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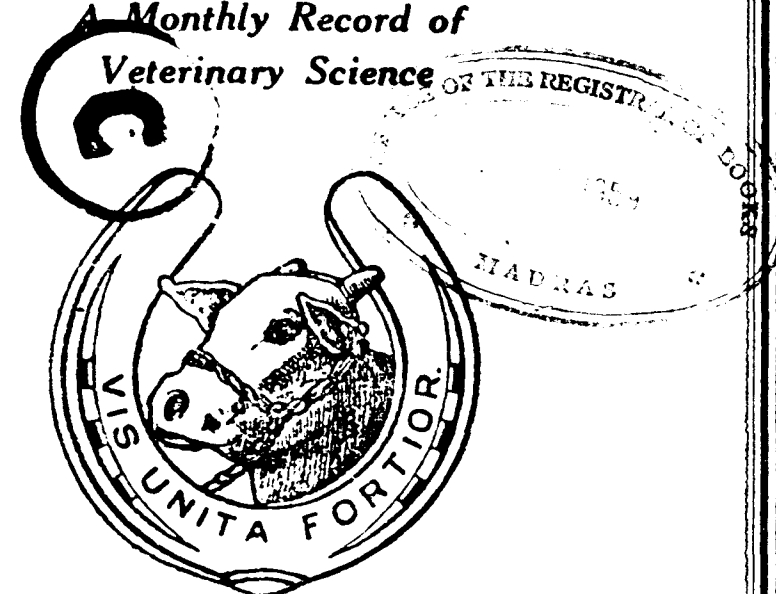
Vol. 36, No. 4

APRIL, 1959

THE INDIAN VETERINARY JOURNAL

(The Journal of the All-India Veterinary Association)

A Monthly Record of
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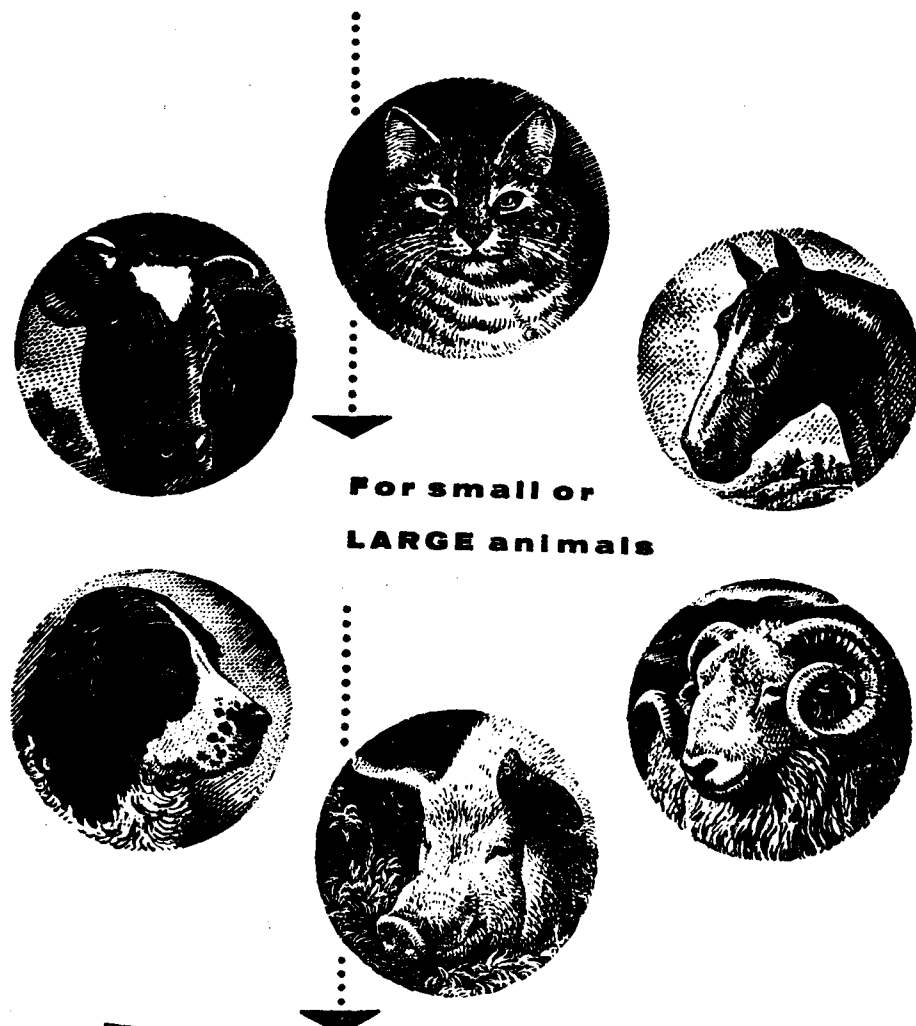
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Vol. 36

April, 1959

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THE INDIAN VETERINARY JOURNAL

[THE JOURNAL OF THE ALL-INDIA VETERINARY ASSOCIATION]

PUBLISHED MONTHLY



A 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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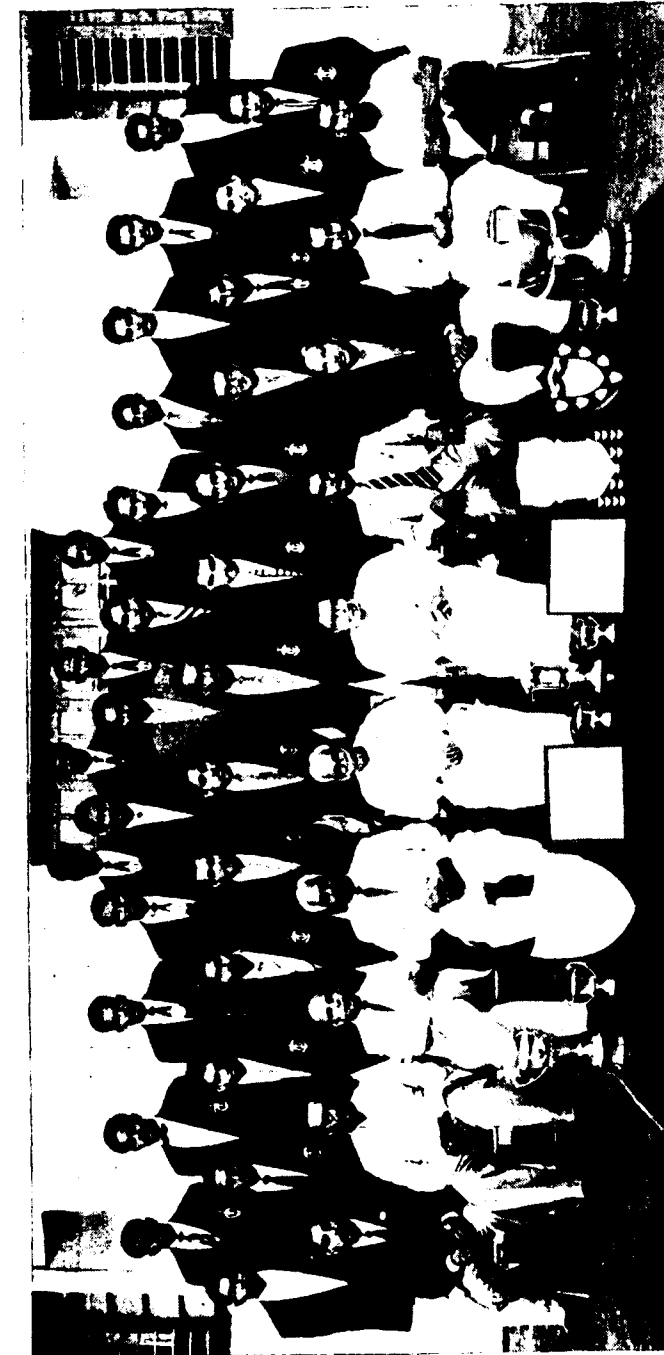
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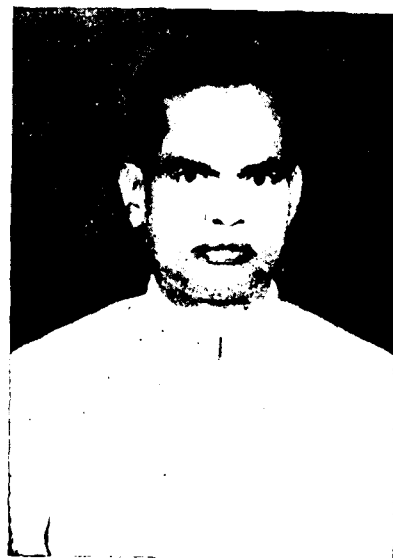
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Editorial

BRUCELLOSIS IN THE PUNJAB

We invite attention to a very informative article that is appearing in this issue from the pen of a Medical Officer, Dr. T. N. Mathur, on the incidence of Brucellosis in the Punjab in human beings. The learned Doctor has done a distinct service in so pointedly drawing the attention of both medical men and Veterinarians, to the possibility of the existence of this disease on a much wider scale than what is usually suspected.

In his covering letter to us he says "I think a lot of collaboration between medical men and Veterinarians is necessary regarding this disease in our country. The information regarding human brucellosis in Punjab should be known to the Veterinarians so that the disease may be investigated in animals in the area. I have chosen your Journal which is read by most Veterinarians in India for publication of my paper". The zeal and earnestness of this Officer cannot be too highly praised.

The existence of this disease in animals in India was long recognised but it cannot be claimed that its true extent and intensity have been fully studied. Mr. J. B. Polding was entrusted with the task of conducting an All-India survey of this disease from 1939 to 1944 and he has collected no doubt much valuable data under very trying circumstances. "In a country of the utmost conservatism" writes Mr. Polding "where there are no laws giving power over livestock, and where religion frequently forbids the drawing of bovine blood, to make a serological diagnosis on privately owned animals is often impossible". He further adds "Obviously, it has only been possible to visit a few representative rural areas". In the context of the present day development programmes of livestock in the country, it needs more than ordinary care to watch for this disease at all Artificial Insemination Centres and in the field. "The use of infected bull semen in Artificial Insemination of cattle in Denmark resulted in serious damage". The

impression one gets from the article under reference, compared to Polding's findings, is that this disease is on the increase. Nothing could be more devastating to livestock industry than the spread of this disease.

From Public Health point of view, it is even more serious. It will undermine a nation's vitality. The clinical syndrome in man is so confusing that it is bound to be often missed, as has been very effectively pointed out by the learned Doctor. It has been said that "Since the reservoir of infection is in infected animals, the disease in man will disappear when the animal reservoir is destroyed". This fact has been well established in countries like the U. S. A., where control and eradication campaigns have been in force for some time now. **It is clear therefore that its eradication is a duty cast upon the Veterinary profession, from Public Health point of view.** It can no more be claimed as merely an occupational hazard, though the chances are greater there than elsewhere. The custom of boiling milk before consumption in India, is no doubt a contributing factor in keeping down the incidence of this disease in human beings. Otherwise, without pasteurisation facilities in this country, the position could have been much worse. But that is only one of the methods of infection. The danger through direct contact is even greater. The Veterinarians face this infection in larger measure than others. "Blood test surveys made before 1940 (evidently in America) indicated that a comparatively large percentage of Veterinarians reacted positively".

