carried out by different workers in India and to discuss the serological survey carried out by the authors among imported sheep and goats from India to Ceylon for slaughter.

Materials and Methods.

The sera used for the survey were taken from random groups of sheep and goats imported for slaughter to Ceylon from Tuticorin, South India. The basic laboratory procedure adopted was the Complement Fixation test, as described by Kaplan *et al* (1952), a modification of the Kolmer and Boerner technique. As a preliminary test all sera were screened for positive reactions at 1/16 dilution (+ + +). All sera giving a positive reaction were further subjected to tests in higher dilutions:—to 1/256. Every test included complement, sheep cells, haemolytic, positive and negative controls. The antigen used was the American Strain-Nine Mile diagnostic antigen.* Haemolysin and positive control sera were supplied by the Deputy Director, Laboratory Services, Medical Research Institute, Ceylon.

* Obtained from Lederle Laboratories Division, American Cyanamid Company, New York.

Results of the earlier surveys.

In India in 1944 Pasricha was the first to report a febrile disease, diagnosed clinically as "Q" fever among troops stationed at Dehra Dun. His findings were not however confirmed serologically.

This was followed by Soman (1949), whose serological findings were as follows:—

TABLE I
Results of C.F. tests for "Q" fever carried out in 1949.

Sera.	No. tested.	No. positive.
Human sera, pyrexia, (Widal)	739	3
" " non-pyrexial, (W.R.)	99	0
Bandicoot sera from Poona.	43	0
	881	3

TABLE II
Results of C.F. tests for "Q" fever on human, sheep and cattle sera—1954.

Sera.	No. tested.	No. positive.	percentage.	16	32	64	128	256	512
Human	367	11	2.9	5	2	1	0	3	0
Sheep	376	39	10.3	18	15	5	1	0	0
Cattle	142	0	0	0	0	0	0	0	0
Total	885	50		23	17	6	1	3	0

Veeraraghavan and Sukumaran (1952; 1954.) reported the disease among humans, cows, bullocks, buffaloes, sheep, goats and horses in the Nilgiris and Coimbatore Districts of the Madras State, South India and their serological findings were:—

TABLE III

Animal.	No. of sera tested.	No. of positives in screening test.	No. of sera positive in the highest dilution.			
			16	32	64	128
Human	99	7	3	3	1	0
Cow	149	19	16	2	1	0
Bullock	75	4	4	0	0	0
Buffalo	6	0	0	0	0	0
Sheep	52	2	0	2	0	0
Goat	2	0	0	0	0	0
Horse	2	0	0	0	0	0
Total	385	32	23	7	2	0

Kalra and Taneja (1953) reported the disease on a serological survey and the observed results were:—

TABLE IV
Serological survey of human and animal sera.

Human sera.	Total sera.	No. positive.	Percentage positive.
N. India	646	76	11.7
E. India	179	14	7.8
S. India	266	19	7.1
Army	629	43	6.3
Animal Sera.			
Sheep	240	38	15.8
Cows	194	27	13.9
Buffaloes	160	27	16.8
Goats	90	4	4.4
Dogs	3	1	—

Kalra and Taneja (1954) reported a more comprehensive serological survey on sera from different parts of India. The recorded results were:—

TABLE V
"Q" fever serological survey with Nine-mile antigen.

	No.	No. positive.	Percentage positive.	Titre.					
				8	16	32	64	128	512
Human sera.									
Mysore	144	24	16.6	11	7	5	—	1	—
Madras	97	11	11.3	9	2	—	—	—	—
Jammu	228	24	10.5	14	5	3	2	—	—
Amritsar	264	21	7.9	9	5	4	1	2	—
Jaipur	129	7	5.4	2	3	1	1	—	—
Agra	80	4	5.0	4	—	—	—	—	—
Shillong	73	3	4.1	3	—	—	—	—	—
Calcutta	109	4	3.6	3	1	—	—	—	—
Poona	172	4	2.3	3	1	—	—	—	—
Jullunder	38	1	—	—	—	—	—	—	—
Delhi	85	0	—	—	—	—	—	—	—
Soldiers	850	26	3.0	19	4	2	1	—	—
Totals	2,269	129	5.6	77	28	16	5	3	—
Animal sera.									
Sheep	287	33	11.5	17	13	2	—	1	—
Buffalo	143	14	9.8	8	4	2	—	—	—
Cows	291	19	6.5	9	5	1	1	2	1
Goats	90	3	3.3	3	—	—	—	—	—
Dogs	10	1	—	1	—	—	—	—	—
Monkeys	4	0	—	—	—	—	—	—	—
Totals	825	70	8.4	38	22	5	1	3	1

Results of the present survey

TABLE VI (Authors.)
Results of C.F. tests for "Q" fever on sera from imported
sheep and goats from India.

Sera.	No. tested.	No. positive.	Percent positive.	Titre.				
				16	32	64	128	256
Sheep	126 { Males 58 Females 68	15 { Males 4 Females 11	11.9	6	7	1	1	—
Goats	119 { Males 50 Females 69	8 { Males 3 Females 5	6.7	5	1	1	1	—

Discussion

The above mentioned workers in India as well as the authors have all adopted the same technique in their "Q" fever investigations. Screening for positive reactions were done by all at a dilution of 1/16 of the sera tested, with the exception of Kalra and Taneja, who based their investigations on a screening dilution of 1/8. It is desirable that a serum dilution of 1/16 be taken for screening purposes in view of the non-specificity observed among some animal sera at lower dilutions.

We have observed that sheep record a high incidence. This accords with the findings of workers in other parts of the world. It was also observed that there is a higher incidence of the disease among females rather than males.

Marmion *et al* (1954) have observed a seasonal occurrence of the disease especially during docking, shearing and at parturition time. It would be interesting to investigate further these observations at different sheep breeding centres in India.

We are now engaged in further investigation work to determine the incidence of "Q" fever in man, domestic animals, rodents and wild animals in Ceylon.

Summary

1. Results of the serological survey of "Q" fever among imported sheep and goats from India in Ceylon have been discussed.

2. Out of a total of 126 sera of sheep and 119 sera of goats tested, 15 positives in sheep and 8 positives in goats were observed.

3. Serological studies and findings of earlier workers (India) have also been reviewed.

Acknowledgment

The authors wish to thank the Colombo Municipal Council for providing the necessary facilities to carry out this survey. We are grateful to the Deputy Director, Laboratory Services, Medical Research Institute, Ceylon, for the supply of Haemolysin, positive control sera, useful advice and confirming our positive results. Thanks are also due to Mr. E. B. Rudolph, Laboratory Assistant for technical aid and to others of the Colombo Municipal Veterinary Department for their co-operation in this work.

REFERENCES

- Burnet, F. M., and Freeman, M. (1937) ... *Med. J. Australia*, 2, 299.
 " " (1938) ... *Ibid.*, 1, 296.
 " " (1939) ... *Ibid.*, 2, 887.
 Davis, G. E., and Cox, H. R. (1938) ... *Publ. Health Rpt.*, 53, 2259.
 Derrick, E. H. (1937) ... *Med. J. Australia*, 2, 281.
 " (1939) ... *Ibid.*, 1, 14.
 " (1944) ... *J. of Hyg.*, 43, 5, 357.
 Huebner, R. J., Jellison, W. L., Beck, M. D. and Wilcox, F. P. (1949) ... *Publ. Health Rpt.*, 64, 449.
 Kaplan, M. M., and Hulse, E. C. (1952) ... WHO/FAO Seminar on Zoonoses.
 Kalra, S. L., and Taneja, B. L. (1953) ... *A.M.C.J.* Vol. 9., 4, 211.
 " " (1954) ... *Ind. J. Med. Res.*, 42, 315.
 Marmion, B. P., Stoker, M. G. P., Stewart, J., Richmond, P., and Barber, N. (1954) ... *Lancet*, 266, 1288.
 Robbins, F. C., Gauld, R. L. and Warner, F. B. (1946) ... *Amer. J. Hyg.*, 44, 23.
 Soman, D. W. (1949) ... *An. Rpt. Haffkine Inst., Bombay*, 44.
 " (1954) ... *Ind. J. Med. Sci.*, 8, 10, 698.
 Veeraraghavan, N., and Sukumaran, P. K. ... 45th An. Rpt. Pasteur Institute, Coonoor, South India and the Scientific Rpt. for 1952, 12.
 " " (1954) ... *Ind. J. Med. Res.*, 42, 5.

RETIRED OFFICERS

Of late we have been getting very many enquiries on the availability of retired officers as Lecturers, Demonstrators, Superintendents of Livestock Farms, National Extension Officers, etc. We therefore intend maintaining a register in this office, free of all cost, of officers who are willing for such service. Those who are interested in this proposal are requested to furnish us with their name, qualification and address (all in block letters) and the type of work they are willing to take up.

OBSERVATION ON THE BEHAVIOUR OF GOAT ADAPTED RINDERPEST VIRUS IN GOATS IN HYDERABAD STATE

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Introduction

The preparation and use of goat adapted Rinderpest Virus Vaccine for protecting the large number of cattle population in this State were in vogue since 1932 and the author had the opportunity of being incharge of Vaccine production since 1953 till date. During this period the author has handled strains of goat adapted Rinderpest Virus obtained from two different sources, namely, Indian Veterinary Research Institute, Izatnagar and Institute of Veterinary Preventive Medicine, Ranipet, for production of vaccine in the local goats drawn from various parts of the State.

The behaviour of the strains of the Virus in the serial passages in relation to the goats used is observed and recorded in 3 separate groups (of 66, I. V. R. I.) 61 & 100 (I. V. P. M.) passages.

Observations

General :—On a critical study of the temperature charts available from 1953 to 1955 in his laboratory, involving 3 passage groups of 66, 61 and 100 each, atypical behaviour of the virus was observed by the author at passage levels of 9, 51, 58, 59 & 60 in group I, 9, 12, 13 & 21 in group II, and 60, 62, 68 & 96 in group III. (vide graphs A, B & C).

Details of passages :—The following details in regard to the season, Passage level, mean maximum and minimum atmospheric temperature, average pre inoculation temperature during the period of observation of about 5 days, reactor rate, mean peak morning temperature in goats used and the mean day of peak temperature were all worked out and tabulated in this observation and study.

Group I.—The strain of virus was obtained from the Indian Veterinary Research Institute Izatnagar, during the month of January 1955 and 66 passages were carried out during the period covering late winter, summer and rains. The average pre inoculation temperature, was between 99° & 100°F, except on a few occasions in all the different

BEHAVIOUR OF GOAT ADAPTED RINDERPEST VIRUS

97

seasons going a little over 100°F. On an average, 4 goats were used in each passage. The reactor rate is tabulated as below :—

Number of passages.	Reactions observed.
23	100 per cent.
7	75 "
12	66.6 "
9	50 "
10	33.3 "
5	atypical.

The average mean day of peak temperature, representing the day of harvesting the virus, was found to be 4 in this group which corresponds to the day of virus collection followed in many parts of virus producing centres in India. The altered behaviour of the strain of virus at different passage levels in the individual goats has been graphically represented (Vide Graph No. 1).

Group II.—The strain of virus passaged in this group was that of Institute of Veterinary Preventive Medicine, Ranipet, during the period from 1953 October to June 1954, and 61 passages were carried out during this period covering winter, summer and beginning of rains. The average pre inoculation temperature was between 100° & 101°F and in a few instances over 101°F. Either two or three goats depending on availability were used in each passage. The reactor rate is tabulated as below :—

Number of passages.	Reactions observed.
41	100 per cent.
7	66.6 "
8	50 "
1	33.3 "
4	atypical.

The average mean day of peak temperature representing the day collection of virus was found to be 4.2 in this group. The altered behaviour of this strain of virus in different passages in individual goats has been graphically represented (Vide Graph No. 2).

Group III.—The strain of virus was received from Institute of Veterinary Preventive Medicine, Ranipet and was carried forward for over 100 passages from November 1954 to December 1955. The average pre inoculation temperature was between 99° and 100°F except on a few occasions when temperature went a little over 100°F. On an average 4 goats were used in each passage. The reactor rate is tabulated as below :—

Number of passages.	Reactions observed.
40	100 per cent.
8	75 "
12	66 "
12	50 "
16	33.3 "
7	25 "
5	atypical

The average mean day of peak temperature representing the day of collection of virus was found to be 3.8 in this group. The altered behaviour of this strain of virus at different passages in individual goats has been graphically represented (Vide Graph No. 3).

In every passage the inoculum consisted of 10 c.c.s. of blood drawn from the donor.

Discussion

From the compilation of data for nearly 3 years and study of the same wherein 208, 136 and 338 goats have been used in 3 separate groups of passages each going upto 66, 61 and 100 respectively, it would appear that here in Hyderabad goats also, variations in thermal as well as clinical response are observed. Similar such observations have been reported by Cilli, V (1951) in Eritrea and also by Henderson in Nigeria (personal communication through Scot.) The possible role of variants developing in strains of virus during passage, showing considerable differences in their tissue localisation and in their pathogenicity in relation to the varying susceptibility of goats from different areas of Hyderabad State may explain the observed variations, in a total of 682 goats used by me.

In his observations on 120 Eritrean goats inoculated with 20 passages of Kabete goat adapted Rinderpest Virus by Cilli, an incubation period of 2 to 14 days was seen. Such information could not be had in my observations since I had to discontinue the goats after the 4th or 5th day for reasons of economy to the Government; otherwise more useful information could have been gathered on this line also. He had 41.7% of typical response to the virus and 37.3% of atypical reactions, as compared to 72.6% typical and 27.4% atypical in group I, 82.3% typical and 17.7% atypical in group II, and 68.7% typical and 31.3% atypical in group III of one I. V. R. I. strain and two I. V. P. M. strains respectively. His suggestion that the virus possesses two components (a Haemotropic and an Enterotropic) and that goats vary in their susceptibility to each of the components may hold good in the cases under report in Hyderabad goats also. Given increasing facilities in times to come, it will be possible for us also to further the studies on his lines, in the demonstration of the above two components in the blood, spleen, gastric mucosa, intestinal mucosa and rectal faeces in the goats used, keeping them under observation for as long as 14 days.

Similar reports in India have not so far been seen by the author and hence he feels that more useful information could be available from parallel studies from the various goat virus producing centres in India.

Summary

1. 682 He-goats drawn from different parts of Hyderabad State were the subject of observation and study while being used in the

routine passage and production of goat adapted Rinderpest Virus Vaccine for over 3 years involving 66 passages of I. V. R. I. and 61 & 100 passages of two I. V. P. M. strains.

2. Graphical representation of the same has been made with a view to bring about clearly the variations in clinical response amongst them.

3. Similar such rare studies by foreign workers are reported.

Acknowledgment

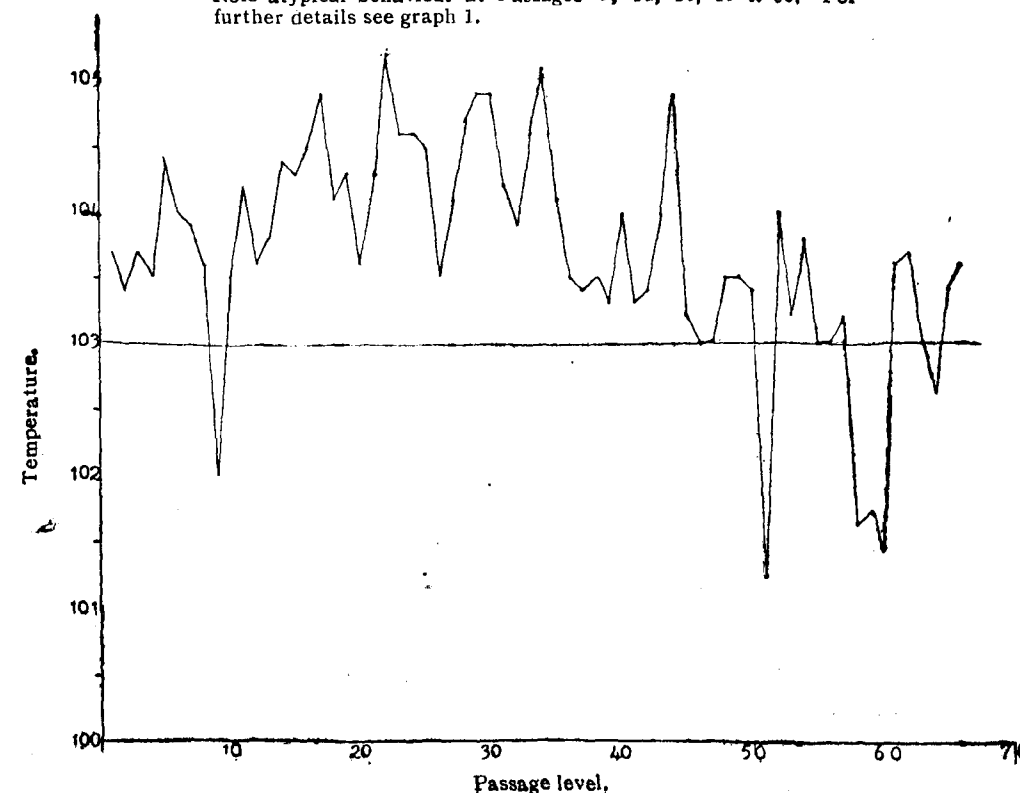
Thanks in a large measure are due to Dr. K. S. Shetty, G.M.V.C., Ph.D. (Edin.), Director, Veterinary Department, Hyderabad, for his personal interest and guidance from time to time. The opinions offered by M. S. Jayaraman, Assistant Disease Investigation Officer (Sheep & Goats), Hyderabad are gratefully acknowledged.

REFERENCES

1. Cilli, V. (1951) ... *Riv. Biol.*, Perugia, **43**, 255-290.
2. Scot, ... Veterinary Research Laboratory, Kabete, Kenya. (Personal communication).

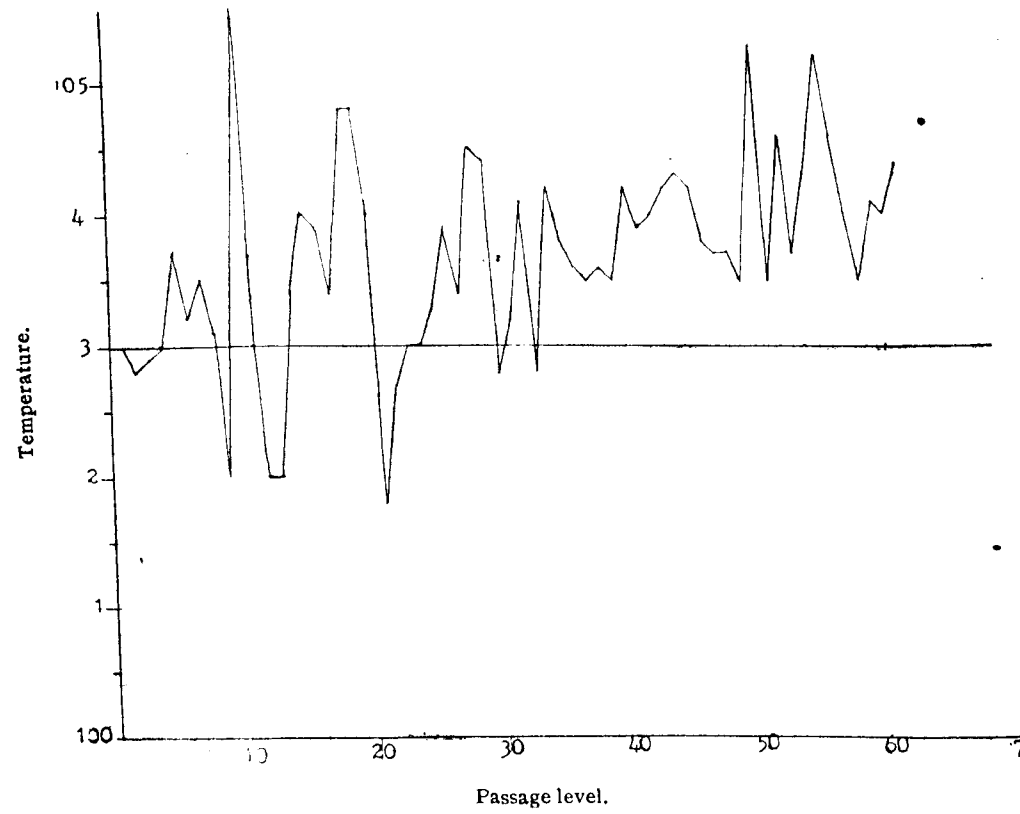
GRAPH A.

Curve showing the Mean Peak Morning Temperature recorded in 66 Passages of the strain received from I.V.R.I. (Izatnagar).
Note atypical behaviour at Passages 9, 51, 58, 59 & 60. For further details see graph 1.