The article under reference is not a day too soon to remind both Medical men and Veterinarians of the duty they owe to the society at large, with regard to this insidious disease. What is obtaining in the Punjab is not peculiar to that part of the country alone. We know it is fairly widely prevalent in this country. There is sufficient reason therefore for all concerned both medical men and Veterinarians to be on the alert in other places as well.

We know much is being done in almost every country to bring down this disease under control. Even at International level there is a joint FAO/WHO Expert committee on Brucellosis, which has already issued three valuable reports on the subject. We know also that the I. V. R. I., is a Brucellosis centre of this international effort in India. But it is primarily a problem to be tackled at State level. With specialised staff that are now made available with regard to livestock breeding in every State, a well planned campaign seems to be a possibility in the near future. It is a case for big co-operative effort on the part of all concerned - breeders, owners, medical men,

Veterinarians, field-workers and Laboratory men. It is the men who actually deliver the goods that count more than Governments and Planning bodies, however well-intentioned they may be. Let us hope Dr. Mathur's article will stimulate efforts in this direction and that the Punjab will receive immediately the attention it deserves at the hands of the State authorities and the I. V. R. I.

JUDGING AT LIVESTOCK SHOWS

It is time the I. C. A. R. takes up the question of constituting separate panels of judges for different breeds of cattle both at State-level and at All-India level. They must be quite knowledgeable men in the art and science of judging. A common pool of all such men may be created and selection for each show made from this pool. We would even go to the extent of saying that a certain amount of training and ultimate testing are necessary. The question, no doubt, bristles with difficulties as some of the eminent cattle breeders and others interested in the line may not care to submit themselves to such discipline. But men of proved merit in this class of people may be exempted. It is likely that ultimately we may be creating a class of 'Professionals', perhaps, with all attendant evils. But a high-power committee of experts can always watch and control matters.

We want not only knowledgeable men but also men of high integrity, who will be free from all petty considerations. All these, we are aware, are more easily said than achieved; but something has to be done to keep pace with the high standard of livestock that are coming up and the consequent keen competition that is bound to ensue.

Judges of particular breeds must be men who are well conversant with those breeds in their day-to-day life. In other words they should preferably be men from the home tracts of such breeds. There is no point in asking a man from Kanyakumari to judge Bachur breed of cattle or Karnah breed of sheep, which he probably sees only at the time of cattle shows. Similarly, administrative officers tied down to files and pads and who are not 'livestock-trained' cannot be expected to make successful judges. It would be easier to constitute a panel of judges for each breed at State level and use them at all shows. Some such arrangement seems to us to be very necessary, with the increasing tempo of our livestock development work. What we have said with regard to Cattle equally applies to other kinds of livestock. We hope the matter will receive the attention it deserves, before serious difficulties crop up.

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General Articles

HUMAN BRUCELLOSIS IN PUNJAB, ITS IMPORTANCE TO THE VETERINARIANS

By

DR. T. N. MATHUR, M.B.B.S., D.T.M., P.C.M.S.,
Assistant Bacteriologist, Govt. of Punjab, Karnal.

The incidence of brucellosis among humans depends upon its incidence in animals. The evidence of animal brucellosis is a valuable index of the presence of infection in human beings in an area. It is also true that if there are cases of human brucellosis in a region there must be brucellosis among cattle in that region. Although, brucellosis is of interest both to medical men and veterinarians, it is strange that there has not been any collaboration between them regarding its prevalence or about its deleterious effects on our rural and national economy.

Even the information that the veterinarians possess about this disease among animals does not appear to come to the notice of the physicians and consequently the latter fail to suspect cases among their patients. Similarly cases of human brucellosis are not reported to the veterinarians with the result that their attention is not directed to the detection of the disease among animals in that area. It is also not realised by many veterinarians and physicians that brucellosis is an occupational hazard for farmers, dairy workers, veterinarians, butchers and bacteriologists who handle the micro-organism and so cases occurring among them are mistaken and treated for other diseases such as malaria, influenza, typhoid, rheumatic fever, rheumatism, pleurisy, tuberculosis, tubercular hip, hepatitis, infectious mononucleosis and chronic tonsillitis; and Orchitis, brachial neuritis and sciatica of brucellar origin are not recognised at all. The veterinarians themselves when they suffer from such pathological conditions do not generally suspect that they might be suffering from brucellosis. Among women there is serological evidence that brucellosis might also be the cause of abortions and still births (Mathur, 1954, i). Synovitis due to brucellosis in humans is not so common as in cattle. It was found in 1 of the 116 cases observed. However, orchitis is much more common among humans than in cattle (Mathur 1955, i).

This paper is written with a view (i) to draw the attention of the veterinarians to areas of Punjab where cases of human brucellosis occur, so that their efforts may be directed towards the assessment of the incidence of brucellosis among cattle, sheep and goats in these areas; (ii) to acquaint them with the clinical manifestation of the disease in humans such as, fever, headache, joint or body pains, tired feeling, weakness, cough, excessive sweating and orchitis, so that the

possibility of brucellosis is not lost sight of when the disease occurs among them. They may even request their physicians to exclude the possibility of the disease among them, since such a possibility does not occur to most physicians at present. Till recently very little work has been done on human brucellosis in this country with the result that brucellosis consciousness among the medical practitioners has been so low, that the diagnosis is missed in most of the cases and when it is diagnosed it is very late. The disease was missed for 153 days even in a physician. The physicians are also not aware of the manifestations of the disease among animals and of the different modes of infection by which human beings may get the disease. Besides drinking raw contaminated milk, direct contact with infected cattle, sheep, goats, pigs and hares constitutes an important mode of infection in man. A person who has contact with an infected animal or who attends to such an animal can get the disease even though he may be taking boiled milk of this animal. To detect cases of human brucellosis a physician should be familiar with the disease as it occurs in animals and with whom his patient may have come in contact. That brucellosis is the cause of abortions, birth of dead macerated calves, retained placenta, infertility, arthritis, synovitis, mastitis and low milk yield in cattle is not known to the physicians at the present time, consequently they seldom suspect brucella infection in their patients with a history of prolonged fever and overlook to enquire if they had contact with such animals.

Mode of infection:—Veterinarians and dairy workers get infected while attending to the cattle, goats or pigs suffering from brucellosis. Contact with the diseased animals is an important cause. Taking out the retained placenta of a cow or buffalo, attending on an animal who has given birth to a dead macerated calf, and living in such surroundings where infected animals are kept, are important factors responsible for the causation of the disease, because the urine and uterine discharges of such animals are infective. It is possible that brucella organisms may be present in the dust of the farms and veterinary hospitals. Besides the alimentary tract the micro-organism also makes its entry through the abraded skin or through the respiratory tract. It is arrested by the draining lymph glands and from here brucella are periodically discharged in the blood stream producing bacteraemia and giving rise to waves of fever. It is generally well known that there are 3 species of brucella *B. melitensis*, *B. abortus* and *B. suis*.

Brucellosis among humans must be suspected before it can be diagnosed:—The veterinarian should also know a few elementary facts about the disease as it affects humans so that he is able to suspect its presence in case it affects him. The diagnosis can of course be established by such tests as a total and differential count of the white

blood corpuscles, agglutination test of the serum and blood culture. Unfortunately these examinations are rarely done so the incidence of infection among humans is considered to be low and the disease is missed for many of the conditions enumerated above and brucellosis is looked upon as a curiosity.

Signs and symptoms and the diseases for which brucellosis is missed among humans:—In brucellosis the fever might come with a chill, last a few hours of the day and then come down in some cases by sweating. It is, therefore, initially mistaken for malaria, later when there are several relapses it is confused with chronic malaria. It may be mistaken for influenza, because of fever, cough, body pains and sweating. When the course of fever is prolonged it is mistaken for typhoid fever; because of joint pains and fever it is mistaken for rheumatic fever; because of body pains it is mistaken for lumbago or rheumatism; because of prolonged fever, cough, loss of body weight, loss of appetite and night sweats it is mistaken for tuberculosis. It is confused with amoebic hepatitis due to fever and enlargement of liver and is often treated with emetine (Mathur 1955 ii). In children it is variously missed (Mathur 1956). It is mistaken for tuberculosis of the hip due to pain, limping and prolonged fever. In some children brucellosis is entirely missed and the low grade temperature and indifferent health of the child are attributed to chronic tonsillitis and tonsillectomy is advised. It is mistaken for sciatica and brachial neuritis (Mathur 1954 ii) and even neurosis (Mathur 1954 iii) because of the vague illness and lack of physical signs. Besides fever, which is present in all cases, enlargement of the spleen, liver, adenitis and orchitis are the only other signs in this disease. The spleen was found enlarged by the author in 22.6% of the cases, the liver in 14.3% and both liver and spleen in another 26 percent of cases. There are many symptoms such as chilly feeling, tiredness, feeling of weakness, body and joint pain, headache, sweating, cough in some cases, loss of appetite and loss of weight. These symptoms are common to so many diseases that brucellosis often escapes suspicion, more so, because it has no definite signs.

Polding (1948) has done remarkable work in conducting an all-India survey of brucellosis among cattle and goats. Physicians and general practitioners can thus direct their efforts to detect cases of human brucellosis in places where the infection among cattle and goats has been reported to be high. Polding's findings have been published in a Veterinary Journal and so are unfortunately not known to the physicians and general practitioners and hence they have not directed their efforts to find cases of human brucellosis even in areas where the disease is highly endemic among cattle e.g. Orissa (Mathur 1958) and Andhra. In the city of Bombay due to bad hygienic conditions in the

private dairies the incidence of the disease was high, and some cases were reported among humans (Soman & Kothari, 1954). With the establishment of the Government Dairy where the conditions are ideal it is hoped that the incidence among cattle will be negligible and consequently the incidence in the human population of Bombay will also fall.

In regard to Punjab Polding has observed, "apart from certain serious and anomalous epidemics in buffaloes, both clinical abortions and brucella reactors are rare among village cattle". The rate of clinical abortion among cows was 1% or less. Among non-aborting cows taken at random from 8 herds close to the Himalayas it (brucella reactor rate) was approximately 20%. Abortion was endemic in that tract and among 118 aborting cows it was 51%. Apart from these observations recorded by him brucellosis in villages was reported to be negligible. Table II shows the incidence of cattle and goat brucellosis in Punjab. Table I shows the

TABLE I
Showing No. of cases of Human brucellosis in Ambala Division,
District & Tehsilwise.

Total cases	Dist. Karnal	Dist. Hissar	Dist. Rohtak	Dist. Gurgaon	Dist. Ambala
	63	14	5	6	21
Teh. Karnal	30	Teh. Hissar	5	Teh. Rohtak	5
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bad	23	" Hansi	3	hospitals did	
" Panipat	6	" Bhiwani	2	not send any	
" Kaithal	2			sera for test-	
" Thanesar	2			ing.	
				teh. not recei-	
				ved for exami-	
				nation.	
					Teh. Ambala 18
					" Rupar 5
					" Narain-
					garh 3

Legend.

Dist. District. Teh. Tehsil.

number of cases of human brucellosis discovered in the various districts and tehsils of Ambala Division during the last 7 years. From the incidence of human brucellosis in the various districts of Ambala Division it appears that a more thorough survey of brucellosis among cattle and goats is required, for the incidence in humans in some places is greater than is apparent from Polding's survey and table 1. In Rohtak district where the incidence of cattle and goat brucellosis is reported to be zero per cent, four cases of human brucellosis were discovered within one year by a single physician who was brucellosis conscious among 21 sera that he submitted for the Widal test (19% brucella positive). Perhaps if he had sent more sera of his febrile patients under observation, there would have been more cases covered, because the incidence of brucella positive sera has been found to be 7% among 1591

sera examined for Widal and Weil-Felix test and for agglutination test for brucella (Mathur, 1958ii). Parkash (1958) has also reported that of the few sera tested by him for Widal at Rohtak he found 25% positive for brucella. More cattle need to be tested in this district. Greater survey among cows in Amritsar, Gurdaspur and Simla is called for as the infection among goats in these districts is 3%. Infection from goats to cows is a possibility since the strains so far recovered from human cases who were in contact with cattle have all been found to be *B. melitensis* (Mathur 1959). Patiala division has not been surveyed but Balasubrahmanyam (1959 personal communication) found 10 sera positive for brucella out of 479 submitted for Widal test at Patiala in 1958. Very few cattle and goats have been tested in Jullundur. In Ambala where the incidence among cows has been reported to be 3.6% and where the greatest number of human cases after Karnal have been found, buffaloes have not been tested for brucellosis. It is likely that they are also infected. In Hissar district, which is sandy and dry 14 cases of human brucellosis have been reported; the goats in this district, have, however, not been tested except at the Government Goat Farm in Hissar where 5 goats proved positive for brucellosis from 1950-1958 and 3 aborted goats showed *B. abortus* and not *B. melitensis* as the causative micro-organism (Nilakantan & Pande 1948). The significance of this finding will be discussed later. More goats in the villages need to be tested because in some human cases from Hissar a history of contact with goats was forthcoming. Seeing the large number of cases discovered in Karnal district a more thorough survey among cattle in this district is called for. The incidence of brucellosis among cattle in other districts may not be less than at Karnal since it is possible that the greater incidence among humans in recorded Karnal may be due to the presence of a brucellosis conscious pathologist and some brucellosis conscious physicians in this region. If it had not been for this pathologist and these physicians, the incidence perhaps might have been similar to what has been reported from the other districts of Ambala Division. The greatest incidence in Ambala division out of the 3 divisions of Punjab (the other two being Jullundur and Patiala) is due to the brucellosis conscious pathologist who has been testing the sera sent for Widal test by various physicians of this division as a routine for agglutination test for brucella and has also been promoting brucellosis consciousness among them through his writings and lectures. In Karnal where the incidence of the disease among the few buffaloes tested is reported to be 9%, the incidence among cows needs to be found out. The incidence of positive reactors among slaughter house goats was found to be 8.3% and among sheep 7% (Mathur 1953). whereas, the survey of Sharma (1958) has shown the incidence among goats to be only 1%. The greater incidence among the slaughter house goats may be due to the fact that

useless goats find their way to slaughter house and it is possible that the incidence of brucellosis among them is higher than in normal goats. Sera of 23 persons working in the Govt. Dairy Farm Karnal which is a very well managed cattle farm were tested for brucella agglutinins. None was found to be positive. This may be due to the fact that there are very few brucella reactors on this farm. Looking again at table 11

TABLE II
Showing the incidence of brucellosis among cows, buffaloes and goats in the various districts of Punjab.

District	Positive Cows	Positive buffaloes	Total tested	Total goats tested	Percentage Positive
Amritsar	N.D.	0.7%	186	391	8%
Ambala	3.6%	N.D.	161	40	1%
Ferozepur	N.D.	2.0%	103	167	2%
Gurdaspur	N.D.	0%	48	194	3%
Gurgaon	3.4%	6.4%	118	81	0%
Hissar	1.2%	Nil	170	N.D.	N.D.
Karnal	N.D.	9.0%	67	95	1%
Ludhiana	4.7%	4.0%	111	75	0%
Rohtak	0%	0%	62	184	0%
Simla	0%	0%	85	250	3%
Jullundur	N.D.	N.D.	Nil	50	0%

Legend.

N.D. Not done.

which gives the incidence of cattle and goat brucellosis, greater number of human cases should be expected in Amritsar, Gurdaspur, Simla, Ludhiana and Gurgaon districts. The physicians and Pathologists in these districts have to direct their efforts to find cases of brucellosis among their patients suffering from pyrexia of unknown origin, they have also not to take for granted the clinical diagnosis of diseases for which brucellosis is missed but confirm it by laboratory methods.

Strains of brucella isolated at Karnal:—All the ten strains of brucella that were recovered by me from blood culture of human cases were found to be *B. melitensis* on typing. The strains isolated did not require carbon dioxide for their growth, they did not produce hydrogen sulphide, and their growth was not inhibited by basic fuchsin and thionine. The finding of *B. melitensis* strains is a serious matter for it shows that cows and buffaloes have become infected from goats and to eradicate melitensis infection from humans is also more difficult, the disease caused is more serious, there are more complications in the nervous system and the bones, and it is not known whether vaccination will protect such cattle. However, due to climatic conditions in this State which are low humidity and scanty rainfall except in the submountainous parts of the State, it is not expected that brucellosis will become such a problem among humans and animals as it is in Spain,

Italy or other Mediterranean countries. From what has been written it must not be expected that cases of human brucellosis in Punjab are at all as numerous as they are in Spain and Italy (Spink 1953 Infection due to *B. melitensis*), but brucellosis among humans and animals is not as rare as it is believed to be. Polding has isolated a strain which he calls the A/M Strain from cattle in South India. What strain infects the serologically positive animals in Punjab has to be found out. Is it the same as has been found in human cases in Karnal or is it the A/M strain which Polding found in the South Indian Cattle? Whereas, all the strains isolated from human cases at Karnal, some of whom had been in contact with goats were *B. melitensis*. Nilakantan & Pande, (1948) have reported that at Hissar brucella abortus and not brucella melitensis was isolated from the milk of 3 aborting goats. Thus it is evident that more work on cultural studies of materials from man and animals is necessary. No work has been done on porcine brucellosis in India although it is supposed that porcine brucellosis cannot be very common in India, because there are no big pig farms in this country. There are, however, small herds of 20-50 animals that a certain class of people keep in villages in India and some work among pigs and these people must be done before any conclusions in this respect can be drawn.

Summary

The evidence of animal brucellosis is a valuable index of the presence of infection in human beings in an area, the reverse is also true. In India brucellosis among humans is very much being missed. It is not reported even from areas where animal brucellosis is hyperendemic. This is due to lesser consciousness among physicians regarding this disease and lack of collaboration between them and the veterinarians. Brucellosis is missed for malaria, influenza, typhoid fever, rheumatic fever, rheumatism, hepatitis, tuberculosis and some other diseases. The mode of infection among humans is by drinking raw milk or more often by contact with infected animals. Veterinarians and Dairy workers run a hazard of getting this disease due to their profession. Dr. Polding has done remarkable work in conducting an All-India Survey of brucellosis among cattle but his findings are published in a Veterinary Journal and are not known to the physicians. According to Polding brucellosis among cattle is rare in Punjab except in regions close to the Himalayas. Seeing the incidence of human brucellosis in Ambala and Rohtak, a more detailed testing of cattle is required in these districts. The incidence of disease in cattle in Patiala Division is not known but 10 cases of human brucellosis were discovered in one year at Patiala. In Karnal, cows have not been tested for brucella infection. Seeing the incidence of the disease in

animals, greater number of human cases would be found in Amritsar, Gurdaspur, Simla, Ludhiana, and Gurgaon if the sera of all cases of P.U.O. in these districts were tested as a routine for brucella in addition to the Widal and Weil-felix tests. All the strains isolated from human cases so far at Karnal have been found to be *B. melitensis* on typing, work on isolation and typing of strains of brucella among animals needs to be done in Punjab.

Acknowledgment

My thanks are due to Dr. R. M. Sharma for conveying to me the information contained in Table II and for other useful suggestions and to the Director of Health Services, Punjab for kindly permitting me to publish this paper. I am also indebted to Dr. K. K. Iya Director of Dairy Research, Govt. of India for having gone through the manuscript and for his suggestions.

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PLEASE NOTE

As already announced in our February '59 issue, the *I. V. J.* is now being released on the 20th and 21st of every month. Please expect it therefore in the last week of every month.

Editor, *I. V. J.*

STUDIES ON THE UTILITY OF VARIOUS BIOLOGICAL STAINS AS SEMEN STAINS—Part IV

By

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In the earlier papers (Rao, 1958 a, b, c) the suitability of a large number of biological stains in the alphabetical series from A to N, ranging from acid green to Nile blue was reported with reference to their efficiency in staining spermatozoa using four different techniques of staining. This work is a continuation of the earlier work and covers the stains in the alphabetical series from O to X ranging from stain Opal blue to xylydine ponceau 2 R.

Lagerlof (1934) used Opal blue in his studies on sterility in bulls and Perry (1947) recommended its use for staining sperm. Rao and Hart (1948) used Opal blue in their studies on the morphology and development of bovine sperm. Greenberg *et al* (1943) and Macleod (1947) used a combination of pyronin with methyl green for staining human sperm. Herman and Swanson (1941) reported good results with rose bengal for staining bull sperm.

Materials and Methods

The semen of the buffalo and the bull was used in this investigation. The techniques adopted in this study are the same as already reported in earlier papers on this subject (Rao, 1958, a, b, c). The following four techniques were employed.

- | | |
|--------------------------------|---------------------|
| 1. Conventional method | ... Cv. method. |
| 2. Direct mixing method | ... D. M. method. |
| 3. Dipping and blotting method | ... D. & B. method. |
| 4. Ignition method | ... Ig. method. |

Results

Opal blue (Bresslau Losung):—This is one of the best semen stains and gave excellent results by all the four staining techniques. This stain is put up as liquid in the market by Grubler and Co., Serial dilutions of the same with distilled water in the ratio of 1 : 1 to 1 : 10 were tried. All the different strengths of the stain, gave excellent results and 1 : 10 dilution gave results comparable to those obtained with the stock solution. With the 1 : 10 dilution 15 to 30 seconds exposure gave very pretty preparations, the sperm taking a deep blue colour against an unstained background. The postnuclear cap and tail

took a deeper colour than the acrosome. Longer exposures upto 5 minutes increased the depth of staining. 1:2 to 1:4 dilution of the stock stain with the isotonic solvents gave excellent negative preparations by the D. M. method (Rao, 1957). Sperm in fresh semen were differentiated into live and dead groups (Rao, 1956). 1:10 aqueous dilution also gave excellent preparations by the D. & B. method, the entire sperm taking a deep blue colour while the background remained clear. The Cytoplasmic cap and the terminal filament were also very clearly brought out. 1:10 dilution with absolute alcohol gave excellent results by the ignition technique.

Orcein :—The following formulae of orcein were tried to determine their suitability for staining semen smears.

1. Taenzer-Unna Orcein stain (Onna, 1894)
2. Acetic orcein (La Cour, 1941) - three formulae of acetic orcein were tried - 1 per cent orcein in 45 per cent glacial acetic acid, 1 per cent orcein in 70 per cent acetic acid and 2 per cent stain in 70 per cent acetic acid.
3. Aceto-Orcein-fast green (Kurnick and Ris, 1948)
4. The same formula as above but without sodium chloride.