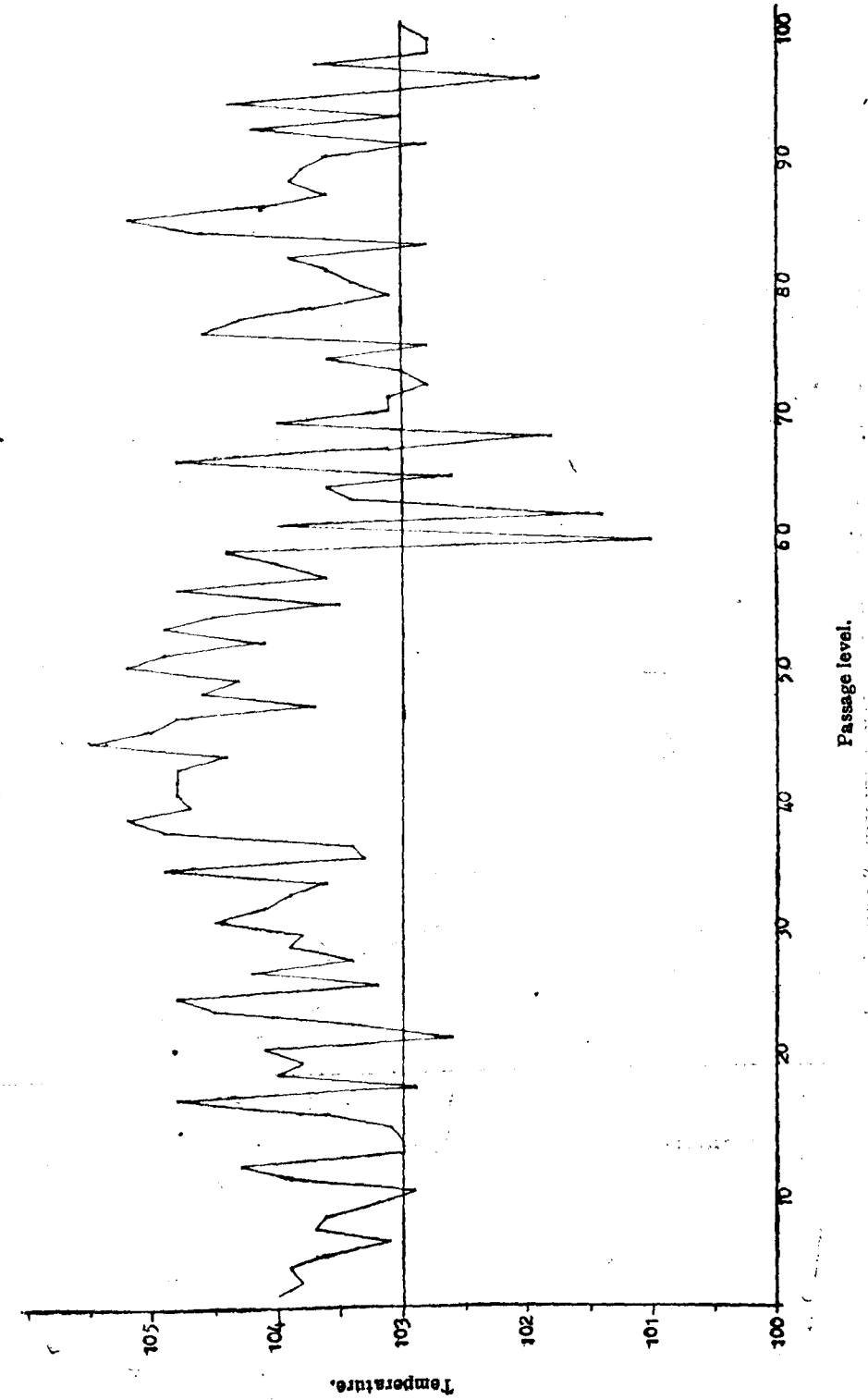
GRAPH B.

Curve showing the Mean Peak Morning Temperature recorded in 61 Passages of the strain received from I.V.P.M. (Ranipet).
Note atypical behaviour at passage levels 9, 12, 13 & 21. For further details see graph 2.

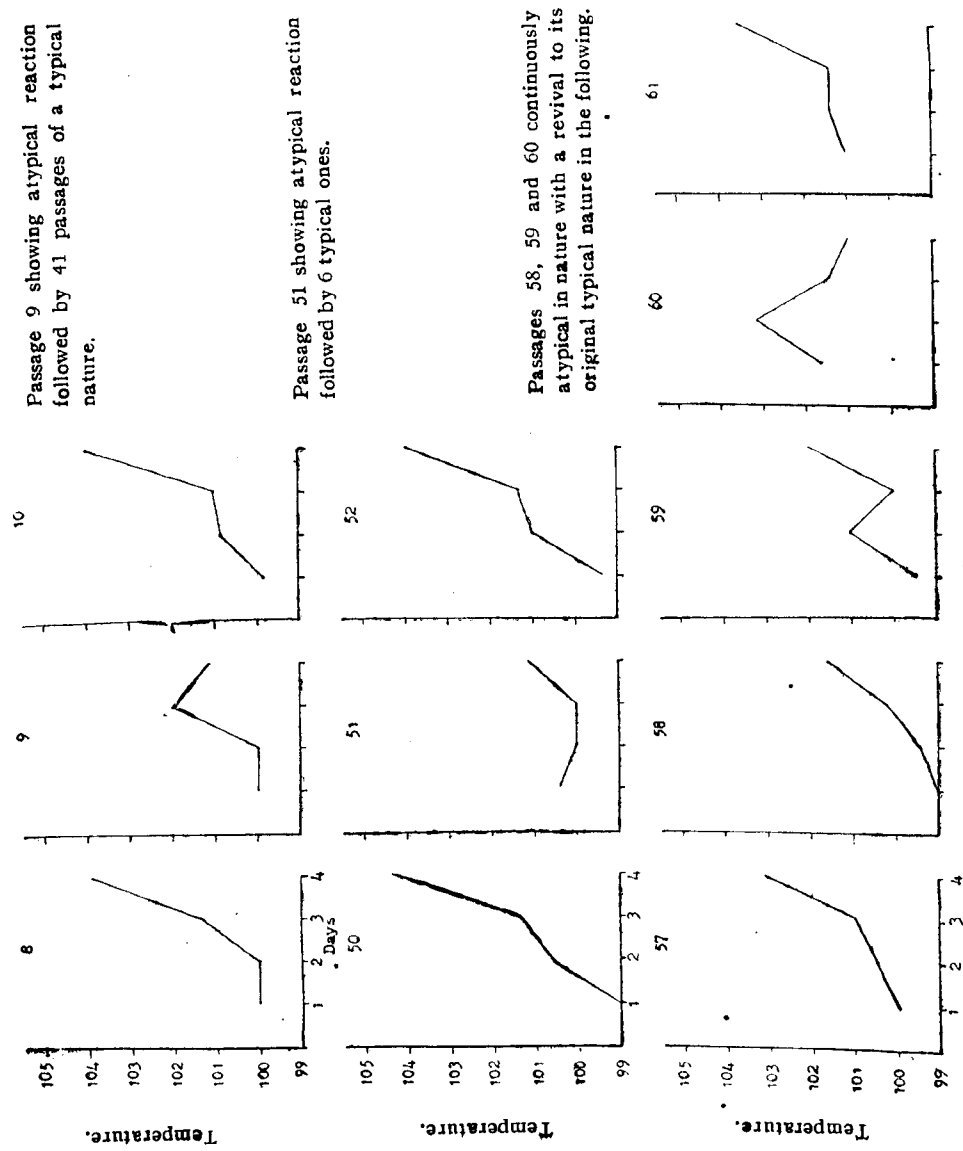


GRAPH C.

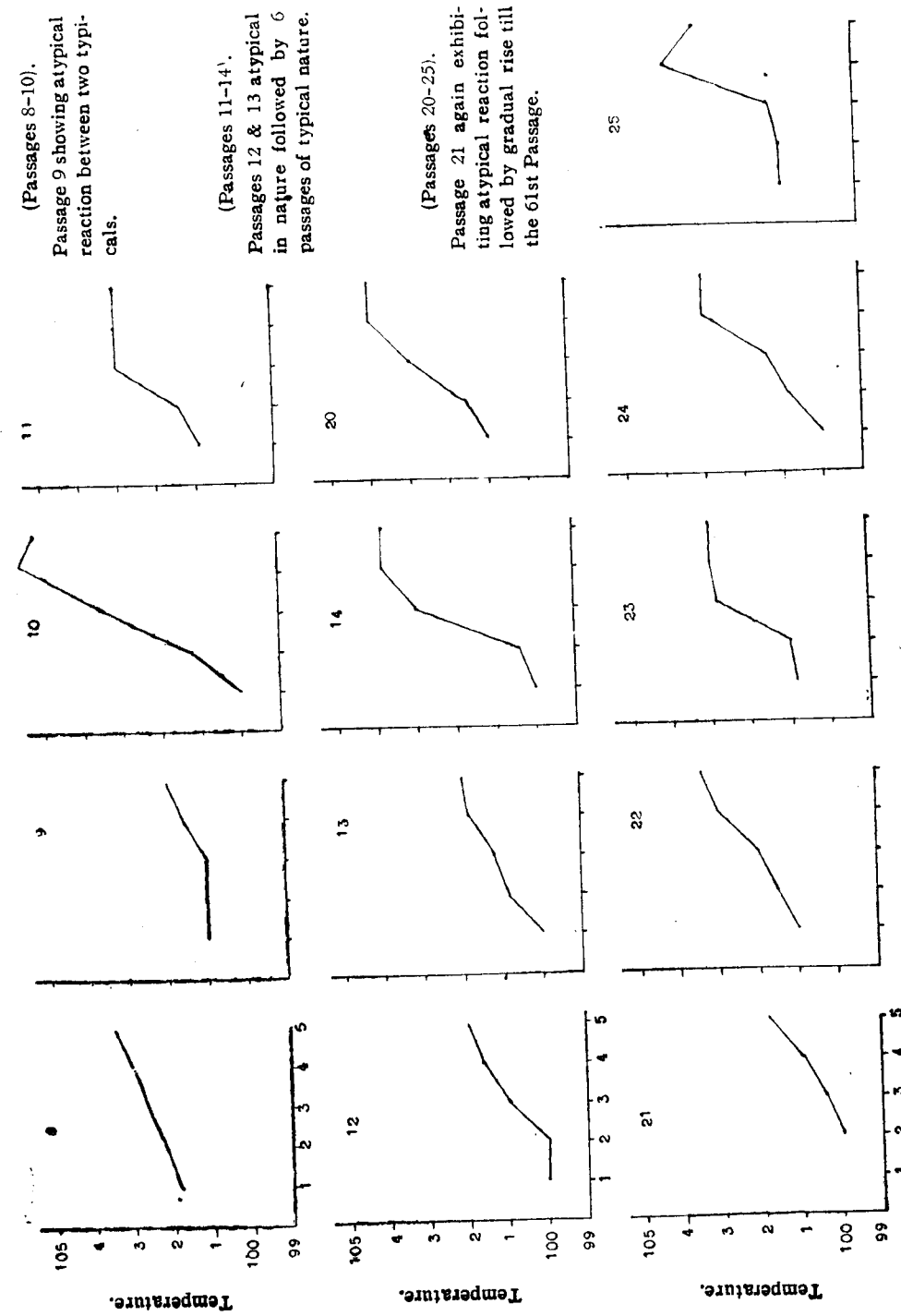
Curve showing the Mean Peak Morning Temperatures recorded in 100 Passages of the strain received from I.V.P.M. (Ranipet).
Note atypical behaviour at Passage levels 60, 62, 68 & 96. For further details see graph 3.



GRAPH 1
Graphs representing variations observed in individual passages. (Day of harvest, 4th day).



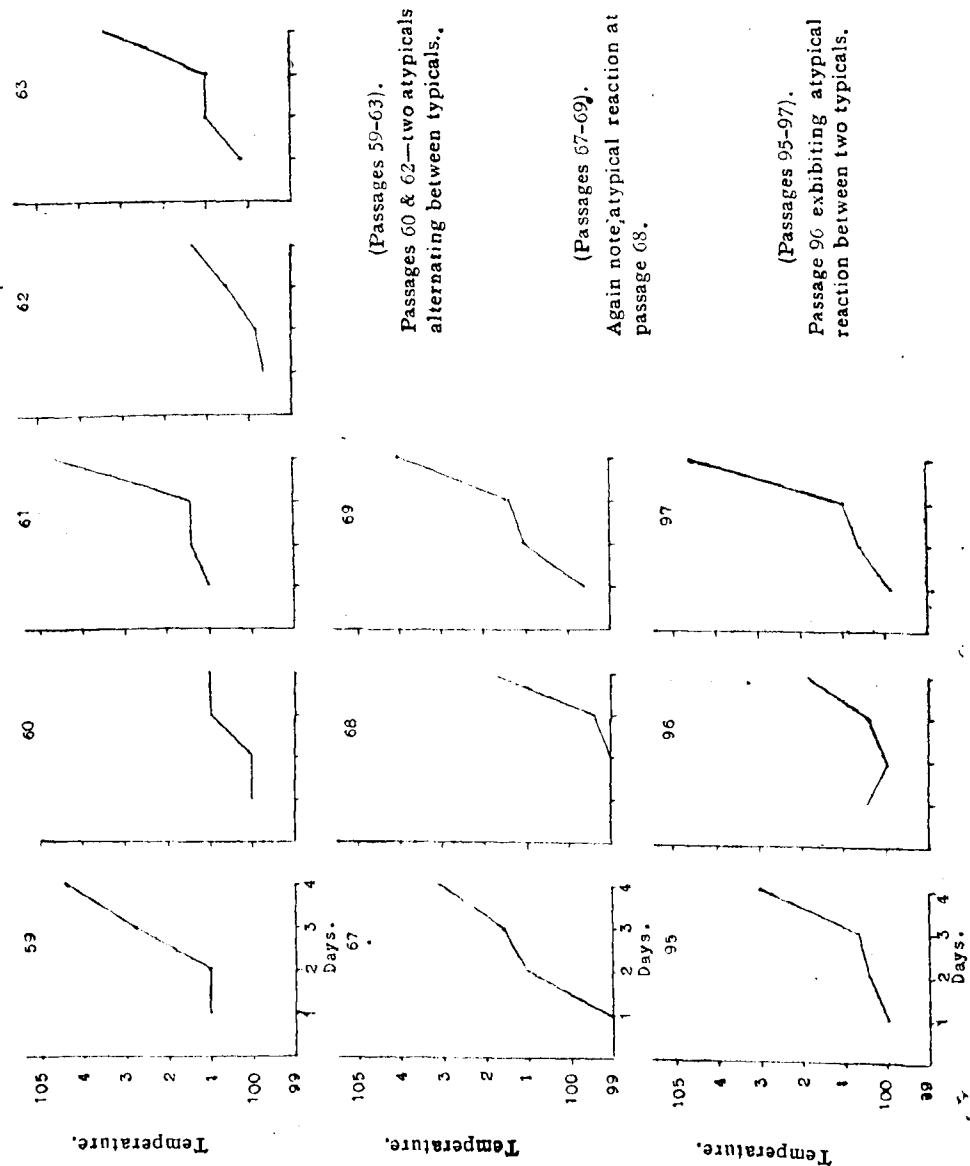
GRAPH 2
Graphs representing variations observed in individual passages (Day of harvest, 5th day).



PASSAGE GROUP I

Strain of Virus Received from I.V.R.I. Izatnagar 19-1-1955.

Month.	Passage level.	Mean Max. & Min. atm. temp. Degrees F.	Average Pre Inoculation Temp. Degr. F.	No. of goats used in each passage.	Reactor rate. %	Mean Peak Morn. temp. Degr. F.	Mean day of peak temp.
1	2	3	4	5	6	7	8
January	1	83/59	99.7	4	50.0	103.7	3.5
	2		99.5	4	50.0	103.4	4.0
	3		99.6	4	50.0	103.7	4.0
	4		99.7	4	75.0	103.5	3.7
February	5	89/63	99.4	4	50.0	104.4	4.0
	6		100.2	4	50.0	104.0	4.0
	7		99.6	4	100.0	103.9	4.0
	8		99.7	4	75.0	103.6	4.0
	9		100.4	4	atypical	102.0	3.5
	10		99.6	4	50.0	103.5	4.0
	11		99.8	4	75.0	104.2	4.0
March	12	95/68	99.7	4	75.0	103.6	4.0
	13		99.4	4	75.0	103.8	4.0
	14		99.1	4	75.0	104.4	4.0
	15		99.6	4	75.0	104.3	4.0
	16		99.3	4	100.0	104.5	3.9
	17		99.4	4	100.0	104.9	4.0
	18		99.3	4	100.0	104.1	4.0
April	19	99/74	99.5	4	100.0	104.3	4.0
	20		100.3	2	100.0	103.6	3.5
	21		99.4	3	66.6	104.3	4.0
	22		99.7	3	100.0	105.2	4.0
	23		99.5	3	100.0	104.6	4.0
	24		99.9	3	100.0	104.6	4.0
	25		99.3	3	100.0	104.5	4.0
	26		99.2	3	100.0	103.5	4.0
May	27	99/78	99.6	3	100.0	104.1	4.0
	28		99.4	3	100.0	104.7	4.0
	29		99.3	3	100.0	104.9	4.0
	30		99.7	3	66.6	104.9	4.0
	31		99.7	3	100.0	104.2	4.0
	32		100.8	3	100.0	103.9	4.0
	33		100.3	3	100.0	104.6	4.0
	34		100.4	3	100.0	105.1	4.0
June	35	92/74	100.6	3	100.0	104.1	3.7
	36		100.5	3	66.6	103.5	4.0
	37		100.4	3	66.6	103.4	4.0
	38		100.4	3	100.0	103.5	4.0
	39		100.1	3	100.0	103.3	4.0
	40		100.2	3	33.3	104.0	4.0
	41		99.6	3	66.6	103.3	4.0
July	42	85/72	100.4	3	66.6	103.4	4.0
	43		99.6	3	66.6	104.0	4.0
	44		99.7	3	100.0	104.9	3.7
	45		99.6	3	33.3	103.2	4.0
	46		100.3	3	33.3	103.0	4.0
	47		99.3	3	33.3	103.0	4.0
	48		99.2	3	100.0	103.5	4.0
	49		99.5	3	66.6	103.5	4.0

GRAPH 3
Graphs representing variations observed in individual passages (Day of harvest, 4th day).

PASSAGE GROUP I (Continued)

Month.	Passage level.	Mean Max. & Min. atm. temp. Degrees F.	Average Pre Inoculation Temp. Degs. F.	No. of goats used in each passage.	Reactor rate. %	Mean Peak Morn. temp. Degs. F.	Mean day of peak temp.
1	2	3	4	5	6	7	8
August	50	85/71	99.2	2	50.0	103.4	4.0
	51		99.9	3	atypical	101.2	4.0
	52		99.7	3	33.3	104.0	4.0
	53		99.5	3	66.6	103.2	4.0
	54		99.3	3	66.6	103.8	4.0
	55		100.1	3	33.3	103.0	4.0
	56		99.7	3	66.6	103.0	4.0
	57		99.7	3	33.3	103.2	4.0
	58		99.9	3	atypical	101.6	4.0
September	59	85/71	100.3	3	atypical	101.7	4.0
	60		100.0	1	atypical	101.4	3.5
	61		99.3	3	33.3	103.6	4.0
	62		99.0	3	66.6	103.7	4.0
	63		99.2	2	50.0	103.0	4.0
October	64	84/69	100.0	3	33.3	102.6	3.5
	65		99.3	2	50.0	103.4	4.0
	66		99.7	3	33.3	103.6	4.0
Mean							3.9

CANCERINA and PRANAVA

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PASSAGE GROUP II

Strain of Virus Received from I.V.P.M. Ranipet 24-10-1953.

Month.	Passage level.	Mean Max. & Min. atm. temp. Degrees F.	Average Pre Inoculation Temp. Degs. F.	No. of goats used in each passage.	Reactor rate. %	Mean Peak Morn. temp. Degs. F.	Mean day of peak temp.
1	2	3	4	5	6	7	8
End of Oct.	1	85/70	101.2	3	33.3	103.0	4.0
	2		100.0	2	50.0	102.8	4.0
November	3	84/58	100.4	3	66.6	102.9	4.0
	4		100.6	3	66.6	103.0	3.5
	5		100.1	3	100.0	103.7	3.8
	6		100.3	2	100.0	103.2	3.5
	7		100.2	2	100.0	103.5	4.0
	8		100.4	2	100.0	103.1	5.0
	9		100.3	1	atypical	102.0	5.0
December	10	82/52	100.1	2	50.0	105.6	4.0
	11		100.1	2	50.0	103.0	4.0
	12		100.4	2	atypical	102.0	4.5
	13		100.3	2	atypical	102.0	4.3
	14		100.3	2	100.0	103.4	3.0
	15		99.9	2	50.0	104.0	4.0
	16		99.9	3	66.6	103.9	3.3
January '54	17	83/57	100.6	3	66.6	103.4	4.0
	18		101.2	2	50.0	104.8	4.0
	19		100.8	2	100.0	104.8	3.5
	20		99.4	1	100.0	104.0	4.0
	21		100.4	2	atypical	101.8	5.0
	22		100.0	3	66.6	102.7	4.5
	23		100.3	2	50.0	103.0	3.5
	24		100.2	1	100.0	103.0	4.5
February	25	90/62	100.7	2	100.0	103.3	4.0
	26		100.2	3	66.6	103.9	3.5
	27		100.3	3	100.0	103.4	4.7
	28		100.2	3	100.0	104.5	4.0
	29		100.4	3	100.0	104.4	4.3
	30		100.1	3	66.6	102.8	4.5
	31		100.2	3	100.0	103.2	4.7
March	32	93/67	100.2	3	100.0	104.1	4.3
	33		100.1	2	50.0	102.8	3.0
	34		101.8	2	100.0	104.2	4.0
	35		101.8	2	100.0	103.8	5.0
	36		100.5	3	100.0	103.6	4.7
	37		101.0	2	100.0	103.5	4.5
	38		100.5	2	100.0	103.6	4.8
	39		100.7	2	100.0	103.5	4.8

PASSAGE GROUP II (Continued)

Month.	Passage level.	Mean Max. & Min. atm. temp. Degrees F.	Average Pre Inoculation Temp. Degr. F.	No. of goats used in each passage.	Reactor rate. %	Mean Peak Morn. temp. Degr. F.	Mean day of peak temp
1	2	3	4	5	6	7	8
April	40	100/77	100.8	2	50.0	104.2	5.0
	41		99.6	2	100.0	103.9	5.0
	42		100.3	2	100.0	104.0	4.0
	43		101.3	2	100.0	104.2	4.5
	44		100.1	2	100.0	104.3	4.0
	45		99.5	2	100.0	104.2	4.0
	46		99.6	2	100.0	103.8	5.0
May	47	104/83	99.6	2	100.0	103.7	4.5
	48		100.1	2	100.0	103.7	4.8
	49		100.0	2	100.0	103.5	4.8
	50		100.3	2	100.0	105.3	4.5
	51		100.5	2	100.0	103.5	5.0
	52		99.6	2	100.0	104.6	4.0
	53		100.5	3	100.0	103.7	4.2
	54		100.3	3	100.0	104.3	4.8
June	55	93/75	100.3	2	100.0	105.2	4.8
	56		100.3	2	100.0	104.6	4.8
	57		100.2	2	100.0	104.0	4.5
	58		100.5	2	100.0	103.5	4.5
	59		101.2	2	100.0	104.1	4.0
	60		100.7	2	100.0	104.0	5.0
	61		100.5	2	100.0	104.4	4.0
Mean							4.2

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PASSAGE GROUP III

Strain of Virus Received from I.V.P.M. Ranipet 14-11-1954.