Of the three aceto-orcein formulae 2 per cent orcein in 70 per cent acetic acid gave the best results followed by 1 per cent stain in 45 per cent acetic acid and 1 per cent stain in 70 per cent acetic acid. There was no need for clearing of smears. With 2 per cent aceto-orcein, 2 to 3 minutes exposure gave very good preparations, the sperm taking a deep brown colour against a clear back-ground. The post-nuclear cap took a deeper stain than the acrosome and the division between the two regions was clear. At 5 minutes exposure preparations were excellent.

Aceto-Orcein-fast green without sodium chloride gave preparations much superior to those obtained with the other formula with sodium chloride. However, no differential staining of sperm could be obtained. With this formula at 3 to 5 minutes exposure the sperm took a deep moss-green colour and stood out very clearly against an unstained back-ground. The post-nuclear cap took a deeper colour than the acrosome. Staining for 10 to 15 minutes gave very pretty preparations.

Orange G :—This was generally unsatisfactory as a semen stain, the only technique by which satisfactory results could be obtained being with 1 per cent aq. stain by the D & B method. By the D.M. method, sperm were differentiated into live and dead groups.

Owen's blue :—5 per cent aq. solution gave reddish violet staining of sperm at 3 to 5 minutes exposure by the Cv. method, the background remaining clear. By the D.M. technique, sperm were differentiated into

live and dead groups. 1 per cent aq. stain gave excellent results by the D & B method the sperm taking a clear violet colour. 1 per cent alcoholic stain also gave satisfactory results by the Ig. method.

Phenosafranin :—This is not very satisfactory as a semen stain. Clearing of smears was essential with this stain with all the techniques employed to avoid intense background staining. 1 per cent aq. solution gave satisfactory results at 5 minutes exposure by the Cv. method, the sperm taking a light brownish colour. With cleared smears 1 per cent aq. stain gave excellent preparations with the D & B method, the sperm taking a reddish safron colour.

Phloxine B :—This is one of the best semen stains and gave uniformly good results by all the four techniques of staining. 5 per cent aq. solution gave bright pink staining of sperm at 5 minutes exposure by the Cv. method. When deeper staining is desired longer exposures upto 10 minutes can be employed. 1 to 3 per cent phloxine in isotonic solvent gave excellent results by the D.M. method. Even when fresh semen was used, all sperm without exception took a bright pink colour. 1 to 3 per cent aq. phloxine gave excellent results by the D & B method, the terminal filament also being clearly visible. 1 per cent alcoholic phloxine also gave very pretty preparations with clear delineation of sperm morphology.

Pyronin :—3 to 5 per cent pyronin in isotonic solvent gave excellent results by the D.M. technique, all sperm without exception, even in fresh semen taking a deep pink colour with a bluish cast, with remarkable clarity of sperm morphology. 1 per cent aq. stain gave excellent results by the D & B method, the terminal filament also being clearly brought out.

Resorcin blue :—1 per cent aq. solution gave satisfactory results after 3 to 5 minutes exposure by the Cv. method, the sperm taking a blackish brown colour. Exposures beyond 1 to 7 minutes do not increase the depth of staining. 1 per cent aq. stain gave excellent results by the D & B method, the sperm taking a blackish brown colour. 1 per cent alcoholic stain also gave satisfactory results by the Ig. technique, the sperm taking a dull blackish brown colour.

Rose Bengal :—This is an excellent semen stain and gave uniformly good results by all the four techniques of staining. 2 per cent aq. stain gave very good results at $\frac{1}{2}$ to 1 minute exposure by the Cv. method, the depth of staining increasing upto 5 minutes exposure. The sperm took a bright pink colour and their morphology was very clear against an unstained background. 2 per cent stain in isotonic solvent gave excellent results by the D.M. method all sperm in fresh semen without exception taking a deep pink colour. 1 to 2 per cent aq. stain

Victoria blue:—1 per cent aq. stain gave excellent results at $\frac{1}{2}$ to 1 minute exposure, the sperm taking a bright blue colour against a clear background. Longer exposures upto 3 to 5 minutes increase the depth of staining. 1 per cent aq. stain gave excellent results by the D. & B. method, the sperm taking a deep blue colour against a clear background. 1 per cent alcoholic stain gave very pretty preparations by the Ig. technique.

Victoriarot (Grubler) or Victoria red:—1 per cent aq. stain gave mahogany brown staining of sperm at $\frac{1}{2}$ to 1 minute exposure by the Cv. method and longer exposures upto 3 to 5 minutes increased the depth of staining. 1 per cent stain in isotonic solvent gave satisfactory results by the D.M. method, the sperm taking a deep brown colour. 1 per cent aq. stain gave excellent results by the D. & B. method. 1 per cent alcoholic stain gave excellent results by the Ig. method by which the deep brown stained sperm stood out very prominently against the clear background.

Xylidine ponceau 2 R:—This stain was not satisfactory as a semen stain. By the D.M. technique sperm were differentiated into live and dead groups.

Summary

Various biological stains in the alphabetical series from O to X, ranging from Opal blue to Xylidine Ponceau were tried to determine their suitability for staining semen smears by four different staining techniques. Of these opal blue, orcein, phloxine, pyronin, rose bengal, safranin, soluble blue, thionin, victoria blue and victoria red were found to be the best.

Owen's blue, phenosafranin, resorcin blue, and trypan blue proved satisfactory as semen stains.

Opal blue, soluble blue and thionin gave excellent results as negative stains by the direct mixing technique. Opal blue, Orange G, Owen's blue, rose bengal, soluble blue, thionin, trypan blue, thiazin red and xylidine ponceau 2 R gave live and dead differentiation of sperm by the direct mixing method when fresh semen was used.

The ignition technique of staining was found to be very useful and no danger to sperm morphology was evident.

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VALUE OF IPOMOEA DIGITATA AS A GALACTAGOGUE IN GOATS*

By

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Many substances including drugs have been used to increase the milk yield in lactating animals by villagers in different parts of the country for centuries past and probably some of them are still in use. While there may be a few of such substances that deserve the reputation they have earned as galactagogues, many are likely to be of little or no value at all. With this object in view, an attempt was made to study the widely reported galactagogue properties of the plant *Ipomoea digitata* and assess its value, if any, in stepping up the milk yield in lactating animals.

Materials and Methods

Ipomoea digitata, belonging to the natural order "Convolvulaceae" and known as "Bilaikand" in Hindi and Bengali, "Mattapaltiga" in Telugu and "Bhumichekrigadde" in Kannada, is a native of tropical India, cultivated from Bengal and Assam to Ceylon. It is commonly found in the drier western portions. It is a climbing creeper with pink-purple flowers and large tuberous roots. The part of the plant reputed to possess galactagogue properties is the tuberous root.

* Most of this work was done in the laboratories of the Pharmacological Research Unit, Madras Medical College under a research Scheme sponsored by the Indian Council of Agricultural Research. The author was attached to that scheme previously.

The tuberous roots of the plant for this investigation were obtained from Tekkali and the surrounding areas in the Vizagapatam district of the present Andhra State, where the plant was reported to be growing in plenty. The investigations were undertaken on the following lines:

- (i) Feeding experiments on lactating goats to determine how it affected the milk yield.
- (ii) Quantitative estimation of the different constituents of the milk both before and after the tubers were fed, to determine how the plant affected the quality of the milk.
- (iii) Chemical examination of the tuber to find out the active principle or principles responsible for the increase in yield, if any.

Experiments and Results

Feeding Experiments:—Goats six to ten days after kidding were used for these experiments. Three groups of animals (Group A, Group B, and Group C) were under observation. During the entire period of the investigation, the experimental animals were fed only on green foliage of the same type. No concentrates were given. Fresh drinking water was allowed to the animals at regular hours.

In group A, the milk yield was recorded both morning and evening for a period of ten days to determine the average normal yield. Four ounces of the powder of the dried tubers were then fed to these animals daily for the next ten days and the milk yield during the period also was similarly recorded. Afterwards feeding with the powdered tubers was discontinued for the next ten days and was restarted from the 11th day and was continued for another period of ten days. Milk yield was similarly recorded during those periods and also for a further period of ten days to see if there would be a fall in the yield. Thus there were two courses of feeding with the tubers with an interval of 10 days in between. The normal yield was recorded for a period of 10 days immediately before the first course of feeding and for a similar period immediately after the second course. Milking was done regularly at 11 a.m. and 4 p.m. every day. The kids were separated from the mother at 7-30 a.m. and were allowed with the mother after 4 p.m. every day. There was thus a duration of 3½ hours before the morning milking and 5 hours before the evening milking without the kids sucking.

In group B, the goats were milked at 11 a.m. every day and the kids were separated from the mother immediately. At 4 P.M. the milking was done again and only that yield was recorded. The kids were then allowed to be with the mother until the morning milking on

the next day at 11 a.m. The rest of the details were similar to those adopted in group A.

The experiments in Group C were carried out on the same lines as in group B but with the following modifications:—

- (i) The quantity of the tuber fed was reduced from 4 oz. to 2 oz. a day to avoid any possible digestive disturbances.
- (ii) The duration of the feeding at a time was reduced from 10 days to 6 days.
- (iii) The interval between two courses of feeding was increased to 12 days to allow sufficient time for the effect of the drug fed in the first course to pass off before the next course of feeding was commenced.

The results of the experiments indicate that the tubers of this plant do not possess any significant galactagogue properties. The average milk yield in all the goats experimented upon with the exception of goat No. 1 of group A and Group C respectively steadily went down irrespective of the fact whether the tubers were fed or not. In goat No. 1 of group A, there was an increase in the milk yield when the animal was fed with the tubers, and in goat No. 1 of group C there was a small increase in the average yield during the first course of feeding with the tubers. During the second course of feeding the yield showed a decrease in this animal. The results of the experiments are shown in Tables I to VI.

Composition of milk before and during feeding with tubers:—Samples of milk were taken for analysis at different intervals, before the feeding experiments were started, during the period when the animals were fed with the tubers and also during the interim period (when the feeding was suspended between the first course and the second course). Quantitative estimation of the percentage content of the different constituents of these samples was carried out in order to see whether the quality of milk had been in any way affected as a result of feeding with the tubers. Samples of milk were taken from all animals in group A and three samples were examined in each of the first two periods, viz. the period when the normal milk yield was recorded and the period when the first course of feeding with the tubers was going on whereas only one sample was examined in the latter stage of the experiment, viz. during the interval between the first course and the second course of feeding with the tubers. Samples of milk were taken only from one of the animals in groups B and C. Only one sample was analysed at each of the above stages of the experiment in group B whereas three samples were examined at every stage from the animal belonging to group C. The results of the analysis of the milk samples are shown in Tables VII to X.

TABLE I
Record of normal milk yield before feeding with the tubers.

Days recorded	Milk yield in milli-litres.											
	Group A						Group B			Group C		
	Goat No. 1			Goat No. 2			Goat No. 3		Goat No. 1	Goat No. 2	Goat No. 1	Goat No. 2
	Yield at 11 A.M.	Yield at 4 P.M.	Average 11 A.M. 4 P.M.	Yield at 11 A.M.	Yield at 4 P.M.	Average 11 A.M. 4 P.M.	Yield at 11 A.M.	Yield at 4 P.M.	Yield at 4 P.M.	Yield at 4 P.M.	Yield at 4 P.M.	Yield at 4 P.M.
1st day	60	120	90	92	95	93.5	110	130	82	75	102	40
2nd day	100	95	97.5	122	70	96	152	210	100	80	140	30
3rd day	100	100	100	90	100	95	80	192	125	80	144	50
4th day	102	110	106	80	80	80	132	182	115	60	140	30
5th day	90	110	100	112	90	101	98	200	120	90	140	25
6th day	95	112	103.5	72	102	87	124	194	120	90	135	15
7th day	70	95	82.5	82	70	76	172	160	95	93		
8th day	80	138	109	84	70	77	144	168	90	68		
9th day	100	110	105	70	70	70	202	204	90	60		
10th day	100	115	107.5	82	88	85	148	166	90	45		
Daily average		100		86			158	103	74	134		32

TABLE II
Record of milk yield during the first course of feeding with tubers.

Days recorded.	Milk yield in milli-litres											
	Group A						Group B			Group C		
	Goat No. 1			Goat No. 2			Goat No. 3		Goat No. 1	Goat No. 2	Goat No. 1	Goat No. 2
	Yield at 11 A.M.	Yield at 4 P.M.	Average 11 A.M. 4 P.M.	Yield at 11 A.M.	Yield at 4 P.M.	Average 11 A.M. 4 P.M.	Yield at 11 A.M.	Yield at 4 P.M.	Yield at 4 P.M.	Yield at 4 P.M.	Yield at 4 P.M.	Yield at 4 P.M.
1st day	97	110	108.5	110	70	90	148	178	100	25	142	10
2nd day	110	120	115	92	80	86	142	152	102	35	130	26
3rd day	90	120	105	80	40	60	120	70	86	30	124	22
4th day	120	142	131	56	78	67	110	98	73	15	150	10
5th day	153	122	137.5	116	34	75	110	130	80	40	160	10
6th day	146	146	146	102	68	85	120	130	85	20	170	15
7th day	142	170	156	88	114	101	90	110	60	22		
8th day	110	163	151.5	60	68	64	34	202	36	20		
9th day	140	160	150	58	96	77	92	138	60	23		
10th day	136	140	138	108	44	76	112	184	58	30		
Daily average			133			78		121	74	26	146	16

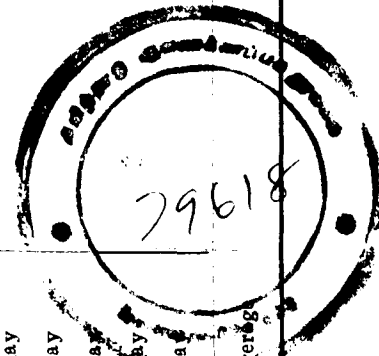
TABLE III
Record of milk yield during the interval between the first course and the second course of feeding with the tubers.

Days recorded	Milk yield in milli-litres.										
	Group A					Group B			Group C		
	Goat No. 1		Goat No. 2			Goat No. 1		Goat No. 2	Goat No. 1	Goat No. 2	
	Yield at 11 A.M.	Yield at 4 P.M.	Average	Yield at 11 A.M.	Yield at 4 P.M.	Average	Yield at 4 P.M.	Yield at 4 P.M.	Yield at 4 P.M.	Yield at 4 P.M.	
1st day	85	95	90	120	120	120	70	30	145	12	
2nd day	44	42	43	120	110	115	48	22	175	10	
3rd day	60	75	67.5	40	96	68	50	25	180	10	
4th day	35	20	27.5	182	94	138	40	28	160	8	
5th day	46	50	48	72	176	124	45	22	165	8	
6th day	32	34	33	62	182	122	42	24	163	Recording was discontinued as the yield was very little.	
7th day	34	34	34	60	112	86	88	25	152		
8th day	32	40	36	70	110	90	85	28	155		
9th day	26	60	43	50	70	60	40	26	148		
10th day	30	40	35	58	112	85	30	24	150		
11th day	—	—	—	—	—	—	—	—	135		
12th day	—	—	—	—	—	—	—	—	144		
Daily average			46			101	44	25	156	10	

TABLE IV
Record of milk yield during the second course of feeding with the tubers.

Days recorded	Milk yield in milli-litres										
	Group A					Group B			Group C		
	Goat No. 1		Goat No. 2			Goat No. 1		Goat No. 2	Goat No. 1	Goat No. 2	
	Yield at 11 A.M.	Yield at 4 P.M.	Average	Yield at 11 A.M.	Yield at 4 P.M.	Average	Yield at 4 P.M.	Yield at 4 P.M.	Yield at 4 P.M.	Yield at 4 P.M.	
1st day	16	32	24	60	148	104			130	Discontinued	
2nd day	62	30	46	48	72	60			125		
3rd day	34	36	35	80	100	90			128		
4th day	36	72	54	40	60	50			130		
5th day	28	34	31	36	28	32			128		
6th day	32	36	34	34	22	28			125		
7th day	30	38	34	32	68	50					
8th day	38	44	41	22	32	27					
9th day	24	30	27	34	74	54					
10th day	22	24	23	54	60	57					
Daily average			35			55			128		

The animal died



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TABLE V
Record of normal milk yield immediately after the second course of feeding with the tubers.

Days recorded	Milk yield in milli-litres.									
	Group A					Group B.		Group C.		
	Goat No. 1		Goat No. 2		Goat No. 3		Goat No. 1	Goat No. 2	Goat No. 1	Goat No. 2
	Yield at 11 A.M.	Yield at 4 P.M.	Yield at 11 A.M.	Yield at 4 P.M.	Average	Yield at 11 A.M.	Yield at 4 P.M.	Yield at 4 P.M.	Yield at 4 P.M.	Yield at 4 P.M.
1st day		22	30	26	26	30	84	57	120	Discontinued.
2nd day		22	20	21	21	26	62	44	120	
3rd day		28	22	23	23	30	70	50	128	
4th day		30	20	25	25	44	62	53	110	
5th day		22	20	21	21	32	72	52	96	
6th day		22	30	26	26	50	84	67	104	
7th day		16	20	18	18	46	86	66	106	
8th day		8	10	9	9	30	70	50	96	
9th day		5	10	7.5	7.5	46	70	58	86	
10th day		5	10	7.5	7.5	26	64	45	84	
11th day		—	—	—	—	—	—	—	80	
12th day		—	—	—	—	—	—	—	76	
Daily average				19	19			54		101

TABLE VI
Summary of the record of the milk yield at different stages of the experiments.

Group and number of the animals	Average milk yield in milli-litres.				
	Normal (before feeding)	During the first course of feeding with the tubers	During the interval between the first and the second course	During the second course of feeding with the tubers	After the second course of feeding with the tubers
Group A. { Goat No. 1 Goat No. 2 Goat No. 3	100	133	Animal died		
	86	78	46	35	19
	158	121	101	55	54
Group B. { Goat No. 1 Goat No. 2	103	74	44	Not recorded	
	74	26	25	do.	
Group C. { Goat No. 1 Goat No. 2	134	146	156	128	101
	32	16	10	Discontinued	

TABLE VII
Composition of milk before feeding with the tubers.

Group	Animal No.	Samples when taken	Specific gravity	Total solids	Percentage content		
					Fat	Ash	Sugar
A	Goat No. 1	4th day	1.08	14.58	5.80	0.76	4.97
		7th day	1.08	13.98	4.70	0.71	4.65
		10th day	1.08	13.41	3.70	0.76	4.45
	Goat No. 2	Average	1.05	13.99	4.57	0.74	4.54
		4th day	1.08	15.96	5.64	0.80	5.05
B	Goat No. 3	7th day	1.08	13.10	5.40	0.63	3.14
		10th day	1.08	14.20	5.55	0.85	2.93
		Average	1.08	14.42	5.53	0.76	3.71
	Goat No. 1	4th day	1.05	14.70	4.78	0.83	3.30
		7th day	1.03	14.40	5.13	0.87	3.50
C	Goat No. 1	10th day	1.03	16.60	5.52	0.79	3.10
		Average	1.04	15.23	5.08	0.88	3.80
		10th day	1.03	14.51	5.00	0.77	4.02
	Goat No. 1	2nd day	1.03	13.68	4.72	0.79	5.44
		4th day	1.03	14.97	6.30	0.83	5.25
		6th day	1.25	14.30	5.51	0.76	5.34
	Average		1.10	14.32	5.51	0.79	5.34

TABLE VIII
Composition of milk during the first course of feeding with the tubers.

Group	Animal No.	Samples when taken	Specific gravity	Total solids	Percentage content		
					Fat	Ash	Sugar
A	Goat No. 1	4th day	1.03	13.31	4.95	0.73	3.86
		7th day	1.03	12.60	4.06	0.76	3.59
		10th day	1.03	12.60	3.80	0.74	3.80
	Goat No. 2	Average	1.08	12.81	3.97	0.74	3.42
		4th day	1.02	13.70	5.25	0.69	3.14
B	Goat No. 3	7th day	1.03	14.30	5.00	0.51	3.16
		10th day	1.03	11.40	6.40	0.65	3.38
		Average	1.03	14.13	5.55	0.62	3.23
	Goat No. 1	4th day	1.01	16.20	4.95	0.96	3.20
		7th day	1.02	15.30	5.52	0.75	2.96
C	Goat No. 1	10th day	1.03	14.10	5.80	0.83	2.94
		Average	1.02	15.20	5.42	0.85	3.03
	Goat No. 1	10th day	1.03	13.06	4.74	0.78	3.31
		2nd day	1.03	14.91	6.27	0.71	4.08
		4th day	1.03	14.58	5.33	0.78	4.39
		6th day	1.03	12.51	3.85	0.69	3.79
	Average		1.03	14.00	5.09	0.73	4.09
							4.24

TABLE IX
Composition of milk immediately after the first course of feeding with the tubers
(when feeding with the tubers was suspended).

Group	Animal No.	Samples when taken	Specific gravity	Percent content				Remarks
				Total solids	Fat	Ash	Total protein	
A.	Goat No. 1	--	--	--	--	--	--	Died
	Goat No. 2	10th day	1.03	15.70	6.25	0.91	3.27	4.28
	Goat No. 3	10th day	1.03	15.30	6.60	0.69	2.83	3.04
B.	Goat No. 1	10th day	1.03	13.16	4.60	0.76	3.65	4.17
C.	Goat No. 1	8th day	1.03	12.20	4.41	0.74	4.00	The first seven days after the feeding was suspended, were allowed for the effect of the drug, if any, to pass off.
		10th day	1.03	12.68	4.13	0.74	4.22	
		12th day	1.03	12.51	3.95	0.76	4.15	

TABLE X
Summary of the results of analysis of the milk at the different periods of the experiment.