Month.	Passage level.	Mean Max. & Min. atm. temp. Degrees F.	Average Pre Inoculation Temp. Degr. F.	No. of goats used in each passage.	Reactor rate. %	Mean Peak Morn. temp. Degr. F.	Mean day of peak temp.
1	2	3	4	5	6	7	8
November	1	82/56	100.0	3	66.6	104.0	4.0
	2		99.7	4	25.0	103.8	4.0
	3		99.9	3	66.6	103.9	4.0
	4		99.9	3	66.6	103.6	4.0
	5		99.9	4	100.0	103.1	4.0
December	6	83/58	99.6	4	50.0	103.7	4.0
	7		99.6	4	100.0	103.6	4.0
	8		99.6	3	33.3	103.2	3.5
	9		99.7	3	66.6	102.9	3.5
	10		99.7	4	100.0	103.9	4.0
	11		99.8	4	75.0	104.3	3.3
	12		99.2	4	25.0	103.0	3.5
January '55	13	83/59	99.3	4	75.0	103.0	3.8
	14		99.3	4	50.0	103.1	4.0
	15		99.0	4	25.0	103.6	4.0
	16		99.2	3	33.3	104.8	4.0
	17		99.5	4	50.0	102.9	4.0
	18		99.5	4	75.0	104.0	4.0
	19		99.6	4	100.0	103.8	4.0
	20		100.1	4	50.0	104.1	4.0
February	21	89/63	99.8	4	100.0	102.6	3.9
	22		99.6	4	75.0	103.4	4.0
	23		99.8	4	50.0	104.5	4.0
	24		99.9	4	100.0	104.8	3.5
	25		99.3	4	50.0	103.2	4.0
	26		99.8	4	100.0	104.2	4.0
	27		99.8	4	100.0	103.4	4.0
March	28	95/68	99.6	4	100.0	103.9	4.0
	29		99.9	4	75.0	103.8	4.0
	30		99.4	4	75.0	104.5	4.0
	31		99.3	4	75.0	104.1	4.0
	32		99.2	4	100.0	103.9	4.0
	33		99.4	4	100.0	103.6	3.8
	34		99.4	4	100.0	104.9	4.0
	35		99.5	4	75.0	103.3	4.0
April	36	99/74	100.2	4	75.0	103.4	4.0
	37		99.7	3	100.0	104.9	4.0
	38		99.6	3	100.0	105.2	4.0
	39		99.4	3	100.0	104.7	4.0
	40		99.6	3	100.0	104.8	4.0
	41		100.0	3	100.0	104.8	4.0
	42		99.2	3	100.0	104.8	3.7
May	43	99/78	99.1	3	100.0	104.4	4.0
	44		99.4	2	100.0	105.5	4.0
	45		99.8	3	100.0	105.0	4.0
	46		99.5	3	100.0	104.8	4.0
	47		99.4	3	100.0	103.7	4.0
	48		100.4	3	100.0	104.6	4.0
	49		100.7	3	100.0	104.3	4.0
	50		100.3	3	100.0	105.2	4.0

PASSAGE GROUP III (Continued)

Month.	Passage level.	Mean Max. & Min. atm. temp. Degrees F.	Average Pre inoculation Temp. Degs. F.	No. of goats used in each passage.	Reactor rate. %	Mean Peak Morn. temp. Degs. F.	Mean day of peak temp.
1	2	3	4	5	6	7	8
June	51	92/74	100.7	3	100.0	104.9	4.0
	52		100.5	3	100.0	104.1	4.0
	53		100.6	3	100.0	104.9	4.0
	54		100.5	3	100.0	104.5	3.8
	55		100.2	3	100.0	103.5	3.7
	56		100.6	3	33.3	104.8	4.0
	57		100.6	3	100.0	103.6	3.7
	58		100.3	3	100.0	104.0	4.0
July	59	85/72	99.9	3	33.3	104.4	4.0
	60		99.9	3	atypical	101.0	4.0
	61		99.8	3	66.6	104.0	4.0
	62		99.8	3	atypical	101.4	4.0
	63		99.6	3	33.3	103.4	4.0
	64		99.6	3	33.3	103.6	4.0
	65		100.0	3	33.3	102.6	3.5
August	66	85/71	99.2	3	33.3	104.8	3.5
	67		99.4	3	66.6	103.1	3.5
	68		99.9	3	atypical	101.8	4.0
	69		99.3	3	33.3	104.0	4.0
	70		99.2	3	66.6	103.1	4.0
	71		99.3	3	66.6	103.1	3.5
	72		99.8	3	33.3	102.8	4.0
	73		99.6	3	33.3	103.0	4.0
September	74	85/71	99.6	3	33.3	103.6	4.0
	75		99.5	1	100.0	102.8	4.0
	76		99.6	3	100.0	104.6	3.3
	77		99.2	3	66.6	104.3	4.0
	78		99.2	3	100.0	103.7	4.0
	79		99.5	3	66.6	103.1	4.0
	80		99.3	3	66.6	103.4	4.0
	81		99.5	3	33.3	103.6	4.0
October	82	84/69	99.2	3	100.0	103.9	3.7
	83		99.7	3	66.6	102.8	3.8
	84		99.6	4	25.0	104.6	3.0
	85		99.5	4	25.0	105.2	4.0
	86		99.7	4	100.0	104.1	4.0
	87		99.4	4	100.0	103.6	4.0
	88		99.4	4	100.0	103.9	4.0
November	89	80/58	99.1	4	50.0	103.8	3.5
	90		99.7	4	50.0	103.6	4.0
	91		99.6	3	33.3	102.8	4.0
	92		99.4	4	50.0	104.2	4.0
	93		99.4	3	33.3	103.0	4.0
	94		99.4	3	33.3	104.4	4.0
	95		99.1	4	50.0	103.0	4.0
	96		99.8	3	atypical	101.9	3.8
December	97	80/55	99.2	4	50.0	103.7	4.0
	98		99.4	4	25.0	102.8	4.0
	99		99.2	2	50.0	102.8	4.0
	100		99.1	4	25.0	103.0	4.0

General Articles

HELMINTHIC DISEASES OF SHEEP IN
BIHAR AND THEIR CONTROL

By

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Minett (1950) while studying the problem of mortality in sheep and goats in India recorded 66.8% mortality at Monghyr (now Gaya) Sheep Breeding Farm during the period 1942-46. This farm then ranked second in India in respect of high mortality, the first being Hissar where the percentage of mortality was 76% for the years 1937-46. He further commented in this respect on the importance of parasitic troubles or effects presumably thereof and concluded that at several farms helminthic disease was an outstanding source of mortality aided by environmental, nutritional and climatic influences and that the death rate from these diseases seemed to be worst from six months to two years and especially at 6 to 12 months. In this communication an attempt is made to present in a concise and convenient form the more essential points concerning the incidence of gastro-intestinal parasites in sheep at two Government farms in Bihar including the one in respect of which Minett had commented earlier. Observations made on the role of 'Phenovis' (Phenothiazine) in reducing the incidence of stomach-worms are also recorded, as the findings may interest persons engaged on sheep husbandry work, particularly those who are often called upon to deal with such conditions. Mention is also made in this paper about the occurrence of some helminthic diseases of economic importance in the State in the light of available information.

Bihar is a typical tropical State with varying geographical conditions. Varma (1954) has fully depicted the topography of certain areas of the State in relation to the endemicity of two important helminthic diseases like fascioliasis and nasal schistosomiasis. This has an important bearing on the incidence of various helminthic infections of sheep as well. The total sheep population in the State approximates a million, scattered in urban and rural areas (Livestock Census, 1951). Their concentration is greater in South Bihar in the districts of Manbhum, Singhbhum, Palamau, Santhal Parganas, Ranchi, Hazaribagh, Shahabad and Gaya, all of which lie south of the river Ganges. There is no organised farm, except the two Government ones, and the sheep are kept under village conditions by a particular class of people locally known as "Gareries". The flocks lead more or less a nomadic life. The local breed is degenerate, but some cross-breeding experiments carried

out at the Government farms suggest that they possess great potentialities for grading up. As helminth parasites have proved to be serious impediments in successful breeding programmes chiefly by impairing the nutrition of the stock and damaging their vital tissues resulting in morbidity, inanition or malnutrition, under-development or stunted growth and thereby affecting the normal performances of the animals, this work was undertaken to determine the incidence of gastro-intestinal parasites in the two organised breeding farms.

Materials and Methods

Fresh faecal samples were collected from one and all animals for parasitological examination. This course was deemed to be preferable and more likely to yield results of value; and although it proved to be hazardous, the decision was probably justified.

After obtaining the results of faecal examination, each animal was clinically examined to establish some correlation between the infections and the general health of the animals. Their age was also noted individually for statistical grouping.

Investigations

Government Livestock Breeding Farm, Patna:—Although it is primarily a cattle breeding farm, it has recently started maintaining a small population of sheep as well. Parasitological survey carried out at this farm by Dr. Varma (personal communication) during May/June, 1954 had revealed that in the bovine population consisting of 417 heads of animals of different age-groups the incidence of infection with Stomach-worms (*Haemonchus*, *Mecistocirrus* and *Trichostrongylus* spp.) was 51%, Whip-worms (*Trichuris*) 4.5%, *Strongyloides* 5.9%, *Ascaris* (instances of pre-natal infections) 2.1%, *Amphistomes* 20.6%, Intestinal Schistosomiasis (*S. indicum*) 0.2%, Coccidia 7.6% and mixed infections 19.4%. The incidence of infection in the ovine population of 111 heads of different age-groups was found to be: Stomach-worms (*Haemonchus*, *Mecistocirrus* & *Trichostrongylus* spp.) 68.4%, Whip-worms (*Trichuris*) 7.2%, *Strongyloides* 49.5%, Intestinal amphistomes 35.1% (as diagnosed by the presence of ova in the faeces), Coccidia 43.2% and mixed infections 72.9%. Although egg-counts of individual cases were not carried out, it was found that the infection with some of these parasites, particularly Stomach-worms, *Strongyloides*, *Amphistomes* and Coccidia was fairly heavy both in the bovine as well as ovine population. This was corroborated with clinical picture presented by the infected animals which showed the usual ill-effects of parasitism like loss of appetite, listlessness, unthriftiness, loss of condition, lustreless coat and also diarrhoea in few cases. On examination of records of mortality for the last six years it was found that most of the deaths were ascribed to

parasitic gastro-enteritis. The mortality figures are given below (Table I).

TABLE I

Incidence of mortality in sheep in Patna farm during the last six years, 1949-50 to 1954-55.

Year	Percentage of mortality	Remarks
1949-50	20.4%	There was a severe outbreak of acute amphistomiasis.
1950-51	9.4%	
1951-52	9.7%	
1952-53	10.7%	
1953-54	22.6%	
1954-55	10.7%	

The farm authorities had been accordingly advised control measures. 'Phenovis' (Phenothiazine), which claims to be 100% effective against the Stomach-worms, was administered to all the sheep in the dosage of 10 to 15 gms. on 11-7-54, 17-9-54 and 21-1-55 and Hexachloroethane was also given during July, 1954 against the amphistomes in the dosage of 10 to 15 gms. The dose of both the drugs was prescribed according to age, size and condition of individual animals treated. Prior to this no worm-drenching was ever done for the sheep in this farm.

Present investigations carried out subsequently by the author during June, 1955, results of which are summarised below in table II, showed that although the incidence of infection with Stomach-worms continued to be high, their severity was controlled to a considerable degree. The investigation also furnishes evidences in favour of Hexachloroethane in controlling the incidence of amphistome infections to an appreciable extent. As no specific treatment was done for *Strongyloides* and Coccidial infections and as the above named drugs have evidently no action on these parasites, their incidence remained practically the same.

Government Sheep Breeding Farm, Gaya:—This farm has been started to breed sheep with superior wool by upgrading the local stock. For the first few months the flock was stationed near Gaya, but had to be shifted to Monghyr during November, 1942 owing to military occupation of its premises. It came back to its original site during May, 1948.

Although no accurate information was available concerning the incidence and intensity of various parasitic infections till now, some of the helminthic infections, particularly *Haemonchus* and paramphistomes,

TABLE II
Incidence of Gastro-Intestinal Parasitic Infections in Sheep at Government Livestock Breeding Farm, Patna.

(Results of investigations carried out in June, 1955.)

No. of sheep with age at the farm.	10 (Suckling) Up to 6 months.			25 6 months to 1 year.			70 1 to 3 years.			29 Over 3 years.			134 Total.		Remark.
	No. Examined.	No. infected.	% of infection.	No. Examined.	No. infected.	% of infection.	No. Examined.	No. infected.	% of infection.	No. Examined.	No. infected.	% of infection.	No. Examined.	No. infected.	
Stomach-worms (<i>Haemonchus</i> , <i>Mecistocirrus</i> & <i>Trichostrongylus</i> spp.)	8	—	—	23	5	21.7	66	47	71.2	25	23	92	122	75	* Infection usually light.
Whip worms (<i>Trichuris</i>)	8	—	—	23	5	21.7	66	10	15.1	25	2	4	122	17	13.8
<i>Strongyloides</i> spp.	8	—	—	23	13	56.6	66	23	34.8	25	9	36	122	45	36.8
Intestinal amphistomes	8	—	—	23	—	—	66	—	—	25	—	—	122	—	—
<i>Moniezia</i> .	8	—	—	23	—	—	66	1	1.5	25	—	—	122	1	.8
<i>Coccidia</i> .	8	—	—	23	17	73.9	66	29	43.9	25	8	32	122	54	44.2
Mixed infections.	8	—	—	23	13	56.5	66	46	69.6	25	17	68	122	76	62.2

TABLE III
Incidence of Gastro-Intestinal Parasitic Infections in Sheep at Government Sheep Breeding Farm, Gaya.

(Results of investigations carried out in July, 1955.)

No. of sheep with age at the farm.	Nil. Up to 6 months.			98 6 months to 1 year.			185 1 to 3 years.			286 Over 3 years.			Total : 569.		Remarks.
	No. Examined.	No. infected.	% of infection.	No. Examined.	No. infected.	% of infection.	No. Examined.	No. infected.	% of infection.	No. Examined.	No. infected.	% of infection.	No. Examined.	No. infected.	
Stomach-worms (<i>Haemonchus</i> , <i>Mecistocirrus</i> & <i>Trichostrongylus</i> spp.)	—	—	—	93	36	38.7	175	67	38.2	276	158	57.2	261*	40.6	* Very light infection in all animals except in those 19 that were away for some time to Dehri-on-Sone.
Whip worms (<i>Trichuris</i> .)	—	—	—	93	2	2.05	175	2	1.1	276	5	1.8	9	1.6	
<i>Strongyloides</i> spp.	—	—	—	93	6	6.4	175	21	12	276	16	5.7	43	7.5	
Intestinal amphistomes.	—	—	—	93	—	—	175	2	1.1	276	1	.3	3	.5	
<i>Coccidia</i> .	—	—	—	93	11	11.7	175	27	15.4	276	38	13.7	76	13.3	
<i>Moniezia</i> .	—	—	—	93	3	3.09	175	3	1.7	276	4	1.4	10	1.7	
Mixed infections.	—	—	—	93	9	9.6	175	25	14.2	276	52	18.8	86	15.1	

were being regarded as prevalent here causing much trouble to the flock at Gaya and in the early days at Monghyr. Most of the deaths in ewes and the lambs were ascribed to malnutrition of the ewes. Faecal samples from this farm examined by Dr. Varma (personal communication) quite recently had shown fairly heavy infection with various gastro-intestinal nematodes and coccidia. As malnutrition was a common complaint, it was proposed to carry out a systematic parasitological survey of the entire flock. The main purpose of this work was to reveal the true picture of various parasitic infections of economic importance, including their incidence and intensity in different age-groups. This was done with a view to estimating the importance of these infections in relation to the health of animals and their bearing on their productivity. Such work is also helpful for the purpose of studying the conditions which influence adversely or favourably the propagation and spread of these parasites.

The results of the investigation are tabulated below (Table III). Although quite a number of animals was found to carry infection with various gastro-intestinal nematodes and Coccidia, in no case was the infection with former, particularly the Stomach-worms, found to be heavy. A batch of 19 sheep, which were sent out to Dehri-on-Sone during the month of March, 1955 and which had recently returned to the farm were the only animals that showed severe infection with these parasites.

An examination of farm records revealed the following figures of mortality in the flock during the last six years.

TABLE IV
Incidence of mortality at Sheep Breeding Farm, Gaya during the last six years, 1949—50 to 1954—55.

Year	Percentage of mortality.	Remarks.
1949—50	27%	
1950—51	48.5%	Mostly parasitic infections.
1951—52	3.8%	Routine drenching with 'Phenovis' (Phenothiazine) and occasionally with Hexachloroethane resorted to during the year perhaps aided in reducing mortality.
1952—53	24.8%	Mostly lamb-mortality due to mal-nutrition and poor husbandry.
1953—54	9%	
1954—55	8.8%	

The records also disclose that 'Phenovis' (Phenothiazine) treatment was introduced in the farm in the month of November, 1951 and that it had been followed since then more or less regularly every quarter in the prescribed dosage (10 to 15 gms.).

Other Helminthic Diseases

Amphistomes & amphistomiasis:—Some members of this group of helminths are found widespread throughout the State, particularly in marshy water-logged tracts. *Cotylophoron Cotylophorum* is very commonly met with in sheep but *Gastrothylax crumenifer* is also not infrequent in this host. *Calicophoron-calicophorum* is also occasionally met with. Their incidence is closely bound up with the distribution of their snail-intermediary belonging to the gastropod species *Indoplanorbis exustus*. The immature forms of these amphistomes cause acute gastro-enteritis, the condition being locally known as "Chherrah". Kuppaswamy (1948) has prescribed a line of treatment for this condition with Copper sulphate followed by Carbon tetrachloride. Hexachloroethane which claims to be superior to that has been recommended by this author. The present investigation has also brought forth evidences in favour of this drug.

Nasal schistosomiasis:—This condition caused by *Schistosoma nasale* has occasionally been met with in sheep as well in the endemic zone of the infection as discussed by Varma (1954). The treatment for this disease with antimonial preparations is well known.

Fascioliasis:—This liverfluke disease is caused by *Fasciola indica*, which has been described by Varma (1953) as a new species of the genus. In the endemic areas, as discussed by Varma (1954), although the ovine population is not much, the sheep are often found infected with this parasite.

Oesophagostomiasis:—This is infection with nodular worms, which are found mostly in South Bihar. *Oesophagostomum columbianum* has been identified from a collection made from some sheep of the Patna farm.

Hook-worm infections:—This is also occasionally met with. Although the adult parasites have not yet been available for identification, it appears from the morphology of the eggs examined in some faecal samples that either *Gaigeria pachyscelis* or *Bunostomum-trigonocephalum* or both occur in the State.

Moniezia:—This tapeworm infection is quite common in the sheep. *Moniezia expansa* has been identified from a collection made from some sheep.

Discussion

From the foregoing brief account it is evident that conditions are very favourable for the spread and propagation of various helminth parasites in the State of Bihar. In fact some of these have established themselves well in certain areas including the organised farms. The statistics given above depicting the overall picture of infections at the two Government farms lend full support to Minett's (1950) observations.

Further, for the differences in the picture of infections at these farms a reasoned explanation is found in the periodical drenching with 'Phenovis' (Phenothiazine) adopted at Gaya farm since November, 1951, which seems to have aided in reducing the incidence as well as lowering the intensity of infection and maintaining it at a low level. The mortality, which was as high as 48.5% due mostly to parasitic infections prior to resorting to Phenothiazine treatment, was also reduced to an appreciable extent. Hawkins *et al.* (1944) had also found that Phenothiazine as a drench was effective in lowering the level of parasitism, as measured by egg counts, to a low level and maintaining it there; but it was not capable of eliminating the infection. Rao (1953) records that there is definite improvement in body-weight, general condition, smartness and behaviour of the sheep regularly drenched with 'Phenovis' where there is strongylosis. The present studies furnish corroboratory evidences to these findings of previous workers.

Summary

1. A survey was carried out on the incidence of gastro-intestinal parasites of sheep in the two government breeding farms at Patna and Gaya. The investigations revealed that the infection with gastro-intestinal nematodes, particularly the stomach-worms (*Haemonchus*, *Mecistocirrus* & *Trichostrongylus* spp.) and *Strongyloides* and also the *Coccidia* was fairly common. Although conditions for the spread and propagation of the parasites are quite favourable, and in fact quite a number of animals was found to carry infection with these, in no case was the infection with stomach-worms found to be heavy particularly at Gaya farm, where 'Phenovis' (Phenothiazine) treatment has been in regular practice since November, 1951.

2. This study lends support to the observations of some earlier workers that 'Phenovis' (Phenothiazine) as a drench is effective in lowering the level of infection with the stomach-worms and maintaining it there but is not capable of eliminating the infection altogether.

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3. The data obtained through the present investigation suggest that Hexachloroethane is effective in controlling the incidence of amphistome infection.

4. A mention is also made of occurrence of some other helminthic diseases of sheep in the State of Bihar, like nasal schistosomiasis, fascioliasis, oesophagostomiasis, hook-worm infections, monieziasis etc.

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The author is grateful to Dr. A. K. Varma, under whose guidance and supervision this work was done. His indebtedness to Dr. Varma is, indeed, very great for his assistance in identifying the parasites and for the personal communications freely utilised in this study. Thanks are also due to the Farm Veterinary Assistant Surgeon of the Patna Farm and the Sheep Development Officer, Gaya for their kind co-operation.

REFERENCES

- | | | |
|--|-----|---|
| Hawkins, P. A. Cole | ... | Studies of sheep parasite. III. Treatment of the lambs. <i>Mich. agr. exp. Sta. quart. Bull.</i> , 27 (1), 1-14. |
| C. L., Kline, E. E. & Drudge, J. H. (1944) | | |
| Kuppuswamy, P. B. (1948) | ... | 'Pitto & Gillar' in sheep and goats. <i>Indian Far.</i> , 9 (2), 73-74. |
| Minett, F. C. (1950) | ... | Mortality in sheep and goats in India. <i>Indian J. Vet. Sci.</i> 20 (1), 69-103. (W. L. 9941b). |
| Rao, M. V. K. (1953) | ... | The economic importance of drenching sheep. <i>Indian Vet. J.</i> , 29 (4), 310-321. (W. L. 9959). |
| Varma, A. K. (1953) | ... | On <i>Fasciola indica</i> n. sp. with some observations on <i>F. hepatica</i> & <i>F. gigantica</i> . <i>J. Hel.</i> , 27 (3/4), 185-198. (W. L. 11224c). |
| Varma, A. K. (1954) | ... | Studies on the nature, incidence, distribution and control of Nasal schistosomiasis & Fascioliasis in Bihar. <i>Indian J. Vet. Sci.</i> , 24 (1), 11-33. (W. L. 9941h) |
| Varma, A. K. (1955) | ... | On a collection of paramphistomes from domesticated animals in Bihar. <i>Indian J. Vet. Sci.</i> (in press) |
| Varma, A. K. | ... | (Personal communications.) |

EXPERIMENTS ON HORMONAL AUGMENTATION OF EARLY MATURITY IN THARPARKAR HEIFERS

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Early Maturity and high fertility are the two corner stones of successful animal production. It is well known, however, that the Dairy Industry in India is greatly handicapped on these two points.