Milk constituents	Percentage content (average value of the sample).											
	Before feeding with the tubers (Normal)						During feeding with the tubers					
	Group A			Group B			Group A			Group B		
	Goat No. 1	Goat No. 2	Goat No. 3	Goat No. 1	Goat No. 2	Goat No. 3	Goat No. 1	Goat No. 2	Goat No. 3	Goat No. 1	Goat No. 2	Goat No. 3
Total Solids	13.99	14.42	15.23	14.51	14.32	14.51	12.84	14.13	15.20	13.06	14.00	Died
Fat	4.57	5.53	5.08	5.09	5.51	5.51	3.97	5.55	5.42	4.74	5.09	6.25
Ash	0.74	0.76	0.83	0.77	0.79	0.79	0.74	0.62	0.85	0.78	0.73	0.91
Total Protein	4.69	3.71	3.30	4.02	5.84	5.84	3.42	3.23	3.03	3.31	4.09	3.27
Sugar	4.54	4.88	4.66	4.78	4.43	4.43	4.26	4.24	4.39	4.44	4.24	4.28
Specific Gravity	1.05	1.03	1.04	1.03	1.10	1.10	1.03	1.03	1.02	1.03	1.03	1.03

Chemical examination of the tubers

The chemical analysis of the tubers yielded the following fractions:

- Fraction I. Petroleum ether extractable matter.
- Fraction II. Ether extractable matter.
- Fraction III. Chloroform extractable matter.
- Fraction IV. Neutral lead acetate precipitate consisting of sugars, tannins, etc.
- Fraction V. Basic lead acetate precipitate.
- Fraction VI. Final filtrate.

All the above fractions were tested separately on lactating goats for their galactagogue properties. Goats 6 to 10 days after kidding were used as in the previous experiments. Milking was done regularly at 11 a.m. and at 4 p.m. every day and the yield was recorded. Fractions I, II, III and IV were administered by mouth and fractions V and VI were injected intramuscularly in suitable daily doses. In the experiment with each of the fractions, the milk yield for the period when the animal was fed or injected with the respective fraction was recorded and the figures were compared with those of the normal yield for a similar period immediately prior to the administration of the drug. The results were not at all encouraging. None of the fractions was found to increase the yield. The injection of fraction VI produced a rise in temperature with symptoms of inflammation at the site of injection.

Conclusion

From the results of the experiments given in the Tables I to VI it may be seen that feeding with powdered tubers did not produce any increase in the milk yield in the experimental animals except in one. In another animal, there was a small increase in the average milk yield during the first course of feeding with the tubers. During the second course of feeding with the tubers in the same animal, the record of milk yield showed a fall instead of a rise and surprisingly enough the maximum yield in this animal was recorded during the interval between the two courses of feeding. In all other animals, the results were uniform and there was no increase in the average milk yield as a result of feeding with the tubers. These facts show that the increase in the milk yield noticed in the first case might have been only accidental and due to some other factors.

While feeding with the powdered tubers did not increase the quantity, it did not materially alter the quality of the milk too. On analysis, a slight fall in the total solids of the milk was noticed in

certain cases mostly due to a reduction in the protein and sugar contents (Tables VII to X).

From the results of these investigations, it is concluded that the tubers of this plant do not have any galactagogue action as they are reputed to possess and that their use, with this object in view, is not rational and economical.

Summary

An investigation into the reported galactagogue properties of the tubers of *Ipomoea digitata* has been made. Feeding with the tubers neither increased the milk yield nor materially altered the quality of the milk. A preliminary chemical examination of the tubers has been done. The different fractions obtained from the tubers were tested for their galactagogue properties on lactating goats and the results obtained were not encouraging.

Acknowledgment

The author has great pleasure in recording here his grateful acknowledgement to the Indian Council of Agricultural Research for the financial help rendered by the Council for these investigations. The author's thanks are also due to the Veterinary Assistant Surgeon, Tekkali, for having supplied the material required for the investigation from time to time. The author is indebted to the Director of Medical Services, Madras and the Principal, Medical College, Madras for affording all facilities for work and to the Director of Animal Husbandry, Madras and the Principal, Madras Veterinary College, for their interest. The author also desires to record the valuable help and guidance given by late Sri K. Venkatachalam and Sri M. R. Subramani Sastry in the course of this work and the help rendered by Sri R. Ramaswamy, the Chemist, and his colleague in the scheme.

FURTHER STUDIES ON THE URINE OF ELEPHANTS

By

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In a previous paper, Simon (1) has recorded the results of examination of elephant's urine for normal constituents. This study is a continuation of the above work and in addition the quantitative estimations of some of the physiological constituents have also been made. Even though the importance of collection of 24 hours' urine for quantitative estimation is fully understood, the writer could collect 24 hours' urine only from two elephants and the other 38 samples are

all single collections from different animals. It is hoped that this will give us additional data regarding normal values of elephant urine.

Materials and Methods

Out of 38 animals, 11 were elephants belonging to the Forest Department kept in Nilambur forests and these elephants were getting almost the same diet as elephants in the wild state. 27 samples were from elephants used for the previous study. Toluene was used as preservative. Colour, odour, turbidity, reaction to litmus and sp. gr. were noted in all the samples. Qualitative tests were done for the constituents of urine. In two elephants the number of urinations were noted and total quantity of urine voided in 24 hours was collected and analysed. In 38 samples estimations of total solids, ash, chlorides, sulphates both total and inorganic, phosphates, urea, creatinine and uric acid were made. Chlorides were estimated by Whitehorn Volhard method and sulphates by the method of Rossenhein and Drummond as given by Cole (2). Phosphates, creatinine and uric acid were estimated by the methods of Fisk and Subba Row, Folin, and Benedicts and Frank respectively using Klett-Summerson Photo-Electric Colorimeter as given by Hawk (3). Urea was estimated by using Doremus ureometer.

Results and Discussion

All the constituents detected in the previous study were found in the new samples examined. Indican was present in 8 samples; two were strongly positive for sugar; and four were showing traces of sugar; 6 were amber coloured and the rest straw coloured and all were clear and watery. The reaction of two were acidic to litmus and the rest alkaline. The average sp. gr. of new samples was 1026 varying from 1022 to 1032. Comparing with the values obtained by Benedict (4) in the elephant herd of Barnes; urine samples analysed here have shown total solids 44.6 mgm/100 c.c. as against 30.18 mgm/100 c.c. and ash 12.3 mm/100 c.c. as against 6.6 mm/100 c.c. and percentage of ash in total solids 27.6 as against 21.7. But the mean sp. gr. of the samples examined is 1029 as against 1016 of Barnes' herd. The findings in this study agree with the view of Benedict that percentage of total solids increases with rise in sp. gr. The chloride content of the samples in this study is in confirmation with that of the findings of Benedict in Ringling herd of elephants. Literature regarding quantity of sulphate and phosphates in elephant urine is not available for reference. The results of this study are recorded in table (1)

The mean Urea content of the urine in this study when converted to urea nitrogen, is found to compare favourably with the urea nitrogen of the urine of experimental elephant Jap used by Benedict. Benedict's

TABLE I
Results of Quantitative Estimation in 38 samples of Urine.

Name of the constituent	Range mgm./100 c.c.		Mean mgm./100 c.c.
Total solids	1.10	to 7.40	4.46
Ash	0.10	to 2.12	1.23
Chlorides	100.00	to 1060.00	460.00
Total sulphates	11.00	to 128.00	56.70
Inorganic Sulphates	10.00	to 77.00	35.50
Phosphates	3.70	to 42.00	17.29
Urea	300.00	to 2500.00	1025.00
Creatinine	32.30	to 238.00	92.90
Uric acid	11.00	to 106.00	36.50

value of creatinine per c.c. of urine of Jap varied from 0.4 to 1 mgm. In his opinion the low creatinine coefficient in the Elephant may be due to extra fat. But in this study the value is from 0.3 to 2.38 mgm. and the mean 0.93 mgm. per c.c. It should be remembered that the normal constituents of urine may vary due to various factors namely, food, water, quantity of urine voided, number of urinations, etc. It requires further study to clarify whether the higher creatinine content in this study is due to the diet or due to some other causes. Any how the elephants were not getting meat diet at the time of taking samples though there is a practice in Kerala to give raw meat mixed with spices and stomachics to hard working elephants as a tonic for two or three weeks continuously every year. According to Mitchell (5) the action of uricase causes oxidative destruction of uric acid in all mammals except man and ape. Benedict did not conduct any test for uric acid in his study since he also thought that purine bodies in elephants are eliminated in the form of allantoin, instead of uric acid. Hence the estimation of uric acid taken up in this study is of some interest. In elephants, it is likely that the source of uric acid is more of endogenous nature rather than exogenous, since their diet does not largely contain purine rich foods like meat, liver, etc.

24 hours' urine was collected from the elephant Janardhanan, height 8'1" aged about 32 years. It had urinated five times during the period and the quantity was 53.755 litres. The other elephant aged about 11 years urinated 8 times, and the quantity was 25.940 litres. According to a calculation of Benedict the quantity of urine voided by the Elephant Jap height 8'1" aged about 40 years is 53.3 litres. The results of analysis are recorded in Table (2).

The difference in the quantity of the various constituents excreted by the two animals may be due to the fact that the first one is an adult and the second a young growing one.

TABLE II
Quantity of constituents of urine in grams excreted in
24 hours by two elephants.

Name of constituents	Elephant No. 1	Elephant No. 2
Chlorides	193.52	176.39
Creatinine	36.55	8.30
Total sulphates	13.98	27.40
Inorganic sulphates	9.68	14.90
Phosphates	13.71	2.21
Urea	107.50	286.00
Uric acid	1.90	6.24

Summary and Conclusion

Quantitative estimations of total solids, ash, chlorides, sulphates, phosphates, urea, creatinine and uric acid of urine of 38 elephants have been made. In two elephants 24 hour excretions of some of the above constituents have also been made.

Acknowledgement

The writer wishes to thank Principal Dr. M. N. Menon for giving all facilities to do the work in the laboratory and the members of the staff on the Physiology Department for their co-operation. He is also grateful to Sri T. N. Natarajan, Laboratory Assistant for the help rendered in collection of urine samples and preparation of reagents.

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Clinical Article

CHLORPROMAZINE HYDROCHLORIDE & PROCAINE PENICILLIN THERAPY IN A CASE OF TETANUS

BY

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Tetanus is known to us since 1884. So far as the treatment of the disease is concerned, no specific agent is known, except the symptomatic treatment and the use of Anti-tetanic serum, both as curative and prophylactic as recommended by various workers, which of course is quite expensive and specially so in large animals.

Chlorpromazine Hydrochloride (Largactil M & B) in combination with Procaine penicillin has been tried by Tait & Ryan in Australia and others in England, America and by a few in India with a fairly good amount of success as a curative agent.

The authors attended on a young horse aged 3 years, property of Shri Jamal Din S/O Shri Shahabudin of L. N. T. Road, Bikaner, which on clinical examination was found to be a fairly advanced case of Tetanus.

The horse (Case No. 368 dated 24-1-1959) was detained in the local Veterinary Hospital under the orders of the Principal of the College and was given the treatment at the cost of the College for demonstration to the students.

The animal was in fair condition with Temp. 100.2 degrees F., Pulse, 40 and Respiration, 10 per minute. There was an increased hypersensitivity; it was 'all stiff' and moved with great difficulty. The feeding was difficult and bowels somewhat constipated; the nictitating membrane was prominently protruding on slight movement, noise or disturbance. It was learnt from the history that the animal had a wound on the foot, a few days back which healed up. On thorough examination a partly healed wound on the bulb of the heels of the off hind and also a wound on the shoulder of the right side was found. Both the wounds were properly cleaned and cauterised with pure carbolic acid as a first step towards treatment.