Most of the recognised milk breeds of India not only mature remarkably late but their effective breeding period is distressingly irregular. While most heifers of the English breeds are in calf before they are 18 months old, the corresponding period for majority of Indian breeds is as late as four years, and a calving interval longer than 18 months is more often the rule rather than exception.

It is well known that maturity and fertility are controlled by a variety of such factors as Heredity, Environment, Nutritional and Hormonal level of the individual. While considerable improvement in some of the factors has been effected through genetic and nutritional researches, hormonal side of the problem has not been explored to that desirable extent. It has therefore been thought worthwhile to study the effect of this factor on the breeding history of the individual.

The action of synthetic oestrogens on the Mammary glands and the genitalia of the heifers has been clearly elucidated by now. Since the first observations of Folley et. al (1940-41) that inoculation of the udder region of virgin goats with ointment containing stilboestrol produced not only mammary growth but lactation as well, a large volume of literature has accumulated on this subject, and the experiments extended on heifers as well (Folley and Malpress, 1944; Folley, Stewart and young 1944; Hammond and Day 1944; Parks and Glover 1944).

The other hormone having fundamental effects upon the activity of the gonads is the Gonadotrophic hormone of the Pituitary. The discovery by Cole and Hart (1930) of a potent gonadotrophic hormone in the blood serum of pregnant mares and the subsequent work of Cole and Millar (1933) on anoestrous sheep was followed by a considerable amount of research on the possibility of augmenting fertility in livestock by hormone administration. (Hammond and Parkes 1942; Zawadowsky et al (1935); Hammond, and Bhattacharya 1944; Bhattacharya, Hammond and Day (1944); Folley and Malpress (1944) and Luktuke and Bhattacharya (1948). While most of the work with the gonadotrophins has been confined to either adult cows or fully matured heifers, the data on comparatively younger heifers are very scanty. Moreover, according to the best information of the writers, little or no work has been done to study the combined effect of the two important sex hormones-the oestrogens and gonadotrophins on young immature heifers. The work under report was undertaken to furnish some information on these points.

Materials and Methods

The experimental animals for this study consisted of 8 young immature Tharparkar heifers each two years old and weighing about 400

lbs. These belonged to the Tharparkar herd maintained at the Government Cattle Farm, Patna. None of these animals showed any signs of sexual maturity and had not even outgrown the calfhood conformation of their body. These were divided into two lots of 4 animals each, one lot was used for hormonal treatment and the other lot served as control.

The experimental lot was administered two hundred (200) mg. (8x25 mg) of stilboestrol (Boots) in the form of subcutaneous implants in the neck region. Local treatment with sulphanilamide ointment was given to animals showing local inflammation. Out of the 4 animals implanted, only one showed mild inflammation at the site after 3 days which readily subsided on treatment. Changes in the mammary glands and in external genitalia were noted at intervals of the first and second month after implantation. Details of observations are given in Table I.

TABLE I
Effect of stilboestrol implants (8 x 25 mg.) on the Reproductive organs of the Heifers.

Animal No.	Date of birth.	Date of implantation.	OBSERVATION	
			One month after implantation.	Two months after implantation.
89/50	31-7-50	2-9-52	Appreciable development of the udder; enlargement of the teats and vulva; slight mucous discharge from the vagina, no milk secretion.	Further development of the udder and enlargement of the teats and vulva; appreciable continued mucous discharge from the vagina for a few days, a few c.c.s. of milk secretion towards the end of the 2nd month; distinct change in the body conformation towards maturity.
118/50	4-10-50	2-9-52	Same as above but with less prominent development.	Same as above.
111/50	17-9-50	2-9-52	Same as above but development of the udder and teats more prominent.	Same as above, but no milk secretion.
130/50	17-8-50	2-9-52	Same as above.	Same as above, but no milk secretion.

In the four control animals, the udder, teats and vulva were still infantile in nature and no change in their body conformation was observed.

After an interval of two months from the date of implantation of the stilboestrol tablets, the heifers were examined per rectum for ascertaining the state of growth of the uterus and ovaries and then

administered 375 i.u. of serum gonadotrophine (Antostab-Boots) subcutaneously and again examined per rectum as above on the fourth, eighth, and 14th day after the injection. Details of this observation are given in Table II.

A second injection of 750 i.u. of Antostab was administered after a month from the first injection and its effects on the gonads were ascertained by rectal palpation. The animals were also examined for visible signs of oestrus by examination with the vaginal speculum. The observations are recorded in Table III.

Thereafter the animals were observed for a further period of 2 months for signs of oestrus, so as to ascertain if the stimulating effect of the gonadotrophine had been able to establish regular oestrus cycle in the animals. They were also examined per rectum at the end of this period. The result of this observation is shown in Table IV.

Results and Discussion

The use of small doses of synthetic oestrogens over long periods for the induction of lactation in mature heifers or dry cow is a well established practice. The conventional method of administration of the oestrogens is by subcutaneous implants, the common dose used varying from 200 to 400 mgs. But the age response to this treatment has not been studied in detail and especially the reaction in very young or very old animals is not well known. In this investigation, however, all the four experimental animals re-acted preceptibly to oestrogen treatment, although the animals were definitely young and had not transgressed their calthood conformation (vide Table I). All the 4 treated animals showed prominent hyperplasia of the vulva with continued mucous discharge, as also considerable development of the udder and enlargement of the teats. All these reactions were manifested within one month of administration of the oestrogen, but continued to be more prominent in course of the second month. As far as it could be gathered from deep palpation, all the implanted tablets were apparently absorbed in all the 4 animals in the course of two months. In the absence of any detailed information on the rate of absorption of oestrogen from subcutaneous implants, this finding may prove to be of interest. Milk secretion was not perceptibly stimulated in any of the animals and only a few c.c.s. of milk could be withdrawn from 2 experimental animals for a few days only towards the end of the 2nd month. The effect of the oestrogens on the infantile uterus was also not very prominent. Although not much change in its size was palpable by rectal examination, there was perceptible change in its tone as it felt very much fuller in all the four cases, especially after an interval of two months from implantation. In short, implantation of synthetic oestrogen visibly stimulated the genitalia towards maturity.

TABLE II
Effect of Administration of 350 i.u. of Gonadotrophine (Antostab).

Animal No.	Interval after injection (in days).	OBSERVATION			Remarks.
		Uterus.	Right Ovary.	Left Ovary.	
89/50	0	Infantile but tense in feeling.	Anoestrous and rudimentary in size.	Anoestrous and rudimentary in size.	No cervical mucous discharge.
	4	No change perceptible.	Enlarged to about 3 times the original size; no follicle palpable.	Perceptibly enlarged, no follicle palpable.	do.
	8	do.	Still more enlarged; size about 4 times the original, no follicle palpable.	No further change.	do. or other signs of oestrus.
	14	do.	Still found to be enlarged but the size was smaller than that on the 8th day. No C. L. palpable.	do.	do.
118/50	0	Infantile but tense in feeling.	Anoestrous and rudimentary in size.	Anoestrous and rudimentary in size.	No cervical mucous discharge.
	4	No change perceptible.	Slightly enlarged, no follicle palpable.	Enlarged to double the original size, no follicle palpable.	do.
	8	do.	No further change.	No further change.	do.
	14	do.	do.	Anoestrous and rudimentary in size.	do.
118/50	0	Infantile and hard in feeling.	Anoestrous and rudimentary in size.	Anoestrous and rudimentary in size.	No cervical mucous discharge.
	4	No change perceptible.	Enlarged to about 3 times the original size, no follicle palpable.	Slightly enlarged; no follicle perceptible.	do.
	8	do.	Still found to be enlarged but the size was smaller than on the 8th day. No corpus Leutenum palpable.	No further change.	do.
	14	do.	Still found to be enlarged but the size was smaller than on the 9th day. No corpus Leutenum palpable.	No further change.	do.
130/50	0	Infantile and hard in feeling.	Anoestrous and rudimentary in size.	Anoestrous and rudimentary in size.	do.
	4	No change perceptible.	No change perceptible.	No change perceptible.	do.
	8	do.	do.	do.	do.
	14	do.	do.	do.	do.

Effect of gonadotrophines :—Serum gonadotrophines have mainly been utilised to stimulate gonadal activity in anoestrus adult cows or mature heifers, but very little information is available on its action on immature heifers. This presented considerable difficulty in arriving at the dosage for the experimental animals. While 1000 i.us. is generally considered a suitable dose for adult cows of within 1000 lb. body weight (Luktuke and Bhattacharya, 1948), it was not known whether a dose proportional to the body weight would be safe for immature heifers. Moreover, the adverse effect of super ovulation resulting in cystic ovary due to over dosing is also an important factor to be borne in mind in computing a suitable dose. In view of these reasons a dose of three hundred seventy five (375) i.us. i.e. one third (1/3rd) of the usual dose for adult cow was decided upon for the heifers which weighed about 400 lbs. each. The effect of its administration is indicated in Table II. It will be seen that 3 out of the 4 experimental animals responded even at this comparatively small dose as evinced by increase in the size of the ovaries with or without palpable follicles. The stimulating effect of the gonadotrophine appeared to be increasing till the 8th day and persisted at that level even upto fourteen days. No mature follicle was however palpable in any of these three reacting animals, nor any corpus leuteum was formed. There was also no cervical mucous discharge or other signs of oestrus in any of the reacting animals. The effect of this dosage may be summarised to be mild stimulation not sufficient to induce ovulation and oestrus.

The effect of the higher dose of 750 i.us. of antostab is indicated in Table III. At this dose all the four treated animals responded, with perceptibly enlarged ovary. Palpably large follicles could also be detected in three animals by the 8th day. But absence of Corpus Leuteum even by the 14th day suggested that ovulation had not taken place in any of the reacting animals. The degree of response was appreciably greater with a dose of 750 i.us. as compared to one of 375 i.us. Two of the three reacting animals also showed clear signs of oestrus but was not shown to the bull as they had not attained the desirable standard of maturity in their body conformation by that time. None of the animals however, showed recurrence of oestrus during the period of careful observation for another two months. The changes brought about by the administration of two sex hormones as narrated above persisted even after an interval of 2 months. Apparently the hormonal treatment was able to temporarily induce the onset of puberty in the reacting animals and also helped in the earlier development of their secondary sex organs, but was not able to establish regular oestrus cycles in them (vide Table IV).

Summary and Conclusions

1. Subcutaneous implantation of 200 mgs. of stilboestrol in 2 year old Tharparker heifers induced marked development of the mammary glands, swelling of the vulva and changes in its body conformation.
2. Subcutaneous injection 375 i.us. of gonadotrophine (antostab) markedly increased the size of their anoestrous ovary but failed to produce mature follicle or ovulation.
3. A subsequent dose of 750 i.us. of the same gonadotrophine was able to produce mature follicles but no ovulation.
4. The changes brought about by the administration of these two sex hormones persisted even after two months, but the hormones failed to establish regular oestrous cycle in the treated animals.

Acknowledgment

The authors express their thanks to Sri Sharfuddin Ahmed, the Farm Veterinary Assistant Surgeon for technical assistance in carrying out the work and to Sri H. R. Kapur, Principal, Bihar Veterinary College, Patna, for his active interest in the work.

REFERENCES

- Folley, S. J. & Malpress, F. H. (1941) ... *J. Dairy Res.* **12**, 241.
 (1944) ... *J. " Sci.* **24**, 845.
 " " Stewart D. L. & Young, ... *J. Endocrinol.* **4**, 43.
 F. G. (1944) ...
 Hammond J. (Jr) & Day F. T. (1944) ... *J. " "* **4**, 53.
 Parkes, A. S. & Glover, R. E. (1944) ... *" " Amer. J. Physical.* **95**, 57.
 Cole, H. H. & Hart, G. H. (1930) ... *" " "* **104**, 165.
 & Muller, R. F. (1933) ...
 Hammond, J. & Parkes, A. S. (1942) ... *J. Agri. Sci.* **32**, 308.
 " J. (jr) & Bhattacharya P. ... *" " "* **34**, 1.
 (1944) ...
 Bhattacharya, P., Hammond J. Jr., & ... *Vet. Rec.* **33**, 450.
 Day F. T. (1941) ...
 Folley, S. J. & Malpress, F. H. (1944) ... *Proc. Roy. Soc. B.* **132**, 164.
 Luktuke S. N. and P. Bhattacharya ... *Ind. J. Dairy Sci.* Vol. I-page 59.
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A REVIEW ON THE EFFECT OF ENVIRONMENTAL LIGHT ON REPRODUCTION OF FARM ANIMALS

By

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Seasonal breeding behaviour of Sheep, during fall and winter, especially well marked in those produced outside the tropical zone, was observed and reported by various workers long ago (Heap 1900,

Effect of gonadotrophines :—Serum gonadotrophines have mainly been utilised to stimulate gonadal activity in anoestrus adult cows or mature heifers, but very little information is available on its action on immature heifers. This presented considerable difficulty in arriving at the dosage for the experimental animals. While 1000 i.us. is generally considered a suitable dose for adult cows of within 1000 lb. body weight (Luktuke and Bhattacharya, 1948), it was not known whether a dose proportional to the body weight would be safe for immature heifers. Moreover, the adverse effect of super ovulation resulting in cystic ovary due to over dosing is also an important factor to be borne in mind in computing a suitable dose. In view of these reasons a dose of three hundred seventy five (375) i.us. i.e. one third (1/3rd) of the usual dose for adult cow was decided upon for the heifers which weighed about 400 lbs. each. The effect of its administration is indicated in Table II. It will be seen that 3 out of the 4 experimental animals responded even at this comparatively small dose as evinced by increase in the size of the ovaries with or without palpable follicles. The stimulating effect of the gonadotrophine appeared to be increasing till the 8th day and persisted at that level even upto fourteen days. No mature follicle was however palpable in any of these three reacting animals, nor any corpus leuteum was formed. There was also no cervical mucous discharge or other signs of oestrus in any of the reacting animals. The effect of this dosage may be summarised to be mild stimulation not sufficient to induce ovulation and oestrus.

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REFERENCES

- Folley, S. J. & Malpress, F. H. (1941) ... *J. Dairy Res.* **12**, 241.
 (1944) ... *J. " Sci.* **24**, 845.
 " " Stewart D. L. & Young, ... *J. Endocrinol.* **4**, 43.
 F. G. (1944) ...
 Hammond J. (Jr) & Day F. T. (1944) ... *J. " "* **4**, 53.
 Parkes, A. S. & Glover, R. E. (1944) ... " " **4**, 90.
 Cole, H. H. & Hart, G. H. (1930) ... " Amer. J. Physical, **95**, 57.
 & Muller, R. F. (1933) ... " " **104**, 165.
 Hammond, J. & Parkes, A. S. (1942) ... *J. Agri. Sci.* **32**, 308.
 " J. (jr) & Bhattacharya P. ... " " **34**, 1.
 (1944) ...
 Bhattacharya, P., Hammond J. Jr., & ... *Vet. Rec.* **33**, 450.
 Day F. T. (1941) ...
 Folley, S. J. & Malpress, F. H. (1944) ... *Proc. Roy. Soc. B*, **132**, 164.
 Luktuke S. N. and P. Bhattacharya ... *Ind. J. Dairy Sci.* Vol. I-page 59.
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A REVIEW ON THE EFFECT OF ENVIRONMENTAL LIGHT ON REPRODUCTION OF FARM ANIMALS

By

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Seasonal breeding behaviour of Sheep, during fall and winter, especially well marked in those produced outside the tropical zone, was observed and reported by various workers long ago (Heap 1900,

Marshall 1903, 1922, Cole and Miller 1933, Grant 1934, Roux 1936, Mc Kenzie and Terril 1937, Hammond Jr. 1944, Philips, Schott and Simmons 1947, and others). Such reproductive periodicity in livestock and its varying duration in different latitude is convincing evidence that some environmental factors operate directly or indirectly on the endocrine glands, thus influencing the sexual cycle. Reported research indicates that the different stages of sexual cycle depend upon certain levels of different hormones and these hormone levels are influenced in turn by environment. It is apparent therefore, that there is a chain reaction, relating to environmental climate, successively to nervous system, to the endocrine system, and finally to the metabolic and reproductive processes. This paper is undertaken in an endeavour to review the works done on the influences of environmental light on the reproduction of some of the farm animals.

As early as 1919, Levis *et al.* made first observation on the effect of the seasonal variation in amount of light on eggs of chickens. Rowan (1925-30), Benoit (1936) and others made observation on avians like Juncos, Crows, Starlings, Ducks and others and reported that the daily period of light is a factor in conditioning sexual activity. In fact, they found that during winter the progressive increase in day-light induced testicular activity while diminution in light had inhibitory effect.

In mammals, Bissonnette (1932) was the first to show a similar response of ferret gonads to light. He reported that in female ferret full oestrus was induced some months earlier than normal by subjecting them in winter to 6-6½ hours of artificial (electric) light in addition to daily light hours.

Response to light by ruminating ungulates *e.g.* deer, sheep, goat, has been reported. Marshall (1937) has pointed out that when sheep and reindeers are transferred from one hemisphere to other, they soon adjust their habits to the reversed seasons, and breed at different times of the year but the right season. He further stated that autumn is the sexual season for the majority of ruminants, both in Northern and Southern hemispheres, so that if these animals react to the light, it must be to diminution and not to increase.

Effect of light on goats was studied by Bissonnette (1941) who has pointed out that the breeding cycle in goats is controlled by light in such a way that diminution in light induces breeding cycles while increase inhibits them.

Sykes and Cole (1944) observed the effect of light on reproduction of ewes. They subjected eight ewes to the gradual increase in the duration of artificial light during March until three hours of light were added to the normal day. The light was then decreased at

intervals in one hour steps until early May when it was decreased by six hours of day light. They concluded that alteration in the amount of light resulted in the alteration of the sexual cycle, bringing the sexual cycle in an anoestrus ewe. Yeates (1947) made an extensive investigation of the effect of light on the sexual activity of sheep. By subjecting a group of ewes to gradual increases of light during shortening days and decreases of light during lengthening days of the year, he observed changes in breeding and lambing time of year. The experimental ewes conceived in mid-summer (May and June) and lambed in the following October, which is the usual time of mating. He, therefore advanced his hypothesis that the sexual season in sheep can be modified or reversed at will by suitable artificial alteration in the duration of daily light. He was also of the opinion that light environment appears to cause the seasonal variation in the fertility of rams. Hart (1950) using the same flock of sheep, studied by Yeates, induced oestrus in ewes by subjecting them to a daily light-dark ratio, in hours of 4 light, 2 dark, 4 light, 14 dark and 4 light, 8 dark, 4 light, 8 dark. From this, he suggested that splitting of the long summer days into two short periods may induce breeding activity. Hafez (1950) studied the breeding behaviour of British sheep and classified them into three groups. The Scottish or Welsh breeds *e.g.* Black face mountain, Border Leicester, and Welsh mountain, bred when length of days was 11½ to 12½ hours or less, the Southern England breed *e.g.* Romney Marsh and Suffolk when it was 12 to 13½ hours or less, and the Dorset when it was 12 to 17 hours or less.

The probability of the fact that the factors responsible for this periodic breeding activity may govern to some extent fecundity and multiple births in ewes has also been studied. Singh (1953) studied the effect of environmental light on the multiple births of the Hampshire, Oxford, Shropshire and Southdown breeds of Sheep. He stated that the increased photoperiodicity was significantly associated with the decreased percentage of multiple births in ewes.

In India, breeding cycle of farm animals is not observed to be well defined, like temperate climate, to particular time of year. Slater and Bhatia (1935) reported that Bar Bari goats bred all the year round but he observed most frequent mating in Jamunapari goats from July to October. Smith & Singh (1938) stated that Bikaneri ewes mated throughout the whole year though autumn and spring seasons predominated in lambing. The year round breeding behaviour of Indian Sheep and Goats may be due to the absence of great difference in the length of daily sunlight during different periods of the year which occur in temperate countries.

Mode of Action of Light on Reproduction

The periodic gonadal activity has already been stated to be influenced by environmental light, but the mechanism of its effect is still obscure. Within recent years, much has been revealed, however, and consideration will now be given to the most plausible reports.

It has been suggested that seasonal breeding behaviour is due to variation in the secretion of gonadotrophins by the pituitary (Warbritton and McKenzie 1937 Robinson, 1951, and others). It appears that the sexual cycle is influenced by certain environmental factors which stimulate and/or inhibit the functional activity of the anterior pituitary.

Hill and Parks (1933) have demonstrated that in wild mice and various species of birds response to illumination is not possible after hypophysectomy, and it is much impaired after division of the optic nerve (Bissonnette 1935 a,b, 1936). Marshall and Bowden (1934) have adduced further conclusive evidence that activation of the gonads is principally dependant on retinal stimulation, and on the effects which such stimulation exerts upon the pituitary. A ferret blinded by cataract failed to come in heat at any time between December 23, 1932 and July 10, 1935, notwithstanding successive periods of artificial illumination (Marshall and Bowden, 1934, 1936). When birds were hooded and simultaneously exposed to light, normal sexual rhythmicity was not observed. On the other hand, when eyes were removed from ducks, sexual activity was not inhibited (Benoit and Ott 1944). These workers also demonstrated that by transmitting light directly on the anterior pituitary they could induce the development of the testis in ducks. Moreover, Benoit's (1936-44) researches on ducks showed the increased amount of light to be related with increased secretion of gonadotrophic hormone from pituitary. Light was also found to stimulate the pituitary through the penetration of head tissues in addition to through the eyes by the same worker. But the ferret did not respond to light in the absence of eye (Bissonnette 1936) and it has been assumed that the pituitary of the ferret is too deep to be affected by light directly. Based on these assumptions light cannot have direct effect on the pituitary but through the eyes in the farm animals due to its more deep location.

The best available evidence indicates that light impulses are received by the eyes. They are then passed by way of the optic nerves to the hypothalamus, the pituitary stalk, and finally to the pituitary itself, where they produce their effects on the release of gonadotropic hormones which serve to stimulate the respective target organ, ovary or testis. Of all the endocrine glands influencing reproduction, it has

conclusively been shown that thyroid is affected by season in its output of thyroxine.

Thyroid and Gonad

Within recent years, the thyroid hormone has been found to be related with gonadal functioning. It has been demonstrated that the level of thyroid secretion is influenced by seasonal variation. There is also evidence to indicate that gonadal activity is dependant in part on the optimum levels of thyroid hormone.

Thyroidectomy has been found to result in reduced sperm concentration and in general, impaired fertility. In rams, Berliner and Warbritton (1937) observed marked decrease in sperm concentration, volume of semen with a relatively increased number of abnormal spermatozoa. On administration of thyroxine, spermatogenesis was improved in these animals. Rams with low fertility in summer also showed marked improvement when treated with thyroxine. Working with chickens, Winchester (1939), and Taylor and Burmester (1940) observed marked decline in egg production following thyroidectomy. By replacement therapy egg production was found to be increased.

Turner, Kempster, Hall and Reineke (1945) found that egg production was maintained on a more uniform level in White Leghorn and Rhode Island Red birds when the thyroid hormone was maintained at a uniform level in the feed and possibly in the body. These workers concluded that thyroid secretion was one of the most important factors influencing gonadotrophins and egg production. Furthermore, they interpreted the results as indicating that seasonal cycle of egg production was in part due to reduced secretion of thyroid hormone during summer month.

Reineke (1946) reported that thyroprotein corrected certain types of infertility in bulls. Shaffner and Andrews (1948) found reduced semen quality in fowls as a result of hypothyroidism.

Cyclic variation in the activity of thyroid as related to the functioning of gonads has been observed from time to time. Turner (1948) found that when egg production began to decline in May, the secretion of thyroxine also declined by fifteen percent. During the cooler months, between January and March no decline in Thyroxine nor egg production was observed. Henneman (1953) observed significantly low levels of thyroid secretion in sheep during summer as against high levels during other periods of the year. This seems to furnish further evidence in support of the seasonal control of thyroid secretion and relating it to seasonal breeding activity of sheep. However, it is believed that the thyroid activity is under the direct control of

anterior pituitary and therefore, environmental factors can influence the Thyroid function only by way of the pituitary. Besides this, the function of the gonad is also said to be under the control of the anterior pituitary. Hence, if the thyroid has any action on the gonads, as has been suggested because of their apparent relationship during different times of the year, it is quite logical it is through the pituitary. However, some workers suggested the possibility of a direct action on the function of gonads.

Summary

Breeding behaviour of farm animals is considerably governed by environmental light. This environmental influence is well marked outside the Tropical region due to the fact that the Seasonal variation in the length of light is not as great in Tropics as in other parts of the world.

Natural or artificial decrease in length of light induces breeding activity in sheep and goat, while increase inhibits it.

In avian, viz. chickens, turkeys etc., light is recognised to be a factor in conditioning sexual activity in such a way that natural or artificial increase in it stimulates egg production.

The effect of light on gonads is probably through eye, hypothalamus, pituitary stalk, and pituitary.

LITERATURE CITED

1. Benoit, J. (1936) ... Stimulation of the Hypophysis and Genital Glands in the Duck by Electric Light. Effect of Thyroidectomy on the Testis and Liver. *Anat. Rec.* 67, Suppl. No. 1: 81-82.
2. Benoit, J. (1937) ... Etude du mecanisme de la stimulation par la lumiere de l'activite testiculaire chez le canard domestique. Roie de l'hypophyse. *Bull. biol. de la Belgique*, 71: 393-437.
3. Benoit, J. and Ott (1944) ... External and Internal Factors in Sexual Activity. Effect of Irradiation with Different Wave-lengths of the Mechanisms of Photo stimulation of the Hypophysis and on Testicular Growth in the Immature Duck. *The Yale Jour. Biol. and Med.* 17: 27-46.
4. Berliner, V. and V. Warbritton (1937) ... The Pituitary and Thyroid in Relation to Sperm Production in rams. *Proc. Amer. Soc. Ani. Prod.* 1937: 137-142.
5. Bissonnette, T. H. (1931) ... Studies on the Sexual Cycles in Birds Experimental Modification of the Sexual Cycles in Males of the European Starling (*Sturnus Vulgaris*) by Changes in the Dairy period of Illumination and Muscular Work. *Jour. Exp. Zool.*, 58: 281-319.
6. Bissonnette, T. H. (1932) ... Modification of Mammalian sexual cycles. I. Reactions of ferrets (Putorious) of both Sexes to electric light added after dark in November and December. *Proc. Roy. Soc. (London)* B. 110: 322.

7. Bissonnette, T. H. (1935a) ... Modification of Mammalian Sexual Cycles. Delay of Oestrus and Induction of Anoestrus in Female Ferrets by Reduction of Intensity and Duration of Daily Light Periods in the Normal Oestrus Season. *Jour. Exp. Biol.* 12: 315-320.
8. " " (1935 b) ... Relations of Hair Cycles in Ferrets to Changes in the Anterior Hypophysis and to light cycles. *Anat. Rec.* 63: 159-168.
9. " " (1936) ... Modification of Mammalian Sexual Cycles. The Avenue of Reception of Sexually Stimulating Light. *Jour. Comp. Psych.* 22: 93-103.
10. " " (1941) ... Experimental Modification of Breeding Cycles in Goats. *Physiol. Zool.* 14: 379-383.
11. Cole, H. H. and R. F. Moller (1933) ... Artificial Induction of Ovulation and Oestrus in the Ewe during Anoestrus. *Amer. Jour. Physiol.* 104: 167-171.
12. Grant, R. (1934) ... Studies on the Physiology of Reproduction in the Ewe. *Trans. Roy. Soc. Edin.* 58: 1-47.
13. Hafez, E. S. E. (1950) ... Sexual season of the ewe and daylight environment. *Nature*, 166: 822-823.
14. Hart, D. S. (1950) ... Photoperiodicity in Suffolk Sheep. *Jour. Agri. Sci.* 40: 143-149.
15. Hammond, J. (1944) ... On the Breeding Season in the sheep. *Jour. Agr. Sci.* 34: 97-105.
16. Heap, W. (1900) ... Abortion, Barrenness and Fertility in Sheep. *Jour. Roy. Agr. Soc.* 10: 217-248.
17. Henneman, H. A. (1953) ... The Thyroid Secretion Rate of Sheep as Affected by: Seasons, Age, Breed, Pregnancy and Lactation. Unpublished Ph.D. Thesis, Michigan State College.
18. Hill, M. and A. S. Parkes (1933) ... Studies on the Hypophysectomized Ferret. Effect of Hypophysectomy on the Responses of the Female Ferret to Additional Illumination during Anoestrus. *Proc. Roy. Soc. Lond. B.* 113: 537-540.
19. Lewis, H.R., R.R. Hanas, and E. H. Wene (1919) ... The first two years of the Vineland contest. *New jersey Agric. Exp. Sta. Bull.* 338.
20. Marshall, F. H. A. (1903) ... The Oestrus cycle and the Formation of the Corpus Luteum in the Sheep. *Phil. Trans. Roy. Soc. B.* 196: 47-99.
21. Marshall, F. H. A. (1937) ... On the Changes over in the Oestrous Cycle in Animals after Transference across the Equator, with further Observations on the Incidence of the Breeding Seasons and the Factors Controlling Sexual Periodicity. *Proc. Roy. Soc. Lond. B.* 122: 413-427.
22. Marshall, F. H. A. and F. P. Bowden, (1934) ... The effect of Irradiation with Different Wave-lengths on the Oestrus Cycle of the Ferret, with Remarks on the Factors Controlling Sexual Periodicity. *Jour. Exp. Biol.* 11: 409-422.
23. " " (1936) ... The Further Effects of Irradiation on the Oestrus Cycle of the Ferret. *Jour. Ex. Biol.* 13: 383-386.
24. McKenzie, F. F. and C. E. Terrill, (1937) ... Estrus, Ovulation and Related Phenomena in the Ewe. *Missouri Agr. Exp. Sta. Res. Bull.* 264.
25. Phillips, R. W., R. G. Schott, and V. L. Simmons, (1947) ... Seasonal Variations in the Occurrence of Conceptions in Karakul Sheep. *Jour. Anim. Sci.* 6: 123-132.

26. Reineke, E. P. (1946) ... The Effect of Synthetic Thyroprotein on Sterility in Bulls. In Engle, E. T., "The Problem of Fertility", Princeton Univ. Press Princeton N. J. pp. 233-242.
27. Robinson, T. J. (1951) ... Reproduction in the Ewe. Camb. Philols. Soc. Biol. Rev. 26: 121-157.
28. Roux, L. L. (1936) ... Sex Physiology of Sheep. Onderstepoort Jour. Vet. Sci. and Ani. Ind. 6: 465-717.
29. Rowan, W. (1925) ... Relation of light to Bird Migration and Development Changes. Nature. 115: 449-495.
30. Rowan, W. (1930) ... Experiments in Bird Migration. II. "Reversed Migration". Proc. National Acad. Sci. 16: 520-525.
31. Shaffner, C. S., and F. N. Andrews (1948) ... The Influence of Thiouracil on Semen Quality in the Fowl. Poultry Sci. 27: 91-102.
32. Singh, O. N. (1953) ... Effect of Environmental factors on Reproduction and Growth in Sheep. M. S. Thesis. Mich. State College (U.S.A.)
33. Smith, L. W. and G. Singh, (1938) ... A preliminary Note on the Study of Oestrus in Sheep, Agr. and Livestock in India, 8: 683-686.
34. Slater, A. E. and S. S. Bhatia (1935) ... Allahabad Farmer, 9: 156-159.
35. Sykes, J. F. and C. L. Cole (1944) ... Modification of Mating Season in Sheep by Light Treatment. Mich. Agr. Expt. Sta. Quart. Bull. Vol. 26 No. 4: 250-252.
36. Taylor, L. W. and B. R. Burmester (1940) ... Effect of Thyroidectomy on Production, Quality and Composition of Chicken Eggs. Poultry Sci. 19: 326-331.
37. Turner, C. W. (1948) ... Effect of age and Season on the Thyroxine Secretion Rate of White Leghorn Hens. Poultry Sci. 27: 146-254.
38. Turner, C. W. H. L., Kempster, N. M. Hall and E. P. Reineke ... The effect of Thyroprotein on Egg Production. Poultry Sci.
39. Warbritton, V. and F. F. McKenzie (1937) ... The Pituitary Gland of Ewes in Various Stages of Reproduction. Missouri Agr. Expt. Sta. Res. Bull. 257.
40. Winchester, C. F. (1939) ... Influence of Thyroid on Egg Production. Endocrinology. 24: 697-701.
41. Yeates, N. T. M. (1949) ... The Breeding Season of the Sheep with Particular Reference to its Modification by Artificial Means of Using Light. Jour. Agr. Sci. 39: 1-43.

**A RECORD OF MYIALGES ANCHORA (MYIALGESIDAE) ON
PSEUDOLYNCHIA MAURA (HIPPOBOSCIDAE)
FROM INDIA**

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The mites of the family Myialgesidae are parasitic on Hippoboscid flies and rarely on Mallophaga. The females are broadly oval and the first pair of legs without a claw or lobe but provided with an anchor or a hook. Males are not known. Sargent & Trouessart (1907) were the first to describe *Myialges anchora* on *pseudolynchia maura* at

Algeria. Speiser (1910) described *Myialges caulotoon* from *Lynchia ardeae* at British East-Africa. Ferris (1928) made a record of these two species from California and Philippine Islands indicating that the mites were found to parasitise *Ornithoica confluenta* and *O. philippinensis*. Corremann (1944) gave an account of the species recorded and described a third species *Myialgopsis trinotoni* from a louse *Trinoton luridum*, the genus *Myialgopsis* differing from *Myialges* in possessing an ambulacral sucker on the first pair of legs.

At the time of examining a large number of *Pseudolynchia maura*-pigeon flies, the present author came across a dozen specimens of *M. anchora*, attached to the abdomen of the flies and it is redescribed here with a view to filling the gaps in the original description. This is the first record of this species from India.

Myialges anchora Sargent & Trouessart, 1907. Fig. 1.

Female :- Body oval, with the anterior end slightly narrow and the posterior broad. Length - 550 to 600 microns. Breadth - 400 to 450 microns.

Dorsal surface : Abdomen weakly chitinised with a single propodosomal plate. No suture between propodosoma and hysterostoma. Propodosomal plate broader than long, with its anterior margin slightly convex and the posterior rounded. Two long and two short setae on the posterior border of propodosomal plate. One long and short setae on either side in level with 3rd pair of legs. A pair of short setae in level with 4th pair of legs. Anus terminal. Posterior margin of abdomen with one long and short setae on either side of the anus.

Ventral surface : Abdomen without any chitinous plates. First pair of apodemes united and Y-shaped. Second pair of apodemes not united. Region between the 1st and 2nd pair of apodemes poorly chitinised with a moderately long seta near the inner angle. Genital opening situated between 2nd and 3rd pair of legs, with a transverse chitinous rod in front and two poorly chitinised longitudinal rods on either side of the opening. Two short and slender setae, one behind the other, on either side of the genital opening. Another short seta on either side in level with 3rd pair of legs. A pair of long setae rather widely placed between 4th pair of legs. Four short setae in a transverse line anterior to the anus.

Legs : First pair of legs short, thick with a strong anchor-shaped hook and without ambulacral sucker. Digits with a short seta on the inner border dorsally and without any setae ventrally. Second pair of legs comparatively shorter and stouter than the 3rd and 4th pair of legs and armed with a stout recurved hook which is lacking in *M. caulotoon* and with 1-2 short setae dorsally. Third and fourth pair of legs

long, slender, of equal lengths with a few short setae on the dorsal and ventral surface. Ambulacral sucker present on 2nd, 3rd and 4th pair of legs.

Host: A pigeon fly-*Pseudolynchia maura*.

Locality: Bombay Veterinary College compound, in Sept. '55.

REFERENCES

1. Sergent & Trouessart (1907) ... Sur un nouveau type de Sarcopridae (*M. anchora*) parasite descriptes pupipares' *C.R. Soc. Biol. Paris* tome. 62, 443.
2. Speiser P. 1910 ... Diptera, pupipara, Anbaog, in exped. Zool. suedoise au kilimandjoro-Meru en Africa Orientale, 1905-1906 tome 2, Part 10, 1: P-9.
3. Ferris G. F. 1928 ... The genus *Myialges* (Acarina: Sarcoptidae *Ent. News* 39 (5): 137-140.
4. Cooreman J. 1914 ... Un nouveau cas d'hyperparasitism permi les Acaridiae: *M. trimotoni* n. gen. n. sp. parasite d'un Mallophaga. *Bull. Mus. Roy. d'hist. Nat. de Belgique* 20 (26): 1-12.

NUTRITIVE VALUE OF GREEN MANURE CROPS

IV. *Crotalaria juncea*, (Sunn Hemp)

By

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Crotalaria juncea or Sunn hemp (Janumu in Telugu) is a well known Indian legume, which is one of the most popular green manure plants cultivated in the irrigated lands, sugar cane fields, citrus orchards and coffee plantations. It is the fastest growing of all crotalaris numbering about 600 and is a branched erect, cross fertilising annual, 6 to 10 feet high with elliptical lanceolate leaves and yellow flowers in terminal open racemes and small inflated pods with stiff hairs. It is suited to hot climate and resistant to eel worm, though susceptible to attack by pod borers, blight and beetles. The seed rate per acre varies from 20 to 80 pounds and it is often sown in rice fields between the rows before the paddy is harvested. It is grown widely for green manure, forage, soil cover and fibre.

Sunn hemp is fed to cattle in many countries like sub-tropical U. S. S. R., Africa, India, Pakistan and Ceylon. Though it is palatable to livestock when grazed or made into hay or silage, its cyanogenetic glucoside content makes it unsuitable for continued feeding as a sole forage. As hay mixed with 4 to 5 times the quantity of straw, it is fed to cattle. Young plants are not palatable but dried leaves, husks and bolied seeds are readily relished by animals. This species is considered toxic to horses. The plant can stand 2 to 3 cuttings and then the final

stand can be left for seed or easily ploughed under as green manure. The seed yield for 2 years per acre can vary from 600 to 1100 pounds according to the space variation between plants from 24 inches to 6 inches when plants are in rows 5 feet apart. [3] The forage or green manure production has been reported under irrigated conditions as 8600 pounds at Hosur, 8700 pounds at Koilpatti and 16000 pounds at Aduthurai. [2].

In order to study the nutrients composition of Sunn hemp, it is cultivated in the college garden plots and three successive cuts, at monthly intervals from the date of sowing, are analysed. The plant matures at 5 to 6 months. The results are presented for leaves and stalks separately for the three cuttings in Table I.

TABLE I
The Percentage Nutrients Composition of Sunn Hemp in Three Successive Monthly Cuttings after Sowing on Dry Matter Basis.

Nutrients.	First Cut.		Second Cut.		Third Cut.		Average.		Hay (1).
	Leaves.	Stalks.	Leaves.	Stalks.	Leaves.	Stalks.	Leaves.	Stalks.	
Moisture on fresh basis.	80.06	85.1	78.59	75.1	78.46	75.78	79.04	78.66	7.66
Crude Protein, (N x 6.25)	24.06	12.68	19.25	11.38	26.69	13.46	23.33	12.51	11.42
Ether Extractive.	5.04	1.98	4.01	1.45	3.16	1.07	4.07	1.5	1.01
Crude Fibre.	13.00	28.30	17.27	31.29	18.07	34.56	16.11	31.38	42.17
Nitrogen Free Extractive.	47.26	39.84	48.50	45.75	43.13	45.55	46.50	43.71	32.63
Total Ash.	10.65	17.20	9.97	10.13	8.95	5.36	9.86	10.90	5.11
Calcium.	1.38	0.29	1.37	0.85	1.41	0.40	1.39	0.51	—
Phosphorus.	0.71	0.97	0.58	0.36	0.41	0.19	0.57	0.51	—

Discussion

The crude protein content of leaves is about twice that of stalks in the three cuttings and is found to be the highest in leaves and stalks of third cutting and the lowest in the second cut. The ether extractive or crude fat decreases in successive cuttings in both leaves and stalks. The crude fibre also increases both in leaves and stalks successively in the three monthly cuts. The nitrogen free extractive of leaf and stalk ranges from 43 to 48 percent. The total ash in leaves remains about 9 to 10 percent, though appearing to decrease slightly in the the succeeding cuts. But the total ash of stalks falls down from 17 to 5 percent from first to third cut. While the calcium remains the same in leaves of three cuts, it varies irregularly in the stalks. Phosphorus decreases both in leaf and stalk in the three cuts.

The average composition of leaves and stalks in 3 cuts, shows that leaves have a high protein content, fair amount of fat, high N.F.E., and

calcium and low fibre thus making it a highly nutritious fodder. The stalks have half the protein of leaves, one third of its fat, twice its fibre, same N.F.E. and total ash. They have lower amount of calcium and same amount of phosphorus as that of leaves. The amounts of calcium and phosphorus are same in the stalks unlike the leaves, making the stalks well balanced in calcium and phosphorus and increasing its forage value. The protein rich feed of Sunn hemp at monthly growths, suitably mixed with 4 or 5 times as much straw poor in protein, will make it a highly desirable feed in use, overcoming the need for special protein supplement like oil cakes and bran. Comparing the composition of hay made at maturity and reported in the literature, the monthly cut fodder has higher protein, ether extractive, and N.F.E., and lower fibre, which makes it a better fodder and yields more than hay made at full growth.

Summary

1. The nutrients compositions of leaves and stalks of *Crotalaria juncea* (Sunn Hemp) at monthly growth for three successive cuttings from the date of sowing and the average composition for the three cuts are, respectively, on dry matter basis (dried at 105°C), crude protein in leaves 24.06, 19.25, 26.69%, Av. 23.33%, in stalks 12.68, 11.38, 13.46%, Av. 12.51%, E.E. in leaves 5.04, 4.01, 3.16%, Av. 4.07%, in stalks 1.98, 1.45, 1.07%, Av. 1.5%, crude fibre in leaves 13.00, 17.27, 18.07%, Av. 16.11%; in stalks 28.30, 31.29, 34.56%, Av. 31.38%; N.F.E. in leaves 47.26, 48.50, 43.13%, Av. 46.50%, in stalks 39.84, 45.75, 45.55%, Av. 43.71%, total ash in leaves 10.65, 9.97, 8.95%, Av. 9.86%; in stalks 17.20, 10.13, 5.36%, Av. 5.11%, Ca. in leaves 1.38, 1.37, 1.41%, Av. 1.39%, in stalks 0.29, 0.85, 0.40%, Av. 0.51%, P. in leaves 0.71, 0.58, 0.41%, Av. 0.57%; in stalks 0.97, 0.36, 0.19%, Av. 0.51%.

2. Comparing the composition of hay, the protein rich leaves and stalks with lower crude fibre, higher E.E. and N.F.E. at monthly growths are superior to hay made at maturity.

3. The Sunn hemp is popular in use as both forage and green manure crop. Stacked with paddy straw or other cereal straw layer after layer in suitable proportion, it forms a balanced dry fodder for cattle as practised in South India.

4. Though it is not suitable to be grazed when very young, it makes a palatable fodder when dried or ensiled for silage.

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REFERENCES

1. "Legumes in Agriculture", FAO, publication, 1953, pp. 134.
2. Memoirs of Department of Agriculture, Madras, published by Government Press, Madras, 1954, pp. 1700.
3. Wilsie, C. P., *J. Amer. Soc. Agron.*, 1935, Vol. 27, pp. 784—790.

SPIROCERCOSIS IN DOGS IN BIHAR

By

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Spirocerca lupi (Rudolphi, 1809) has been reported to be very common in dogs in India and has been recorded from the Punjab, U.P. and Madras (Bhalerao, 1935 and Baylis, 1939). There is, however, no recorded evidence to show its occurrence in Bihar, although it has occasionally been recovered from some dogs. This opportunity is taken to put on record two authenticated cases of Spirocercosis in dogs in this State.

On 14-5-53 the carcass of a male Labrador dog was brought for Post-Mortem examination by the owner belonging to this locality. The dog was an out-patient in the college hospital for a few days and was treated for pyrexia and loss of appetite. During the course of his last illness, which lasted for a week, the animal showed the following symptoms:—

"High temperature—105-106 F, loss of appetite, complete refusal to take any solid food and even liquid diet was not accepted unless forced into. There was respiratory distress which was attributed to high temperature. Stools and urine were apparently normal and hence perhaps escaped the attention of the attending physician to get them examined.