The patient was given the following treatment:—

24-1-1959:

R/

1. 'Largactil' 250 mgms. i/v
2. Procaine penicillin 40 lacs Units i/m
3. Mag. Sulph. Concentrated solution 35 cc. s/c

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4. Extract. Belladonna Sic. drachm half.
 Pot. Chlorate ,, two
 Ammonium Chloride ,, one
 Pulv. Glycyrrhize ,, four
 Pulv. Linseed
 Treacle each sufficient quantity.

Diet: The diet given was about half a seer of gruel and two seers of milk which the animal took but very slowly.

No. 2, 3, 4 and 5 were repeated on the following 3 days but No. 1 ('Largactil' 150 mgms. i/v was given on January 25th and again 100 mgms. on Jan. 26th.)

It was however observed that the horse showed some restlessness and excitement for a few minutes after every time the 'Largactil' was given; and at one time it laid itself on the ground for about fifteen minutes.

Except No. 1, the rest of the treatment was continued till 30-1-59, when again 100 mgms. of 'Largactil' was given i/v on Jan. 31 and also on Feb. 1st and 2nd, 1959.

The animal showed marked improvement; practically all the stiffness of various muscles was over and now the animal was feeding with great ease on its normal diet, having regular bowels and urination. There has been no rise of temperature throughout the period as recorded daily both morning and evening.

Extract. Belladonna Sic. in cough electuary as mentioned above was continued for another four days. The animal was given walking exercise and thorough grooming and massage. It was kept as an indoor patient till on 12-2-1959 when it was discharged as cured.

Summary

1. A fairly advanced case of Tetanus has been successfully treated with 'Largactil' and Procaine penicillin therapy.
2. A combination of above mentioned drugs gives a good promise to be used as a curative agent in the treatment of this disease.
3. Some restlessness has been observed for a few minutes practically every time the 'Largactil' was administered.

Acknowledgments

The authors are grateful to Dr. D. K. Sharma, In charge Veterinary Hospital, Bikaner, for the help and also to Dr. Mohan Singh Purohit, M.S., Ph.D., Vice Principal of the College for the facilities provided.

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Abstracts

Laboratory studies on some Biological Properties of the far East Influenza Virus.—By SAN-PIN WANG and TSU-YANG LIN. *The Journal of infectious diseases*, Vol. 103, No. 2, Sept.—Oct., 1958.

Two biological properties of the Far East strain of Influenza virus isolated during the world wide influenza epidemic of 1957 have been investigated. It has been shown that this new strain causes agglutination at room temperature of erythrocytes from the following 17 animal species:—human (Type O), guineapig, chicken, white mouse, white rat, dog, duck, frog, monkey, sheep, goat, cow, swine, Japanese horse, Chinese Pony, rabbit and Cat. This broad spectrum of haemagglutination is unique among standard influenza strains and offers a means of biological identification of the new Far East set of viruses. Strains of Far East Virus isolated in Taiwan were tested for susceptibility to non-specific inhibition of haemagglutination with serum from the 17 animals. Horse and frog sera caused the highest titre inhibition with susceptible strains. Three of the six Taiwan Far East strains were susceptible to the inhibitor in these sera.

A. MUKERJI.

A Head Outbreak of Mastitis Associated with Streptococcus Pneumoniae Infection.—By G. K. MACLACHLAN, *et al.* *The Veterinary Record*, Vol. 70, No. 49, December, 1958.

(Author's summary)

A serious outbreak of mastitis involving half the number of cows in a herd of 49 is described. The outbreak was undoubtedly spread by milking uninfected after infected cows and only one fresh case occurred in the clean section of the herd when the known clinical cases were removed from the herd. The causative organism was a Type III Pneumococcus and was peculiar in its growth requirements in that it would only grow in Co₂ in our laboratory media. It was subsequently shown that it grew quite well aerobically when another brand of peptone was used. Treatment of well-established cases did not succeed in restoring milk-yield but early cases responded well to large doses of penicillin given via

the teat canal. One cow treated with penicillin given intramuscularly showed a good recovery. It was not possible to trace the source of outbreak, but it may have come from a milker who had left the herd a month prior to the occurrence of the outbreak and who was not available for examination.

A. MUKERJI.

The Differential Leucocytic Count in the Diagnosis & Prognosis of Bovine Traumatic Gastritis.—BY CARROL R. E. & R. R. ROBINSON (J.A.V.M. Ass. 132:6; March 15, 1958 248-49).

The experience based on about 500 rumenotomies and about 200 apparently normal healthy cows kept as controls, revealed no change in the normal leucocytic count in all instances of traumatic gastritis but the change in the percentage of individual type of W.B.Cs. and the body temperature as under :—

Body temp.	Neut %	Lymph %	Mono %	Eosin %	Baso %	Diagnosis and suggestion
101.5 F	38	62	2	3.34	0	Normal animal.
103-107 F (68)	52-90	9-44 (29)	0-3 (1)	0-15 (2)	0	Early traumatic gastritis and peritonitis; Excellent surgical risk.
102-104 F (57)	43-75	20-53 (38)	0-4 (2)	0-15 (3)	0	Subacute traumatic gastritis with localised peritonitis; Good surgical risk.
101.5- 102.6 F (46)	45-68	15-50 (45)	5-9 (6)	0-12 (3)	0	Chronic traumatic gastritis with extensive adhesions; seldom a good surgical risk.
105-107 F	71	15	9	5	0	Traumatic pericarditis; never a good surgical risk.

It is seen that during all the stages lymphocytes are decreased and neutrophils are increased in their number.

D. B. K.

An Outbreak of Blindness (Amaurosis) In Sheep.—BY J. MULLINS, W. J. HARTLEY and R. M. SALISBURY.—*The N. Z. Vet. J.*, Vol. 6. No. 2, April, 1958 Pp. 52-53.

An uncommon outbreak of idiopathic amaurosis in a mob of haggots showing partial or complete blindness has been described in New Zealand. The condition occurred after varying periods of the Crutching operations and gradually disappeared of its own accord, with the lapse of time. Clinical examination, including the ophthalmoscopic examination, revealed no lesions or abnormalities in the eye. The histopathological examination of the brain, however, revealed numerous foci of noninflammatory necrosis of neurons in the deeper layers of the cerebro-cortical grey matter (—polioencephalomalacia). R. N. KOHLI.

News and Views

The B.V.M.A. Bulletin.—The combined issue of Nos. 2 & 3 of Vol. II of this Bulletin is to hand. It is a much improved quarterly now with classified abstracts and extracts. The Departmental news section must prove of great value not only to the members of the profession in Bombay State but also to others who are interested to follow the professional activities in that major State. We are told the Bulletin office has been shifted to Aarey Milk Colony. We wish greater details were available regarding the change in the Editorship, etc. We know what it means to bring out a professional journal. We can well sympathise and appreciate the efforts made by Bombay. We wish the Bulletin all success!

* * * *

A Friend in Need.—We are happy to find the *B. V. M. A. Bulletin* appealing to its members to subscribe liberally to the *Reserve Fund* of the *Indian Veterinary Journal*, "Our only national journal". We are extremely thankful to our Bombay contemporary for this fine gesture. We admit to a sense of disappointment at the response made so far, more particularly by such patriotic States as Bombay and Bengal! We only hope the earnest appeal of the "Bulletin" will rouse our men from their slumber and make them realise their duty.

* * * *

Another Dairy for Bombay.—A grant of one million dollars to Bombay Government towards a second dairy project in the City is expected from the UNICEF (United Nations International Children's Fund). It is conditional by the proviso that the dairy should undertake to supply 75 lakhs worth of free or subsidised milk to school children over a period of five years. The work on the construction of the new dairy at Worli in Central Bombay, is expected to be taken up soon and the project completed by the end of 1960. The New Zealand Government is to be approached soon for a further grant of 500,000 dollars for the completion of the project.

* * * *

Dr. M. R. Jayakar Passes Away.—Another fighter in the cause of freedom has passed away. "A Versatile man with a superhuman intellect"; "a man of great character and scholarship"; "a very eloquent speaker", etc., were some of the tributes paid in the Lok Sabha. He represented a generation of intellectual giants, who knew no fear and who combined all that is best in man. For sometime he was a member of the Federal Court and later a member of the Judicial Committee of the Privy Council. He has no doubt, an assured place in the history of India but more than that, his place is assured in the

hearts of millions of men and women of India. India mourns to-day the death of this great son and we offer our heartfelt condolences to his only son Mr. Jayasingh M. Jayakar and other members of the family.

* * * *

Sir Vijaya's Gift.—Sir Vijaya (better known as Vizzy in Cricket circles or as Maharajkumar of Vizianagaram) has gifted away his "Korukonda Palace" and its surrounding land, estimated to cost about ten lakhs for the purpose of starting an Agricultural and Veterinary College. Recently the award of *Padma Bushan* was conferred on him by the President of India. But we will remember him as "*Dharma Bushan*" through this gift. We offer him our thanks on behalf of the profession.

* * * *

Animal Husbandry Department and the Madras Veterinary College:—"Tributes to the efficient working of the State Animal Husbandry Department and the high standard of training at the Madras Veterinary College, were paid by two Madras Ministers, Mr. C. Subramaniam, Finance Minister and Mr. M. Bhaktavatsalam, Home Minister, when they visited the Veterinary college on March 18 and participated in the anniversary of the staff club of the college.

Welcoming the gathering on behalf of the staff and students, the Principal of the College Mr. I. D. Mantramurti, said the Madras Veterinary College continued to maintain not only a high standard in Veterinary Education and also in extra-curricular activities. He pointed out that, apart from the Jehangir Patel Challenge Cup for the highest milk-yielding red Sindhi Cow, Sir Datar Singh's Challenge Cup for the cows' milk type and the Lalchand Harichand Shield for the highest milk-yielding animal in the Southern Regional Cattle Show which the College won during the year, the College had annexed the trophy for the best Students' Team in the All-India Cattle Judging competition held at Bangalore recently, the trophy for the best drama staged by the City Colleges during the Cultural Week, the Championship for the best college in the National Savings Scheme and the best individual championship for National Savings and the runners-up honours in the Inter-Collegiate knock-out tournament in Hockey for the Stoke's Shield for the second year in succession." Well done, Madras!

* * * *

Paper Famine:—Due to the prevailing scarcity of paper, we are obliged to reduce the number of pages in each issue and to restrict giving publicity to the usual courtesy photographs of general interest to the profession. We request our subscribers to co-operate with us 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.]

INTEGRATION OF TEACHING, RESEARCH AND EXTENSION IN THE COLLEGE OF VETERINARY SCIENCE AND ANIMAL HUSBANDRY

BY

DR. G. BISWAL, M.S., D.V.M. (Hons.), Ph.D.,
Principal, Orissa College of Veterinary Science and
Animal Husbandry, Cuttack.