History of the case.—The dog was two year old and was with the owner since its birth. The mother of the dog is still alive and is reported to suffer occasionally from pyrexia that yields to routine treatment. The blood and stools of the mother were examined on 16-5-53 the former showed microfilariae (probably of *Dirofilaria* species) and the latter numerous ova of *Spirocerca*. It was also ascertained that these dogs never went outside the State of Bihar.

It was further reported that the deceased dog was not keeping well for the last few months and showed occasional rise of temperature that was allayed by a course of Sulphadiazine treatment. On the day the animal died, he showed unusual restlessness with rise of temperature and breathed his last while on the way to the hospital.

Post Mortem findings.—There was sero-sanguinous discharge from the nose and mouth and the nasal cavity was congested. Mouth and pharynx contained froth and there were three small ($\frac{3}{8}$ " diam.) and one big ($1\frac{1}{2}$ " diam.) tumours on the oesophageal wall practically blocking the

lumen. On cutting open these tumours numerous living parasites of blood-red colour were recovered, which on identification proved to be *Spirocerca lupi* (Rudolphi, 1809). A short original description of this parasite is given below. The lining of the big tumour was practically calcified. Lungs and liver were congested. Blood showed anisocytosis and was eosinophilic. Numerous ova of *Spirocerca* were found in the faeces.

Spirocerca lupi (Rudolphi, 1809) About two dozen females and one dozen males were collected alive from the above case. They were fixed in hot 70% alcohol and preserved in the same fluid, adding glycerine to the strength of 15%. For morphological studies they were cleared in glycerine. The specimens were morphologically examined by Dr. A. K. Verma, Research Officer and identified as *Spirocerca lupi*. The description, in detail, of the parasite is given below:—

In living state these spirurid worms are blood-red in colour but preserved specimens tend to turn blackish and coil up. The lips are indefinite and trilobed. Mouth opening is hexagonal and surrounded by six masses of dense paranchyma, two laterally, two sub-dorsally and two sub-ventrally. These are the pulps of the cephalic papillae. There is a short thick walled pharynx, widened anteriorly with anterior borders folded inwards. It narrows posteriorly. The oesophagus has a short narrow muscular anterior portion and a longer wider glandular posterior portion. Cervical papillae are at the level of the nerve-ring, about 0.5 mm. from the anterior end.

The Male.—The male measures from 34 to 52 mm. in length and about 1 mm. in thickness. Caudal alae are present and the tail is spirally coiled up. The spicules are very unequal. The left one is slenderer and pointed and measures about 2.2 mm. and the right is thicker and blunter measuring about 0.65 mm. A rudimentary gubernaculum is also present. There are four pairs of pedunculated postanal papillae. Besides, there is a group of five pairs of minute papillae near the tip of the tail.

The Female.—Measures 52 to 76 m.m. in length and about 1.5 m.m. in thickness. The tail is bluntly pointed and dorsally directed. The anus is situated about 0.4 m.m. from the tip of the tail. The eggs are cylindrical with thick shells containing embryos when laid. They measure 30–35 x 12–6.

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I am also thankful to Mr. H. R. Kapur, Principal, Bihar Veterinary College and Mr. M. I. Malik, Director of Veterinary Services, Bihar for the facilities and permission to publish this paper.

REFERENCES

- | | |
|------------------------|---|
| Baylis, H. A. (1939) | ... Fauna of British India—Nematoda Vol. LI—pp. 108–122. |
| Bhalerao, G. D. (1935) | ... Helminth Parasites of the Domesticated Animals in India—Scientific monograph No. 6 of the Imperial Council of Agricultural Research, pp. 278–280. |

REPAIR OF TIBIAL FRACTURES IN AVIANS BY INTRAMEDULLARY PINNING

By

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Department of Animal Husbandry & Veterinary Services, Orissa, Cuttack.

Introduction

Fracture repair by bone pinning mostly in small animal practice has gained a considerable amount of popularity in recent years with very promising results. But in birds fracture repair by bone pinning is very much limited perhaps due to uneconomical value and the possibility of its repair by unpadded plaster casts and other means, though the results are not so very encouraging as that of the bone pinning. Singh and Rao (1951) repaired successfully a case of femoral fracture in an R.I.R. Cock by intramedullary pinning. The author feels that intramedullary pinning in femoral fractures is comparatively much easier than the tibial fractures.

Birds under observations.—This study involves the repair of seven cases of tibial fractures in birds of different ages. Out of seven cases three were presented for treatment on the same day, three were presented on the third day and the last on the sixth day. All the fractures were simple, oblique and over-riding in nature involving the lower third, middle third and the upper third of the Tibia and the Pins were applied on the day of presentation. In one case which was presented on the sixth day, the affected leg was very much swollen, bruised and the skin was appearing bluish in colour which disappeared on the fifth day after pinning.

Line of treatment adopted.—Preparation of the site—As soon as the bird was presented after a preliminary examination as to the nature of the fracture, the feathers on the affected leg were plucked and the site was sterilised with Tr. Metaphine.

Technique of operation.—2 c.c.s. of 2% procaine hydrochloride solution were infiltrated at the site of introduction of the pin after the usual surgical toilet and then the stifle joint was kept flexed as far as possible. The intramedullary pin was introduced at the tibial crest and it was pushed through the medullary cavity till the edge of the upper broken fragment was reached, after which the over-riding broken fragments were reduced to correct alignment and retained with the left hand and with the right hand the pin was pushed through the medullary cavity of the lower fragment till it reached the distal epiphysis, care being taken not to pass the pin out of the distal epiphysis.

The operative site was sealed with collodion and a part of the pin was kept protruding out and each bird was let out in a separate cage.

After care.—After care is nil except seeing to the cleanliness of the wound. The birds used to peck at the pin but could not loosen it. In all cases the pins were removed on the twenty-first day by which time there was union of the fractured fragments and the birds were able to walk with some lameness. After a few days of the removal of the pins the birds walked normally and the pin point wounds healed up with ordinary antiseptic dressings.

Discussion

The author feels that the application of intramedullary pins is more economical than the unpadded plaster casts. The disuse atrophy caused due to unpadded plaster cast is avoided in pinning in which case both the joints above and below the fractured fragments can move freely. Mal-union fractures are avoided due to correct reduction, alignment and retention.

One X-ray was taken in one case for demonstration only. Otherwise for routine treatments, no X-ray was taken due to heavy expenditure.

Summary

1. The successful repair of seven cases of Tibial Fracture by intramedullary pinning is described.
2. The advantages of tibial Intra-medullary pinning over other methods of fracture treatment are discussed.

Acknowledgment

My grateful thanks are due to Sardar G. B. Singh, B.A., M.R.C.V.S., F.R.V.C.S. (Sweden), Director of Animal Husbandry and Veterinary Services, Orissa, Cuttack for his able guidance.

REFERENCE

Singh, G. B. and Rao, M. M.

... *Indian Veterinary Journal* Vol. I-XXVIII
No. 3 November 1951—p. 204.

Aspergillosis—skin affection
in a calf

By
K. Nagappa Pai



Aspergillosis.

[To face page 150]

Repair of Tibial Fractures in avians by Intramedullary pinning

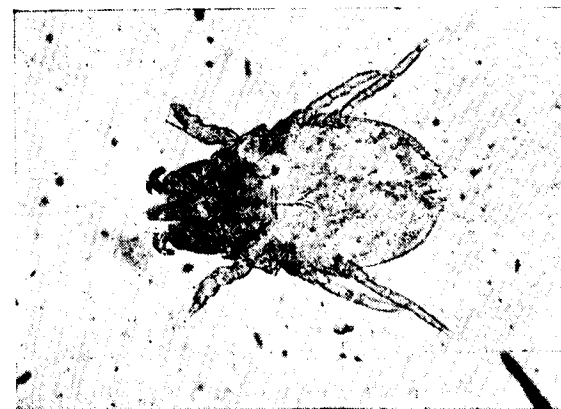
By
M. M. Rao



X-Ray photograph showing the tibial intramedullary pinning in an R.I.R. chicken taken on the 18th day of pinning. This figure gives a comparative idea of the affected leg under repair with that of the healthy leg.

A Record of *Myialges Anchor*
(*Myialgesidae*) on *Pseudolyndu-*
maura (*Hippoboscidae*) from India

By
L. S. Hiregaudar

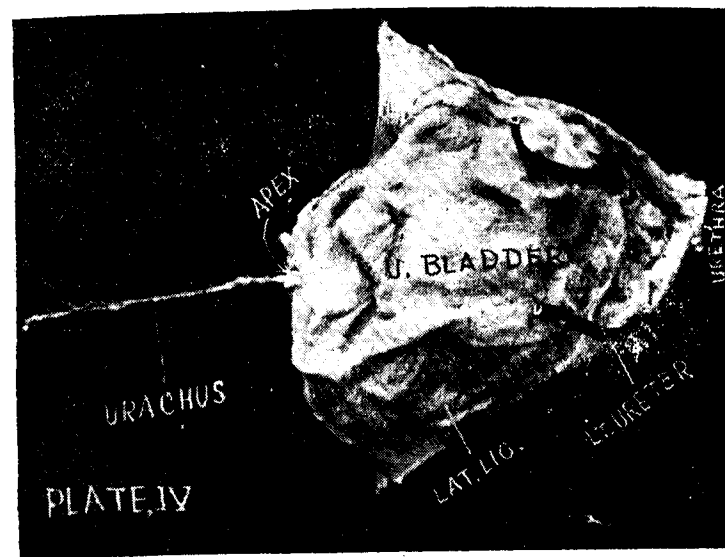


Myialges anchor.

[To face page 134]

Urachal Remnant of Domestic Animals as compared to that of man
and two cases of partially involuted urachus in equines

By
M. N. Jamdar



Urachus in a horse entire aged 8 years.



Urachus in a mare aged 12 years.

URACHAL REMNANT OF DOMESTIC ANIMALS AS
COMPARED TO THAT OF MAN AND TWO CASES OF
PARTIALLY INVOLUTED URACHUS IN EQUINES*

By

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The object of this article is to record two rare instances of partially involuted urachus found in two adult equines and incidentally to bring out a clear comparison between the persisting remnant of the human urachus and the remnant of urachus in domestic animals, namely the horse, cattle and dog.

Embryologically urachus is a canal connecting the allantois with the urinary bladder in the mammalian embryos although it is sometimes defined anatomically as a fibrous cord from the bladder to the umbilicus (Gould).

The latter definition appears to be justified in the case of man wherein in post natal life the urachus is normally altered into a fibrous cord which runs from the bladder to the umbilicus persisting and acting as a median umbilical ligament. Occasionally the cord has been noted to have a lumen throughout life. In animals like horse, cattle, dog, however, the urachus undergoes atrophy after birth and only a scar or a cicatrix is left as a remnant at the vertex of the bladder without any trace of its primitive activity.

Thus there is a fundamental difference between the remnant of urachus in man and that in veterinary subjects such as the horse, cattle, and dog. The definition of the word urachus to mean the post-natal fibrous cord in man can therefore not be applied to the post-natal remnant of urachus in domestic animals.

In the strict embryological sense the urachus is both in man and in animals, a channel of communication between the bladder and the allantois and is converted into a fibrous cord after birth and acts as a median umbilical ligament, in man. In Gray's anatomy (man) it is mentioned that "In the post-natal life the urachus is drawn downwards as the bladder descends but its upper blind end remains connected to one or both of the obliterated umbilical arteries. Its lumen is retained throughout life and its lower end communicates frequently with the bladder near its vertex." The book also mentions, "The apex of the bladder is directed forwards towards the upper part of the symphysis

* Paper read at the Annual conference of the M. P. Veterinary Association on the 29th and 30th January 1956.

pubis and from it the median umbilical ligament (urachus) is continued upwards on the back of the abdominal wall to the umbilicus. The peritoneal fold over this ligament forms the median umbilical fold."

Weiman in his introduction to Vertebrate Embryology states, "The lumen of the urachus remains patent throughout life, though it may be plugged in places by masses of epithelial tissue desquamated from its walls." J. C. B. Grant in his book "Method of Anatomy" (human) says "Urachus or the obliterated allantoic duct ascends in the median plane from the apex of the urinary bladder to the umbilicus." R. G. Last in his booklet 'Aids to Anatomy' (human) mentions, "The apex of the bladder is connected to the umbilicus by the median umbilical ligament (urachus)—".

All the above authors on human anatomy are in agreement in saying that the apex of the bladder is connected to the umbilicus in the adult by a median umbilical ligament and put the word 'urachus' in front of it, into brackets, thereby probably meaning that this ligament is the remnant of the urachus. Some books, like Gould's Medical Dictionary and 'Method of Anatomy' (Grant) use the term 'urachus' synonymously with its post-natal remnant the median umbilical ligament, which in the embryological sense appears to be wrong.

In contrast to this, the authors on veterinary anatomy (Sissons, Bradley, Chauveau) are unanimous in saying that in the horse, cattle and dog, after birth the urachus undergoes atrophy and is completely obliterated and only a cicatrix is left behind as its remnant on the vertex of the bladder. Only Mivart mentions that in the cat a fibrous cord extends from the apex of the bladder to the umbilicus. It seems reasonable, however, to presume that the structure described by Mivart may occasionally be absent (Iyengar).

The presence of a urachus in adult bovines has been recorded by Iyengar (1937, 39) and Jamdar (1955), but the presence of partially involuted urachus in adult equines does not seem to have been reported so far. Two instances of such partially involuted urachus have been detected, one in a horse entire (age about 8 years) and another in an adult mare (age about 12 years) used for dissection in the Department of Anatomy of this College during April 1953 and March 1954 respectively. In both these cases the major part of the urachus was found to have been converted into a flattened fibrous band with only about $2\frac{1}{2}$ inches of it having a lumen in case of the stallion, and about $\frac{1}{2}$ to 1 inch in case of the mare, when measured from the apex of the bladder with which the lumen freely communicated. The length of the urachus in the stallion was about nine inches while the length of the urachus in the mare was about four inches from the apex of the bladder.

In contrast to the normal presence of a large urachal remnant in adult human subjects the persistence of partially involuted urachus in adult equines (and also bovines and canines) in which it is usually only a cicatricial mark is of comparative anatomical interest. It may be suggested here that the usual absence of a structure like the median umbilical ligament of man, in most domestic animals may be related to the natural horizontal posture of the animals in contrast to the vertical posture of man. Due to this vertical posture in man, the bladder is probably more prone to displacement which is prevented by the persistent urachal remnant—the median umbilical ligament. Such a necessity would not appear to arise in the four-footed animals because of their horizontal posture. The above suggestion, however, requires further corroboration in view of Mivart's findings about the cat.

REFERENCES

- | | |
|---------------------------|---|
| 1. Bradley, O. C. | ... Topographical Anatomy of the Horse W. Gree & Son, 1947. |
| 2. Fleming | ... Chauveau's comparative Anatomy J. A. Churchill, London, 11, New Burlington 1891. |
| 3. H. N. Chelva Iyengar | ... Scientific Monograph (I. C. A. R.) No 11 & 13, Manager of Publications, New Delhi, 1937 & 1939. |
| 4. J. C. Grant | ... A Method of Anatomy, William and Wilkins Co., Baltimore, 1952. |
| 5. Gray | ... Gray's Anatomy, Longman, Green & Co. London, 1947. |
| 6. Jamdar, M. N. | ... <i>Indian Veterinary Journal</i> , Vol. XXXII, No. 1, July 1955. |
| 7. R. G. Last | ... Aids to Anatomy, Bailliere, Tindal & Cox, Covent Garden, W. C. 2, London, 1951. |
| 8. Shumway | ... Introduction to Vertebrate Embryology. |
| 9. Sissons | ... Anatomy of Domestic Animals W. B. Saunders Co., Philadelphia & London, 1948. |
| 10. Vertebrate Embryology | ... Weiman. |

PECULIARITIES OF THE FUNCTIONAL ANATOMY OF THE REPRODUCTIVE TRACT OF EQUINES*

BY

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In an age when attention to scientific breeding of cows has surpassed any other time in the history of live-stock breeding, it is but natural that attention towards the raising of the erstwhile highly valued and noble animal of the aristocracy, the horse, has fallen into the back ground. The care and fond attention that has been bestowed and

* Paper read at the Annual Conference of the M. P. Veterinary Association on the 29th and 30th January 1956.

is being bestowed on breeding cows by the stock owner on one hand and by the scientist in pursuit of fuller knowledge of the reproductive phenomena in these animals on the other hand, is not merely due to the important position that the cow holds in the economy and welfare of the human community but also due to the fact that the work with the cow is more encouraging because of her prolific fecundity as against the horse which is proverbially notorious for its low breeding efficiency. It is this low breeding efficiency of the horse as a species, and the failure of attempts to improve the condition to any appreciable extent by artificial means, that has helped the horse not to be so much in the fore front. It may be noted here that our knowledge of the reproductive phenomena in these animals is only of recent development, it being the last thing to be tackled by scientists. The cause of this delayed renaissance is probably due to the esoteric significance attached to sex and the inherent human coyness in dealing with matters relating to it.

Paradoxical as it may appear, it was only the shy breeding of horses which encouraged the Russian physiologist Ivanoff to investigate into the condition, and which has since led to our present knowledge of the physiology of reproduction of farm animals and to the outstanding advances in the methods and application of artificial insemination, although the horse continues to present difficulties and is probably lagging behind from this point of view.

It is common knowledge that only 50 to 60% of the mares bred by general practice of hand-breeding conceive while only 40 to 45% produce offspring at full term. As opposed to this, the common breeding practice gives in cows 75 to 90% calving. Only on range, where the stallion has the opportunity to mount the mare a number of times, the fertility is improved to over 90%. This observation is highly significant since it not only explains the low breeding efficiency of the horse but also has led to the discovery of certain peculiarities in the physiological set up of the equine reproductive tract. Studies in this regard further revealed facts which were less commonly known and appreciated. It is, therefore, proposed here to indicate the salient features of these phenomena in equines, which will be both of practical and general interest.

The anatomy of the genital apparatus of equines is substantially different from that of the bovines. The penis of the bull is firm, dense and very much narrower than of the stallion in which it is of a greater diameter and during coitus the free portion of the stallion's erect penis becomes twice as long as the mare's vagina which it stretches by the large round corona glandis, fitting into the external os tightly. The cervix of the mare is relatively more open and easily dilatable particularly during heat. The cervical canal is straight being devoid of the

tortuous mucous folds that are found in the cow which make her cervical canal difficult of introduction and dilatation. The body of the uterus of the mare is very long—as long as the horn of the uterus, being about 7 to 8 inches, while in the cow it is only 1½ inches and in all other domestic animals it is very much shorter than in the mare.

Unlike in the cow and most other species, except the sow, in the mare the semen is deposited directly into the uterus being forced into its cavity by the piston-like action of the enlarged glans penis, across the relatively easily dilatable straight cervical canal. In the cow and most other animals, the semen is deposited around the external os forming the vaginal pool from which the sperms make their way through the cervix, and the body of the uterus to the upper part of the Fallopian tube which is the usual site of fertilisation of the ovum.

In the usual artificial insemination practice the object is to deposit the semen in more favourable environment than is obtainable in the natural coitus, i.e., into the cervical canal. The direct intra-uterine deposition of semen in the mare, natural though it is, does not materially improve the chances of fertilisation, (on the contrary it retards it as will be seen presently) on account of the hostile conditions that the uterus presents to the sperm. The equine sperms capable of offering only slight resistance to unfavourable factors, even in their own semen plasma are subjected to considerable strain in the uterus. Their viability is greatly imperilled due to the unsuitable chemical composition of the uterine secretion of the mare (Milovanov). It is known that a large number of phagocytes are found in the uterus. Hammond has shown that the sperms remain in the uterus of the mare for a considerably longer period than in other species. The greater length of the body of the uterus of the mare also adds to the duration of their stay in the uterus because of the increased distance of the travel to the Fallopian tubes. They are thus subjected to the invasion and destruction by the phagocytes. According to Anderson, all sperms are found dead in the uterus of the mare 16 hours after service. As a rule, the sperms are very fragile and this is more so with the equine sperm. In general, in the domestic mammals they are known to remain in a fertile condition in the female tract only for a short time namely for 24 to 48 hours. On the other hand the life span of the ovum is still shorter, being about 6 to 24 hours.

The viability of equine sperm is also low in their natural surroundings namely in the semen plasma itself. The reproductive phenomenon in equines is again remarkable and peculiar in that the horse produces frequently a very large volume of semen, giving about 400 to 600 ccs. in one ejaculate and the average may range from 25 to

150 ccs., the draft breeds yielding more than the saddle breeds. Only the boar equals in producing such a volume of semen (350 ccs.) This large volume is due to the secretion of a large amount of fluids by accessory sex glands. In the horse the seminal vesicles are very large and bladderlike, making such a large secretion and its storage possible. Correspondingly the concentration of the sperm in the horse semen is very low. There are only to 30 to 60 million sperms per cc. of semen as against one billion sperms per cc. in the bull. Fresh horse semen is alkaline or neutral (seldom acidic) in reaction and remains alkaline with a pH range from 6.8 to 8.4 even on standing, while the bull semen is acidic and becomes more acidic on standing thus causing anabiosis (limiting the metabolic activities) and helping the sperm to live longer. Anabiosis of the equine sperm does not occur because of the insufficiency of the metabolic end-products due to low sperm concentration, low glucose content, and consequently low lactic acid production, thus preventing alkalinity of fresh semen to shift to acidity which is necessary for driving the sperm into a resting stage. To this is added the destructive action of chlorides present in the semen plasma, which help to enhance the sperm motility as against anabiosis.

As can be seen now, the existence of the equine sperm is threatened both from within (in its semen plasma) and without (in the genital passage of the mare). This is one potent factor that causes low breeding efficiency of horses.

Another peculiar and hitherto unknown phenomenon that occurs during coitus in horses and which has been possible to notice through the advent of artificial vagina is that the horse ejaculates semen in three different stages taking a longer time than the bull. In the bull the coitus is a matter of a few seconds and is finished in a single rapid, forceful eruption. In the horse the three different stages yield three different fractions of the semen. The first fraction consists of a small amount (about 10 ccs.) of thin grayish, dirty looking fluid without any sperm but containing a lot of cellular debris. The second fraction is yielded when the glans swells in a typical trombone fashion becoming fixed tightly into the external os. This fraction is full of sperms and constitutes the second large volume (about 1/3 of the whole ejaculate) and is normally ejected into the uterus under the strong pulsating action of penis. The third and the final phase yields the largest volume (about 2/3 of the total ejaculate) of a gelatinous, viscous, egg-white like material. This is contributed mainly by the seminal vesicles and contains only a few sperms. This viscous material is found to be detrimental to the life of the sperm when stored *in vitro*. Its physiological function is not yet clear.

As far as the mare is concerned, she too seems to be an accomplice in enhancing instead of mitigating the low breeding efficiency shown by her male partner. In addition to the ill effects of her intra-uterine contents on the sperms as already described above she presents a peculiar sex-rhythm. She has a very long period of heat. She has in fact the longest heat period among the farm animals, remaining in heat usually for 5 to 8 days, the outer limits being 2 and 11 days. Such a long period of heat was formerly considered to be an advantage because it was thought that this gave a better chance of marking heat and a longer time for mating thus ensuring a higher fertility rate. But it is now known that the fertile period of heat is only the last forty-eight hours because the ovulation takes place only during this period. As the ovum also perishes between 6 and 24 hours after it is shed from the ovary, the service has to coincide with the period of ovulation. This is possible in the mare if the stallion has got a chance to mount a number of times during the whole period of heat or if the exact stage of heat is known so that the service can be given at the proper time; otherwise this long tragedy of procreation in the equines is completely enacted.

REFERENCES

- | | |
|-----------------------|--|
| 1. Duke, H. H. | ... Physiology of Domestic Animals Comstock Publishing Company, Inc. 1949. |
| 2. Engle, E. T. | ... Problems of Fertility Princeton New Jersey. Princeton University Press, 1946. |
| 3. Perry, E. J. | ... Artificial Insemination of Farm Animals, New Brunswick, Rutgers University Press 1950. |
| 4. Sissons & Grossman | ... Anatomy of the Domestic Animals, W.B.S. Saunders Co. Philadelphia & London 1948. |
| 5. Winters L. M. | ... Animal Breeding. |
| 6. Rice | ... Breeding and Improvement of Farm Animals (1942). |

Clinical Articles

HEPATIC TISSUE GROWTH IN THE UMBILICAL REGION

BY

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A day old bull-calf was brought to me from village Singhpur on 3-3-56 for treatment. There was a hard swelling about 1½ times the size of walnut resembling umbilical hernia but on close observation it was detected to be enclosed in a fibrinous capsule, grey in colour. It was decided to operate the growth.

With due anti-septic precautions, the capsule was opened and to my surprise I found a mass of chocolate colour tissue resembling in consistency and colour that of liver, which was severed after tying a silk ligature at the base of the swelling. There was slight haemorrhage and the wound was dressed with tincture Benzoin Co. and Sulphanilamide powder after cleaning with swab of methylated spirit and giving three interrupted sutures. The wound healed within a week.

The tissue was preserved in formalin and sent to M.P. Veterinary College Jabalpure for histopathological diagnosis which was confirmed for hepatic tissue.

To my knowledge no such case of hepatic tissue in umbilical swelling has been recorded.

My thanks are due to Shri M. Y. Mangrulkar, Principal, M.P. Veterinary College, Jabalpure, and Prof. U. R. K. Rao for making a histopathological examination of the tissue.

ASPERGILLOSIS—SKIN AFFECTION IN A CALF

By

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Animal Husbandry Dept., Madras.

Introduction :—The skin of animals in addition to being a covering for the body is a very specialised structure possessing glands and appendages. The skin protects the body and develops disease when irritated by internal and external causes. The skin works in close association with the nervous system and endocrine glands. Sunshine, changes of temperature and movement of air are known to have profound influence upon the metabolism and hence upon the general health of the body. In veterinary practice skin affections are frequently met with due to external and internal causes. Pathogenic Fungi like *Cryptococcus Trichophyton*, *Achorion*, *Aspergillus*, *Sporotrichum* have caused in different species of animals varied lesions on the skin as well as in internal organs. Ringworm due to *Tricophytosis* is by far the most common among the skin affections affecting the young calves whose finer skin makes them more susceptible. The older dermatology which treated skin diseases chiefly by means of external remedies is giving place to newer knowledge which while not disregarding local applications seeks to trace and remove deep seated cause of cutaneous manifestation of the disease.

The object of this small note is to record *Aspergillus* sp. skin affection in a calf and its successful treatment done at the Veterinary

Hospital, Puttur. *Aspergillus* is a frequent contaminant of culture media occurring as a felted yellow, green or black mould growth; rows of spores or conidia develop from finger like processes or 'Stirigmata' borne on an expanded aerial hypha. Pulmonary aspergillosis due to *A. fumigatus* may occur in birds e.g. pigeons and penguins in captivity and this infection has also been noted in man (among bird fanciers). *Aspergillus pictor* and also other species of fungi, have been described in the skin lesions of 'PINTA' a disease of Central America which is now known to be due to a spirochaete. It is not common to meet with *aspergillus* sp infection in the skin lesions of animals.

A red local calf aged about two months was brought to Veterinary Hospital Puttur for treatment for skin disease on 26th August 1955. The calf was having severe pruritis with greyish crusts over both ears on the external aspect and around the eyes. (vide photo) Skin scrapings sent for examination to the Clinical—Laboratory Kozhikode were positive for the presence of *aspergillus* sp. infection. With the initial failures in getting a cure with topical applications of 0.1 picis dressing, Ung. Sulphuris, Sulpha drugs etc, the following line of treatment suggested by Dr. V. R. Rajagopalan, G.M.V.C., Dip. Bact. (Manchester) who had an occasion to see the calf was tried successfully.

Date		
26-9-1955 to 5-11-55	...	Topical application of 1% alcoholic solution of Gentian Violet.
30-9-1955	...	Ascorbic Acid 'CELIN' (Glaxo) 200 mgms injected intramuscularly.
2-10-1955	...	Repeat Celin Injection.
7-10-1955	...	Repeat Celin Injection.

Steady improvement in the nature of the lesions was observed from 15-10-1955 and the calf on 5-11-1955 showed definite improvement. The crusts have completely disappeared and the skin over the affected parts has become fine, pliable and clear.

REFERENCES

1. T. J. Mackie & J. E. McCartney (1950) ... Hand book of Practical Bacteriology.
2. S. H. Gaiger & G. O. Davies (1938) ... Veterinary Pathology and Bacteriology.

News and Views

Mr. Ajit Prasad Jain, Union Food and Agricultural Minister, speaking at Mhow on 25th June 1956 gave expression to two important statements. He declared "The existing Gosalas in different parts of the country deserve to be scrapped, since they are ill-managed. It is a shame

to have this kind of Gosalas. New Gosalas should be constructed on a scientific basis." We agree. The management in most of them is something to be severely condemned. We know the task is not easy to set matters right. Vested interests have grown up round these institutions in some cases and it is going to be an up-hill task. We are sure Mr. Jain would do it.

The next pronouncement was that very soon the State Governments would be required "to enact necessary legislation to have a pattern of crops to meet the requirements not only of human beings but of cattle as well". This is a long over-due step over which we have ourselves been spilling so much of ink for over a long period now.

Here is news from the *Evening News* of India.

Chicken feathers have become a valued feed supplement used by poultrymen in the important poultry-growing area around the state of Delaware and the "eastern shore" areas of Maryland and Virginia in the United States. In the past the industry has found uses for chicken viscera, blood and rejected birds in feed and rendering plants. "Feather meal," however, is a comparatively new product in the U. S. poultry industry but is declared to have proved its worth. About three tons of feathers are required to produce a ton of feather meal, but it is about 86 percent protein and is a valued supplement to other poultry rations.

Indian Systems of Medicine.—The Indian Council of Medical Research has proposed to establish eight research centres in the country to help intensive and co-ordinated studies in indigenous systems of medicine. This was announced by the Union Health Minister, Rajkumari Amrit Kaur. We have been drawing attention to this question from time to time. Because the fight was carried to the sacred precincts of Parliament and other State Legislatures, the Government have consented to pay some consideration to this question! We hope something tangible will come out of this step.

"Lal, Bal and Pal".—Have you heard of this combination? It is not a scientific formula. They stand for Lala Lajpat Rai, Bal Gangadhar Tilak and Bipin Chandra Pal, the three stalwarts of Indian nationalism who lived round about the turn of the present century and died as martyrs in the cause of Indian independence. Prince or peasant has reason to remember those names in this Tabloid form!

One of them, Bal Gangadhar Tilak, whose birth-day centenary the country was celebrating on 23rd July 1956, gave us, our political *mantra* "Swaraj is our birth-right". When he was Condemned to a six year sentence, here is what he said, standing in the dock in 1906.—

"There are higher powers than this tribunal that rule the destinies of beings and it may be the Will of Providence that the cause I represent will prosper more by my suffering than by my remaining free." How similar to the words "Father, forgive them, for they know not what they do." We pay our homage as a profession to this great son of India, who was virtually the Father of Freedom movement in this country.

Livestock Census Figures 1956.—There has been an increase of 15 millions in the total livestock population of India during the last five years. The population in the current year amounts to 307 millions, as against 292 millions in 1951, thus showing an increase of slightly over 5 per cent during the quinquennium. Out of these figures, poultry numbers 97.4 millions in 1956, as compared with 43.4 millions five years ago, registering an increase of over 124 per cent during the period. Out of the total livestock strength, cattle form by far the largest proportion being about 159 millions, followed by goats numbering 56.6 millions, buffaloes totalling 44.8 millions and sheep aggregating to 38.7 millions. The remainder of about eight millions includes 1.5 million of horses and ponies.

This information is revealed by the eighth All-India Livestock Census conducted in March-April 1956, with the 15th April as the date of reference. The detailed census returns are at different stages of scrutiny in the States and the above all—India totals are provisional and subject to revision.

We are happy to note that people have taken some interest in poultrying. We await details. Hope there has been improvement in quality as well. We shall return to this after the full census report is published.

Preservation of cattle.—A deputation of Bharat Gosevak Samaj met President Rajendra Prasad on 31st July '56 and placed a memorandum before him demanding creation of a statutory body for the development and preservation of cattle with a separate Minister for Animal Husbandry at the Centre and States.

The deputation also drew the attention of the President to fodder shortage in the country. They said that not only was cow slaughter

going on but grazing areas available at present were being acquired for other purposes.

The deputationists included Pandit Thakurdas Bhargava, M. P., Seth Govind Das, M.P. and Sant Tukdoji.

A separate Minister for Animal Husbandry both at State level and at the centre will certainly be able to pay greater attention to the progress of Animal Husbandry matters. It is a vast field which awaits concerted exploitation and this can be done better through a separate Ministry. We wish more and more M.P.'s take greater interest in this matter.

Block Development Corner

[Articles under this section, should be more in the nature of simple 'talks' to rural folks and village level workers, on Animal Husbandry matters, and not loaded with scientific terms and theories.]

THE SHEEP INDUSTRY

By

T. VINAYAKA MUDALIAR,

Retired Livestock Development Officer, Government of Madras.

India with her vast areas of uncultivated land, equitable climate, moderate rainfall, cheap labour and a fairly good market is very well suited for the development of Sheep Industry. That this industry should have failed to receive the attention it deserves all these years, is indeed a matter for regret. It is time now to make a beginning and nurture this industry from a scientific level.

The bulk of the sheep population in this country is of the mutton type. The wool bearing variety is few and far between. The industry itself is in the hands of a class of people who are very poor and highly conservative—factors, which have to be borne in mind in drawing up any scheme for the development of this industry. Therefore all attempts at improvement should be well within the existing set up of this industry and without much disturbance to its trade. The best way therefore appears to be to canalise the time-worn practices followed by these shepherds, on more scientific lines. The initiative should be induced and nurtured in the ryot himself, through *proper inducement*.

In any campaign of livestock improvement, there are four fronts to be tackled *viz.* (1) Breeding, (2) Feeding, (3) Management and (4)

Marketing. Of these, though the value of proper feeding is well established and even widely understood, the sheep industry does not lend itself to any large scale feeding of concentrates of millions of sheep every day—at any rate not at the present level of high prices and non-availability of most of the articles. Improvement on this front therefore can only be brought about through improved grazing; through improved feeding on the edible pods of trees in the nearby forest areas, under some concessional licensing system; cultivation of fodder crops wherever possible and building up of fodder reserves from post-monsoonish conditions, etc. These are difficult propositions no doubt but they have to be followed with some determination, as we have no other alternatives to resort to. We merely induce the shepherd to exert a little more and make him realise and demonstrate to others, that such extra exertion to feed his sheep better does pay high dividends.

It follows therefore that we have to tackle this problem of sheep development, more on the other fronts *viz.* breeding, management and marketing.

Before we think of development measures, let us know the existing defects. The following are some of the major defects noticed in sheep industry, which prevent the growth of that industry to its full stature:—

1. In-breeding.
2. Lack of suitable stud rams in enough numbers and depending on the ram lambs to serve the purpose.
3. Permitting mating and lambing to occur right round the year without confining them to definite seasons, thus bringing about the deterioration of both rams and ewes.
4. Permitting immature ram lambs to roam about with the flocks, thus leading to the birth of weaklings.
5. Taking out two crops of lambs in a year instead of one from the same ewes, because of this unregulated breeding operations.
6. Rigid culling and selection of good breeding stock at the right reason are not made possible as some ewes or other, are always in lamb or would have lambed recently.
7. Disposal of surplus stock has necessarily to be haphazard due to this round-the-year matings and lambings.
8. Great disparity in the lambs born in favourable and unfavourable seasons.

9. Defective management resulting in under-development and disease.
10. Lack of proper feeding through improved grazing and availability of suitable fodder-crops.
11. Lack of facilities for proper marketing through healthy competition. And finally.
12. The shepherds chronic indebtedness to the middle men who advance money.

It would thus be seen that most of the above causes could be eliminated, if proper approach is made.

Subsidising flocks which follow a code of departmental instructions to be issued; granting of premium to first-rate stud rams; supplying of first-rate stud rams wherever required at subsidised rates; introduction of fresh blood in the flocks; Grading up with better breed of rams; holding of rural sheep shows and district shows and awarding prizes under different age groups; establishing auctioning marts at Shandies and Fairs, where they are now sold, based on the weight of sheep, weighed in lots, etc., are some of the remedial measures suggested. The last item is very necessary as there is nothing to equal the price incentive to bring about the improvement of any industry. Perhaps it may be necessary to carry out all the above suggestions in stages. Subsidising flocks and running of shows may be the first items to be taken up. The other suggestions may follow the moment the authorities feel they have gained the goodwill of the ryots and their co-operation.

A subsidy of Rs. 100/- per annum may be paid to the owner of a unit flock of 30 ewes and two good rams, maintained as per conditions to be imposed by the Animal Husbandry Department. Those conditions may be on the following lines:

1. The ewes and rams are to be selected in the above ratio and approved by the Sheep Development Officer, who will arrange to get them tattooed or otherwise marked and registered.
2. The rams are to be run with the ewes only during a particular mating season to be fixed by the Sheep Development Officer, to suit the local conditions and the practice prevalent in the tract.
3. The rams and ram-lambs of over six months of age are to be grazed separately from the ewes.
4. Ram lambs of nine months of age and above are either to be castrated or sold away retaining only such of those ram-lambs ear-marked by the Sheep Development Officer or his Assistant

for stud purposes elsewhere. Such rams will be paid for at a rate slightly higher than the prevalent market rate to be fixed by the Sheep Development Officer. If not agreeable to castration from trade point of view, the owner of the flock should undertake to graze the rams separately from the ewes, until the rams are sold away as adults. Government will have the first preference in the matter of sales of such adult rams for stud purposes.

5. The flock should be subjected to professional advice and treatment as and when required by the staff of the Animal Husbandry Department, free of all cost.
6. Only one crop of lambs is to be taken in a year from the same ewes.
7. The advice of the Sheep Development Officer or his Assistant is to be sought in the matter of culling, so as to retain the best possible breeding stock and improve the flock.
8. The advice of the Sheep Development Officer or his Assistant is to be followed in the matter of general management, grazing and providing of fodder wherever possible.

One-hundred such flocks can be subsidised in the first year; and in the wake of experience gained, the scheme could be extended gradually. To start with, this scheme should not be tried with migratory flocks. It should be tried with stationary flocks. One Stockman compounder with a sheep-attendant exclusively for this work, may be asked for to work under the Veterinary Assistant Surgeon of the Block Development Centre.

In addition to the routine work involved, they should be required to organise 10 Rural Sheep Shows and one Central District Show in a year. All these items of work will keep them fully engaged.

This is a very modest scheme. The main features are:-We do not suppress the initiative in the ryot. We merely advise and help him to avoid the evil effects of in-breeding and immature breeding. We do certain amount of selective breeding under mass selection to be followed at a later stage with stricter selection or grading-up work. We regulate the mating and lambing seasons to bring about best results possible. We create a market for the shepherd at the Show ground and at the Fairs. We put a premium on well-kept stock and thus create a healthy competition. We advise and watch better management under housing, feeding, watering, resting during hot part of the day, etc., etc. We get all these things done by paying a subsidy of barely Rs. 3-2-0 per sheep per annum. We avoid buying of sheep. We put up no buildings and

we do not undertake to feed the sheep. We merely try to regularise the existing practices to achieve better results if possible.

POULTRY FARMING

Listen to what Mr. M. V. Krishnappa, Union Deputy Minister has said about poultry farming. "I am having a poultry farm at my official residence in Delhi. I started with about 80 birds a few months ago and there are now over 130, producing 60 to 70 eggs per day. I am taking care of the birds as lovingly as I am looking after my children and I find poultry farming is exceedingly interesting and highly profitable". We commend these remarks to our Block Development Centres and right round.

ECONOMIC FEEDING FOR MILK PRODUCTION

By

V. MAHADEVAN, M.A., D.Sc., F.R.I.C.,
Professor of Animal Nutrition, Madras Veterinary College.

- i. Every cow-in-milk should be fed concentrates according to her needs.
- ii. Each cow should be fed as much of the forage, viz. pasture grass, hay, silage, or straw, as she could eat.
- iii. The concentrate allowance depends on the quality and quantity of forage eaten, the amount and richness of milk produced.

Concentrates for Cows not on Pasture

Quantity of milk produced daily with a butter fat percentage of—				Daily concentrate allowance* when good hay or its equivalent is fed at the following rate per 100 Lbs. of body weight—			
3	4	5	6	Pounds of hay.			
				3	2½	2	1½
Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
10	7	6	4	0	0	1	4
12	10	7	6	0	0	2	5
15	12	9	8	0	0	3	6
19	15	11	9	0	1	4	7
21	17	13	11	0	2	5	8
24	19	15	13	0	3	6	9
26	21	17	14	1	4	7	10
29	24	19	16	2	5	8	11
32	26	21	18	3	6	9	12

3 Lbs. silage = 1 Lb. hay.

1 Lb. hay (with 6% Cr. Protein) = 1 Lb. straw

+ ½ Lb. concentrate (with 18% Cr. Protein)

I. C. A. R.

Farm News Releases

Salt Licks Provide Minerals for Sheep:—Sheep, like other animals, require a supply of minerals in their diet. The growing lamb and the pregnant and milking ewe suffer most if minerals are deficient in the diet.

Mineral deficiency is more likely to occur when animals are stall-fed.

Common salt should always be provided to the sheep. This is best given in the shape of rock salt. Hang it up in the pens so that the sheep may have easy access to it.

In sheep suffering from severe mineral deficiency, such defects as malformed bones, impaired growth, poor quality wool and infertility may result. In such cases, a compound lick should be supplied. The lick should contain lime, phosphates and other salts. The local Veterinary officer should be approached for details as to how this should be provided. No. 198.

* * * *

Washing Sheep Cleaner Fleece:—Washing sheep four to six times during summer and twice or thrice in winter is found to keep the sheep in health in dry places. Too many washings, however, damage the wool.

Washing is best done in running water. It can also be done in still water, provided it is deep enough. Hard water should be avoided.

In washing, the belly and legs of the sheep may be rubbed, but in no case should the fleece on the body be roughly handled.

Washing is best done on bright, sunny and windless days. To ensure quick drying of animals, washing may be done before midday.

If sheep are washed three to four days before shearing, a cleaner and better wool clip and better prices are obtained. No. 200.

* * * *

New Linseed. Beats Local Varieties in the Punjab:—K-2 is the new linseed of the Punjab. Trials have shown that this new variety can give almost double the yield of the local varieties. In addition, it has 7.1 per cent higher oil content and is about 10 days earlier in maturity than the local. It is highly resistant to rust and wilt diseases.

The strain has been found to be highly suitable for the Kangra district of the State.—201.

Calotropis (Akand). A Good Green Manure:—The wild-growing *akand* or *madar* (*Calotropis procera*) can be used for green manuring with profit.

At Sabour in Bihar, when wheat was manured with the green leaf of *akand* at 200 maunds per acre, the wheat yield went up 150 to 300 per cent over that of the unmanured plot.

Akand can be raised as a green manure crop, if desired, by sowing seed at a seer per acre of land, and ploughing the crop in three to four months.

Three to four plucking can be had from wild-growing plants, and 300 to 400 maunds of leaf can be obtained from an acre of the crop. No. 203.

Shearing of Sheep. Number of Clips:—The number of clips obtained from sheep during the year varies in different parts of the country. In some places one clip is taken while elsewhere two clips a year is the practice.

Studies with Bikanari sheep show that two clips are better than one. With two clips slightly more wool is obtained and the fibre is more uniform. In a full year's clip, the fleece is more likely to become matted and carry more burrs. Moreover, sheep carrying a full year's clip are more susceptible to being 'fly struck' than sheep carrying only six months' clip. No. 204.

Co. 12 Sorghum. Yields High.—A newly introduced strain of sorghum (*Mottai Vellai Cholan*) in Madras has given a phenomenal yield of 6,000 pounds per acre. It is called *Coimbatore 12* or *Co., 12*.

The normal per-acre yield of irrigated *Vellai Cholan* is about 3,000 pounds under well-manured conditions.

Co-12 has given higher yields in farmer's fields. It has become very popular because it is the shortest duration irrigated *cholan* strain so far recommended to farmers. Its duration is 85 days. Because of this it requires fewer irrigations.

It has so far given high yields in all the *Vellai Cholan* growing districts of the State (excepting Madurai, Ramanathapuram and Tirunelveli.) No. 205.

N. P. 718. The Improved Wheat Variety.—A new improved variety of wheat has been performing well, especially in Delhi and Rajasthan. The variety is *N. P. 718*.

Evolved at the Indian Agricultural Research Institute, New Delhi, *N. P. 718* matures 10 to 15 days earlier than the local varieties grown in the Northern parts of the country. Thus it takes on watering less to mature. The variety is very suitable for cultivation on highly fertile lands.

N. P. 718 is a fully bearded wheat with amber, hard grains. The flour has attractive colour and makes excellent *Chapattis*.

Though the crop may show presence of rust, its yields may not be affected seriously. The variety is resistant to loose smut. No. 207.

Hubam Clover. A Useful Crop:—Hubam clover, popularly known as sweet clover, can be used as fodder as well as green manure.

At the Indian Agricultural Research Institute at New Delhi, the clover was grown with wheat. After wheat was harvested, with two extra irrigations two cuttings of the crop were available. The first cutting was used for fodder and the second for green manuring the following maize crop.

Where Hubam clover is used for green manuring, the fertility of the soil increases, and the following grain crop yields better. Hence, it is a good practice to include it as a green manure crop when wheat and maize are grown in rotation.

The Hubam clover seed is broadcast at the rate of 15 to 16 pounds per acre. Then wheat is drilled. After the wheat is harvested in March, the Hubam clover is irrigated. The first cutting of the crop is available in mid-April. The fodder obtained can also be converted into hay, if so desired. With another irrigation after this, the legume gets ready for green manuring by the end of May. It is then ploughed in and the field prepared for maize in the second fortnight of July—No. 206.

Irrigated Grasses. Manuring Increases Yield.—Irrigated grasses like *para* grass give increased yield if given organic manures, especially dung and cow-shed wash.

At the Araey Milk Colony in Bombay, *para* grass gave 200,000 pounds per acre of fodder when given cow-shed wash. But with ordinary irrigation water it yielded 100,000 pounds of green fodder per acre.

Wherever irrigated grasses are grown, farmers should ensure that the valuable wash water from cow sheds is not wasted, but applied to the grasses.

Town sewage water can also be directed to the areas where such grasses are grown—No. 209.

Lambing Time. One Period in the Year Desired.—Shepherds should have the lambing at one period in the year. This will enable them to take proper care of the lambs. It will also restrict the expenditure or the trouble of management to a short period.

Generally, there are three breeding seasons in a year. The first one is March-April or the summer season the second June-July or the autumn season and the third October-November or the winter season.

The percentage of ewes in heat in a flock depends on the age and availability of grazing in these seasons. A shepherd expects about 15 to 20 per cent of ewes in heat in summer, 50 to 80 per cent at the beginning of autumn and a small number of ewes being mated in winter.

Lambs born from the summer matings grow well, as their mothers receive plenty of green grazing during pregnancy. The lambing in winter is to be favoured in places where the flocks have access to grazing on the aftermaths of monsoon crop. Summer lambs are a total loss.

The most important factor to consider is feeding conditions of the ewes which will help a liberal flow of milk. Hence, the ewes should lamb either at the end of monsoon or in mid-winter—No. 214.

* * * *

Sewage Sludge. A Good Organic Manure:—Sewage sludge, a by-product obtained in the sewage processes in big towns, is a good organic manure.

The sludge contains nitrogen, phosphoric acid and potash and also lime, important for crops.

Nearly all sludge is dried on sand-beds after it is treated biologically and is conditioned for easy handling.

The sludge contains fairly good quantities of organic matter and hence good for application both on sandy soils as well as clayey soils. When mixed with artificial fertilizers, the sludge makes a valuable complete fertilizer for most crops.

The sludge dries into lumps and has to be broken apart for spreading and ploughing in easily.—No. 218.

* * * *

Plough Injury to Animals. First Aid.—Many a time, while ploughing, the iron point of the plough injures the back of the fetlock of the hind limbs of the bullocks.

Farmers tend to neglect this, as a result of which dung, clay and dust particles enter the wound and infection (sepsis) sets in. Because of inflammation swelling develops above the fetlock. The animal becomes lame and unfit for work.

The plough injury should receive prompt attention of the farmer. If neglected, the animal will not be fit for work for a long time.

Immediately any injury to the limb is noticed, it is better to take the animal out of the field, and wash the wound with a dilute phenyl or permanganate lotion. There after, the wound should be well covered by a temporary bandage consisting of a clean piece of cloth. The animal can then be walked to the nearest veterinary hospital for treatment. With proper treatment, the animal can be fit for work again in a short time. No. 226.

Association News

THE BOMBAY VETERINARY MEDICAL ASSOCIATION

*Bombay Veterinary College,
Parel, Bombay-12.*

NOTICE

The Annual General Body meeting of the Bombay Veterinary Medical Association, will be held on 15th and 16th of September, 1956 at Bombay Veterinary College, Parel, Bombay-12.

All are cordially invited to attend the meeting.

A detailed Programme of the meeting will be forwarded shortly. Those who wish to contribute professional papers or bring any resolution should forward the same in triplicate to the secretary on or before 31st August, 1956 at the latest.

K. V. DIVEKAR,
V. G. KHARE,
*Hony. Secretaries,
Bombay Veterinary Medical Association,*

PUNJAB STATE VETERINARY ASSOCIATION
Proceedings of the 18th Annual Conference held at
Chandigarh on 16th March, 1956.
Open Session

The morning open session of the 18th Annual Conference of the Punjab State Veterinary Association was held in the Aroma Hotel Hall, Chandigarh, on 16th March, 1956 at 10-45 A. M. The honourable guests were received by the members of the Reception Committee headed by Shri B. N. Handa, Director A. H. and Warden of Fisheries, Punjab. The conference was attended by the following dignitaries besides members of the press and a large number of veterinary doctors who thronged from all parts of the Punjab and Delhi States :—

1. S. Gurbachan Singh Bajwa, Minister for Development Punjab, who inaugurated the conference. 2. S. Gurdial Singh Dhillon, Speaker, Punjab Vidhan Sabha who addressed the conference. 3. Ch. Saroop Singh, Deputy Speaker, Punjab, Vidhan Sabha who presided. 4. Shri Sant Ram Verma, Secretary, Agriculture, Punjab. 5. Giani Rajinder Singh, M.L.A. 6. Pt. Dharam Vir Vashisht, M.L.A. 7. Master Partap Singh, M.L.A. 8. Shri Kidar Nath Sehgal, M.L.A. 9. Rao Abhe Singh, M.L.A. 10. S. Piara Singh Sahi, M. R. C. V. S. Deputy Director, Animal Husbandry, Ambala Division. 11. Shri Talsa Ram, M.Sc. Ph.D., Veterinary Disease Investigation Officer, Pb., Hissar. 12. Pt. Ram Lok, District Animal Husbandry Officer, Kangra, Dharamsala.

The Conference was also honoured by the presence of Mr. Guy A. Hummon, U. S. A. Agricultural Extension Adviser. The Veterinarians feel highly indebted to him for the keen interest in them and ever thank him for this.

The proceedings of the Conference commenced with a welcome address by Shri B. N. Handa, B.Sc., M. R. C. V. S. Director Animal Husbandry and Warden of Fisheries, Punjab. He gave a brief account of the activities of the Animal Husbandry Department since the dawn of independence in 1947 with special reference to the heavy responsibilities the Vets. were shouldering towards the economic development of the state. He felt confident that members of this Association could play a very vital and effective role in the implementation of the targets of the second five year plan and thus materially add to the prosperity of the state.

After the welcome address, Hon'ble S. G. S. Bajwa, Development Minister, Punjab, inaugurated the conference. He exhorted the veterinarians to shoulder great responsibilities in the second five year

plan of the country for providing milk and milk products to the under nourished population of the country. He complimented the veterinary surgeons for the part they had already played in the implementation of the first five year plan. He sympathised with the members of the profession regarding their urgent demands and assured that all possible consideration will be given to their just demands when a special committee appointed by Punjab Government to reconsider the grades and the other service conditions of the Punjab subordinate service meets shortly. He exhorted the veterinary surgeons to work hard to improve the milk yield of animals and to put the country in line with the average milk production of foreign countries.

Thereafter our worthy patron-in-chief S. G. S. Dhillon, Speaker, all Punjab Vidhan Sabha blessed the association and assured the delegates help within the restricted scope of his activities as a speaker. He told that the committee appointed by the Punjab Government to re-examine the existing pay-scales of Subordinate Services will not only go into the question of pay-scales of veterinary surgeons, but would also give a chance to a few representatives of the P. S. V. A. to represent their case.

The annual report for the year 1954-55 was read by Dr. S. B. Sharma, former General Secretary of the Association enumerating the various activities of the association.

Ch. Sarup Singh, Deputy Speaker, Punjab Vidhan Sabha in his presidential remarks congratulated the members of the association for carrying on their activities in a constitutional manner. He was certain that the Punjab Government would give due consideration to their demands about the revision of their low pay scales, about the soundness of which he was fully convinced.

He appealed to the veterinarians that the milk yield of the animals in our country was very low as compared to other countries, particularly Denmark and it should be their constant endeavour to improve the condition of the cattle wealth, which will ultimately improve the condition of Kisans, the back bone of our country. Improvement of the cattle wealth was a pressing need of the country and it could be brought about only by their efforts.

In the end, he expressed his full sympathies with the cause of the Veterinary Association and assured them of his support and help and appreciated the Association for selecting Mr. Dhillon as their patron.

Diwan Alakh Dhari, president of the P. S. V. A. thanked the guests on behalf of the Association for gracing the occasion.

Professional Session

This was presided over by Dr. Tulsa Ram Sahib, Ph. D., Disease Investigation Officer, Punjab. The following Papers were read :—

1. Uneconomical Cattle of India—by Dr. D. Khurana.
2. Clinical study of Twins—by Dr. Sita Ram.
3. Our Nutrition, Health & Livestock—by Dr. Karnail Singh.

Dr. Kundan Lal gave his experiences about certain indigenous drugs that stimulate milk secretion. Lively discussion followed. Dr. Tulsa Ram, V. I. O. gave valuable information on the hamones affecting milk yield, while winding up the discussion on professional papers in his presidential remarks.

Business Session

The Session was presided over by Dewan Alakh Dhari Sahib.

The following resolutions were discussed and passed :—

1. This Conference records its deep sorrow and heartfelt grief on the sad demise of S.S.S. Mool Singh P.V.S.I. and S. Asa Singh P.V.S. who rendered valuable service to the profession in the country in general and to this state in particular. The Association expresses its deep sympathies to the members of the bereaved family.

2. Resolved that this conference urges upon the Government that the fixation of seniority in services, on integration with Pepsu etc. should be based from the date of appointment and not from the date of confirmation. The Animal Husbandry Department Punjab has been postponing confirmation of Veterinary Assistant Surgeons for 10 to 12 years against the laid down period of 2 years probation. In Pepsu, however, confirmation has been made after expiry of 2 years probation period.

3. (a) Resolved that this Conference records its feelings of deep disappointment and utter frustration on the failure of Punjab Government to grant two additional increments to old incumbents in the recently revised scale of Rs. 120-10-200/15-350 with effect from 1-4-55. It becomes all the more painful that the Punjab Government have not cared to implement the above just demand on the face of favourable recommendations made by the Central Government on the subject.

4. Resolved that the Punjab State Veterinary Association expresses its great dissatisfaction and discontentment with the present scale of pay of Veterinary Assistant Surgeons. In view of the vital role the Veterinary Assistant Surgeons are to play in connection with the development of livestock in the 2nd five year plan it is requested that their existing pay scale should be revised from Rs. 120-10-200/15-350 to Rs. 200-15-350/20-450 with benefits of length of service to all incumbents.

5. Resolved to bring it to the notice of the Government that it is a common day occurrence that the personal of the Animal Husbandry Department and students of Punjab College of Veterinary Science and

Animal Husbandry are liable to receive injuries and contract communicable diseases from animals while handling them. It is requested that proper rules should be framed for compensation for such cases.

6. This conference resolves and requests the Punjab Government that majority of post of Project Officers and Block Development Officers should be filled up from the Veterinary Graduates of Animal Husbandry Department, so that proper attention could be paid to the livestock problem, in particular.

7. This Conference is of opinion that, on account of the importance of livestock development in India, it is imperative that Veterinarians should be nominated to the Punjab Legislative Council. Therefore it humbly requests the H. E. the Governor of Punjab to be pleased to nominate Veterinarians as M.L.Cs., in consultation with this Association.

8. This conference records its deep regret and protests to the Govt. against the step motherly treatment in debarring a Veterinary Diploma holder (L.V.P. & G.P.V.C.), from being eligible to be a voter for the Graduates constituency, whereas it gives this right to a Medical Diploma holder; and further requests the Government to rectify this omission at an early date.

9. Resolved that this Conference views with great concern the means adopted by the Punjab Government, to combat the shortage of Veterinary Assistant Surgeons in the State, by withholding their applications for higher posts outside this Province. The marring of one's prospects in life is not only against the fundamentals of our Constitution but also adversely affects the working stamina of the personnel. More over no such procedure is adopted for the Gazetted staff whose exit also results in the shortage. It is, therefore, requested that applications for higher posts outside the Province should not be withheld and chances of promotion denied.

The Conference further requests the Government to appoint an *ad hoc* committee to look into the basic causes for the shortage of Veterinary Assistant Surgeons in the State.

10. This Conference of the Punjab State Veterinary Association requests the Punjab Government that selection of candidates for advance oversea studies and training be made by a competent committee appointed by the Government with a co-opted member expert in that subject. This will afford equal chances of justice to all.

The following important amendments in the constitution have been made :—

1. "The membership of the Association is open to those also who though promoted to higher posts from the cadre of Veterinary Asstt. Surgeons but are yet unconfirmed in the higher posts".

This brings a number of officers in the fold of the Association who are accordingly requested to continue to benefit the Association with their seasoned suggestions with renewed activity.

2. "The number of executive committee members has been increased from two or three."

The following office bearers have been unanimously elected:—

1. Patron-in-Chief— S. Gurdial Singh Sahib Dhillon,
Speaker, Punjab Vidhan Sabha.
2. Patron— Ch. Sarup Singh Sahib,
Dy. Speaker, Punjab Vidhan Sabha.
3. President— Diwan Alakh Dhari Sahib,
Milkhi Nagar, Ambala Cantt.
4. Senior Vice President— Dr. Sudershan Singh,
Govt. Livestock Farm, Hissar.
5. General Secretary— Dr. Karnail Singh,
Govt. Poultry Farm, Jullunder
Cantt.
6. Divisional Vice-Presidents:—
Dr. Khurana, Dhansa, Delhi State.
Dr. Amar Singh, Phillaur, Distt., Jullunder.
7. Joint Secretary Cum Treasurer—
Dr. L. R. Chawla, Garhshanker, Distt., Hoshiarpur.
8. Propaganda Secretary—Dr. J. S. Chhatwal, Ambala.
9. Executive Committee Members:—
Capt. Dr. V. S. Thaper, Ganaur, Distt. Rohtak.
Dr. S. D. Sharma, New Delhi.
Dr. Dharam Paul, Chandigarh.
10. Auditors:— { Dr. R. L. Dawar, Kharer, Distt. Ambala.
 { Dr. H. S. Bawa, Amritsar.

KARNAIL SINGH,
General Secretary.

Communications

Retirement of Mr. M. I. Malik, B.Sc., M.R.C.V.S.,
Director, Animal Husbandry, Bihar.

(Contributed)

Mr. M. I. Malik, B.Sc., M.R.C.V.S., after obtaining his B.Sc., degree from the Benares Hindu University was selected as Bihar and Orissa scholar for Veterinary Education in England in 1923. After passing his M. R. C. V. S., examination and obtaining B. Sc., degree in Veterinary Science from London, he returned to India in 1926 and was appointed as Special Officer in the Veterinary Department in Bihar on 1st December 1926. He held the posts of Deputy Director, Principal of

Bihar Veterinary College and finally became the Director of Animal Husbandry on 1-1-38 and continued as such till he handed over charge of his office on 22-2-56, to go on six months leave preparatory to retirement. During his tenure of office, the Bihar Veterinary College was affiliated to the Bihar University. A fairly large number of deserving Graduates were granted study leave for foreign studies in India and abroad. There has also been a steady increase in the number of non-gazetted and gazetted appointments and a steady demand for more Veterinarians was created by efficient service to the public; their emoluments also were gradually increased which raised their status.

A farewell party was organised to bid him farewell on a grand scale at the Secretariat, where all the Ministers of Government including the Chief Minister, high officials of Government, leading citizens of Patna and large number of officers of Animal Husbandry Department were present. Valedictory addresses were read on behalf of the Department and farewell speeches were made by the Hon'ble Minister, Incharge Animal Husbandry, Shri Dip Narain Sinha and the Chief Minister, which was replied to suitably by Mr. Malik.

Shri R. K. Ram, Retired Disease Investigation Officer, Bihar, in the course of his speech recounted that he had submitted a scheme through the late Rai Bahadur Dwarka Nath of Muzaffarpur to the Hon'ble Minister of Education in 1921 when diarchy was first formed which included amongst others, the deputation of two Graduates from Bihar to England for Veterinary Education and the establishment of a Veterinary College in Bihar—A college of approved type with a farm attached to it for practical training in Animal Husbandry. These proposals in the scheme were sanctioned by the Local Government, Central Government and the Secretary of State for India. Under this scheme Mr. Malik, the retiring Director was first selected. It was indeed a bold suggestion for those times and not without risks and sufferings. Mr. Malik however justified his selection and served his State well.

Reviews

Pharmacology, Materia Medica and Therapeutics.—By V. Srinivasan, B.A.,
Dip. Econ., G.M.V.C., Assistant Professor of Materia Medica and
Therapeutics, Bihar Veterinary College, Patna.

Price Rs. 13-4-0 net.

There can be no two opinions on the necessity to produce text books on Veterinary subjects to suit the conditions in our country. Unlike the medical subjects the number of text books in veterinary

subjects is comparatively small and practically every one of them has been written by foreigners and naturally should be expected to emphasise on problems peculiar to their countries. Under these circumstances the author has to be congratulated on his successful venture in producing a printed book, "Pharmacology, Materia Medica and Therapeutics".

The author, as remarked in his preface, does not claim any originality for the subject matter or for its arrangement and his object has been to place, in the hands of his students, his lecture notes together with notes on his experiences, in the form of a printed book. He has succeeded in this respect. Perhaps the book may be useful as an adjunct to class room studies for veterinary students elsewhere also as under-graduate students taking the course of Pharmacology and Materia Medica will find in the book abundant material for a rapid survey of the subject, particularly for examination purposes. The large number of prescriptions given in the text to illustrate the use of different drugs in therapeutics and the glossary of names of important medicinal plants given in the appendix have certainly enhanced the value of the book as lecture notes in the subject in question for veterinary students.

The book is fairly well got up, and well bound and it is a credit to the publishers.

C. K. V. NAYAR.

"Symposium on Medicated Feeds."—Edited by Henry Welch and Felix-Marti-Ibanez; Publisher, Medical Encyclopedia, Inc., New York, 1956, Distributors, Interscience Publishers, Inc., New York, & London. pp. 214, Price \$ 4.00.

The above Symposium sponsored by U. S. Department of Health, Education, and Welfare, Food and Drug Administration, Veterinary Medical Branch, was held at Washington, on 23rd and 24th, January, 1956, with a message from President, Dwight D. Eisenhower, reading. "The extensive and increasing use of medicated feeds supplied by a great and growing industry is an important part of these developments and a boon to small scale as well as large producers of livestock", which may be aptly described as the subject of this volume. About 400 people representing various departments both official and non-official agencies connected with medicated feeds for livestock and poultry and also representatives from many foreign countries attended the symposium.

31 Papers and a panel discussion, on "History, Types of medicated feeds, their pharmacological aspects, Assay and mixing problems in the manufacture, Public Health Significance, State

regulations, Administration of concerned acts, and Future of medicated Feeds," are reported in this book. Spectacular advances in livestock and poultry feeding based on recent discoveries in nutrition gave rise to this industry particularly in the States in the last 30 years. First Sulpha drugs as supplement in the poultry feed introduced in 1933, hormones like diethylstilbesterol in feeds of livestock and poultry, thyroid hormones, iodinated proteins, antibiotics, arsenicals, other chemicals, many vitamins and aminoacids as supplements in the feeds of animals and poultry are used to obtain maximum rate of gain, feed efficiency, and control of product quality and composition, which are the broad outlines of the themes discussed and reported.

The therapeutic antibiotic feeds are used for lowering death and morbidity losses, improving weight gains and feed efficiency, lessening the recovery period from diseases and minimising further spread of infection. As the role of antibiotics in nutrition is complex, careful consideration to environment, other dietary factors and the general health of animals must be given in conducting and interpreting results.

"The control methods, the laboratory analytical technique to evaluate them, medicated feeds as an economic factor in livestock industry, feed control problems, and common sense and coccidiostats," are some of the subjects dealt by specialists in their respective fields. The discussion sums up the advances and serves to intensify the cooperative efforts for furthering the use of medicated feeds for maintaining the optimum in animal health and productive efficiency at a minimum of cost to the livestock farmer.

The well annotated bibliography at the end of each paper and the classified subject and author indices at the end are useful to the earnest reader in this new field of technology whose advancement in the past decade, was amazing, judging by the efficiency of production in both livestock and poultry in the States. In the tremendous increase in the use of medicated feeds in America, the feed manufacturers, with reluctance, have become drug manufacturers who, with the cooperation of State and State acts, promote the production of healthy livestock contributing to the health and welfare of the nation.

The book in appearance and execution, worthy of the name of publishers and distributors, is attractive.

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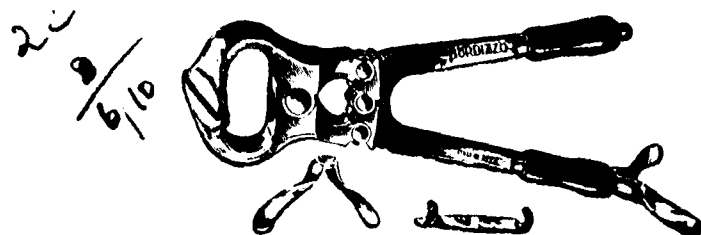
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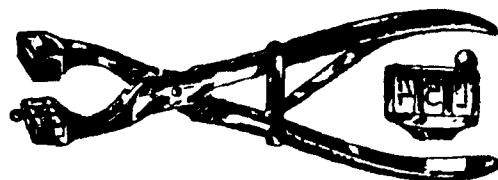
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