It is an accepted fact that teaching, research and extension should go hand in hand. There is no divided opinion in this regard. In order to get the maximum benefit from research it is desirable that it should have an intimate relation with extension work in the field as by that, on one hand, the problems arising in the field can be brought for research and on the other, any new things obtained from research can immediately be disseminated to the field through extension workers. The teaching departments of the Colleges of Veterinary Science and Animal Husbandry have or are going to have well equipped laboratories and fully staffed so that the question of integration of teaching, research and extension (purely educative) can assume primary importance for the maximum benefit to the State.

Teachers may remain only as teachers without contributing anything new towards the progress of the Science, if they do not conduct, initiate, guide or supervise research work, and by and large do not see to the implementation of the result of research in field for the benefit of the farms and farmers of the State.

At present there is a sort of overlapping and incoordination in the field of research in that many research activities are being done by the departmental specialists attached to the respective departments having inadequate facilities in respect of space, library, equipments and expert guidance and other isolated schemes on special problems financed by the I.C.A.R. from time to time, and by the teachers in Colleges where adequate facilities in all respect for research are available, and in result there is duplication of expenditure, which is too heavy a burden on the public exchequer specially in a country-like India. The activities of the research programme of the departmental specialists can very conveniently be integrated with the respective teaching departments of the College under the respective heads of the teaching departments with the Principal as the co-ordinating and controlling authority. Moreover, it is seen that, mostly though not always, the services of the research

workers are utilised for other works which have no connection with their research. Unless all these activities are brought under one control for co-ordination, collaboration and application in the field, no useful purpose can ever be served either in teaching, research or extension.

Once this integration of teaching, research and extension is materialised, the following advantages will accrue.

(i) All the research programmes done in the department in a particular subject can be done at one place and thus ensuring collaborative work in preference to individualisation of research, which is expensive, time consuming, etc.

(ii) There being one co-ordinating and controlling authority, the channelisation of effective research work can be accomplished better.

(iii) The teachers will be compelled to do some amount of research work at least to become good teachers.

(iv) The problems of the field can be solved in Colleges and results of research can be extended to the field. By this arrangement the man in the field and the teacher in the College will have direct contact, which is an ideal condition for teaching, research and extension.

Farm News Release

More Eggs Per Year. Select Early Layers.—Watch out for the pullet that starts laying eggs early. Because, the earlier a pullet starts laying, the better will be her total annual egg production.

This is what experts of the Poultry Division at the Indian Veterinary Research Institute at Izatnagar say.

Another finding at the Institute, which will be of interest to all poultry-keepers is this: if you want to have good-sized eggs, select your breeding stock, especially females, with an eye to their body weight.

A 24-week old White Leghorn pullet should weigh 3-1/2 pounds, and a Rhode Island Red 4-1/2 pounds. Such birds usually lay standard size eggs, a dozen of them weighing 24 ounces or more.

If you are in the table egg business, here is another useful hint from Izatnagar.

It is economical to keep the birds of Rhode Island Red and White Leghorn for only ten to 12 months from the time they laid their first egg. This is so because in the second year, the number of eggs laid goes down by a fifth.—F. I. U. No. 5/59.

Improving your Poultry Flock. Crossing is one good way.—May be it's a little slow process, but the crossing of the males of the improved poultry breeds with *desi* females is a good method of improving poultry, especially in our villages.

For this purpose, males of the White Leghorn or the Rhode Island Red breed could very well be used. These breeds are famous for giving more and larger eggs than *desi* birds do.

By using these breeds for crossing with your *desi* hens, you "grade up" your flock.

The cross-bred chickens have better livability; they do not lose the setting and brooding habits of the *desi* mother. So also, they get the instinct of protecting themselves from their natural enemies.

All Central and State Government poultry farms stock the birds of the improved breeds for supply to poultrymen.—F.I.U. No. 3/59.

Association News

The Madras Veterinary Assistant Surgeons' Service Association

ANNUAL MEETING

The annual general body meeting of the above Association was held at Coimbatore on 1-2-59 at the State Cattle Show Ground.

Dr. D. Veeraraghavan who presided on the occasion recalled the low status of the profession about 20 years ago and opined that it was through the ceaseless efforts of the Association, the profession is enjoying to-day a comparatively better status. He said the profession has therefore reason to remember the early pioneers who worked with such selfless devotion over a number of years.

The Secretary of the Association, Dr. C. R. Krishnamurthy, next read the annual report of the Association for 1958.

Dr. D. Pattabhiraman, the Director of Animal Husbandry, Madras, who was requested to address the gathering, congratulated the members of the profession for impressing the public so well with their efficient and sincere work. He said Associations like this should devote more attention to the reading of professional papers. He found that only 312 Veterinary Assistant Surgeons out of a total of nearly 500 to be on the rolls of the Association. He advised others also to rally round the Association. He deprecated the growing tendency on the part of some to prefer to work only in urban areas and pointed out that the main field of work of the profession was in the villages. Now that

the College has been up-graded, he called upon the members of the profession to specialise in the several branches of Veterinary Science. He assured the profession that the question of emoluments will receive the sympathetic consideration of the Government, when their finances improve.

Dr. C. R. Krishnamurti, the Secretary, thanked the Director for having found time to address the gathering in the midst of his tiring State Cattle Show work. After lunch in Geetha lodge, which was largely attended by the officers of the Department and other distinguished guests, the members met again for the afternoon session, when resolutions on the following subjects were adopted :—

1. A condolence resolution on the sad demise of Doctors Rangamannar, Narguna Nadar, Mahadeva Iyer, K. K. Natesan and Sundaram.
2. Requesting the Director for charge allowance when the Veterinary Assistant Surgeons are put in additional charge of other institutions or works.
3. Requesting for a special allowance of Rs. 50/- p.m., to those working at the Agricultural College, Madras Veterinary College, Live-stock Farms and in other special schemes.
4. Requesting for the benefit of Sundays and other Government holidays.
5. Requesting to restore the circulation of foreign Veterinary journals as of old.
6. Requesting to abolish the routine system of maintaining ticket books at hospitals and to replace it with a system of recording only interesting cases of professional importance.
7. Requesting not to post Retired Officers in charge of major hospitals as it affects the Veterinary Assistant Surgeons in service adversely.
8. Requesting to post a compounder or stockman to every institution irrespective of the number of attendance at the hospital.
9. Requesting to treat the Veterinary Assistant Surgeons selected for the M.V.Sc., course as on deputation.
10. Requesting to post only Veterinary Assistant Surgeons in all the N.E., and C.D. Blocks instead of stockmen and livestock inspectors, as the services of the latter are inadequate to the growing tempo of expansion in all such centres.

The following office-bearers were elected for 1959 :—

Dr. N. Balasubramanian	...	<i>President.</i>
„ A. Ramachandran	...	<i>Vice-President.</i>
„ V. Sarangapani	...	<i>Secretary.</i>
„ R. Krishnan	...	<i>Treasurer.</i>
„ T. G. Abdul Khadder,	}	... <i>Members of the</i>
„ T. Sivaraman,		
„ S. Seshiah,		
„ S. J. Seshadhri,		
„ P. S. Ramachandran,		
		<i>Managing Committee.</i>

With a vote of thanks proposed by the Secretary the meeting came to a close.

C. R. KRISHNAMURTI,
Secretary.

The All-India Veterinary Association

THE RESERVE FUND

An event of great importance to the Veterinary profession in India, took place in August 1924. It was the birth of the *Indian Veterinary Journal*. Circumstances were positively hostile and yet the profession took that bold step and the lion-heartedness of the early pioneers cannot be too highly praised. Ever since then, the *I.V.J.* has toiled hard under very adverse circumstances. The *I.V.J.* lives to-day so that the profession could prosper and science advance.

And now the hat is sent round so as to place this journalistic venture on a sounder and firmer basis. The *I.V.J.* is a priceless possession of our profession. It has placed the Indian Veterinary Surgeon, on the map of the scientific world. Just pause and ponder over, how much we owe to the Journal both individually and collectively. Is it too much then to expect the profession to respond to the appeal issued for a Reserve Fund? We hope not.

Some enquiries have come to us asking us to indicate the extent of help expected. We do not want to put the members of the profession to any undue financial strain in these hard days. At the same time, a certain amount of sacrifice is needed to make this fund a great success, so as to make it worthy of our profession. So we feel that the following scale of contribution will be quite reasonable. It could even be paid in two or three instalments.

Class I Officers	...	Rs. 100/- and above.
Class II Officers	...	Rs. 50/- and above.
All others	...	Rs. 25/- and above.

It is our ambition that no Veterinary Surgeon in this land should remain without contributing to this fund. Brick by brick, this great edifice of our's should begin to rise higher and higher. On the success or otherwise of this venture, the solidarity of our profession depends. "Pay and Prosper" is the slogan we pass on to the members of our profession.

Jai Hind!

T. VINAYAKA MUDALIAR,
Editor, *The Indian Veterinary Journal*.

THE I. V. J. RESERVE FUND

LIST OF CONTRIBUTORS

	Amount acknowledged in March 1959 issue	Rs. nP.
Dr. K. S. Gopal Rao, Asst. Dr. Animal Husb. Mysore, 1st Instalment.	...	3,790.81
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Cheques, money orders and all correspondence should be addressed to the Editor, *The Indian Veterinary Journal*, Madras-17.

Obituary

Major General Anandrao Ganpatrao Sadekar Powar, G.B.V.C.

(CONTRIBUTED)

We regret to announce the death of Major General A. G. Sadekar Powar on Wednesday the 14th January 1959 at Baroda.

General Sadekar was born of a Maratha Family, once the 'Killedars' in charge of the Fort of Sada in Belgaum District. He had his early education at Belgaum and graduated from the Bombay Veterinary College in 1907.

The late Sir Sayajirao, Gaekwar of Baroda, who was well reputed for selection of good officers from any part of India, for the Baroda State Service, during his visit to Belgaum in 1908, picked up young Sadekar who was then working as Veterinary Assistant and posted him as Veterinary Assistant Surgeon for the State Forces under late Dr. Jogalekar who was then the Chief Veterinary Surgeon. General Sadekar Joined the Baroda State Service in 1909.

Appreciating his liking for the horses, not only as a Veterinary Surgeon, but as a rider and sportsman, he was commissioned to the State Forces as a Regular where he rose to the Rank of Major General by dint of his merit and retired from the State Service in 1947.

During his 38 years of service, General Sadekar worked in various capacities. He was an A.D.C. to late Sir Sayajirao for nearly 24 years, Officer Commanding various Regiments and the Controller of Household. After the outbreak of the World War II, he was posted back to the army where he commanded the Infantry Brigade. During the war period of 1939-45, he had an opportunity to organise the state forces which were enlisted to the I. S. F. Units. He visited the Burma Front to meet the State Units. He was subsequently raised to the Rank of Major General and appointed as the Dy. Chief of the Military Staff in 1941.

During his career, he visited Europe on various occasions and always took down valuable notes of his own observations.

General Sadekar worked for many social Institutions and was ever willing to help anybody, at times even going out of his way. Though out of the profession practically throughout his life, he had a sincere love for it and which he called as mother-profession giving him the access to the Baroda State Service. He took active interest in the Veterinary Profession and was a pioneer in forming the Baroda Veterinary Association. He never missed any Veterinary function. He freely contributed towards the Diamond Jubilee Celebrations of the Bombay Veterinary College.

A man of pleasing manners with capacity to work under all odd circumstances, he earned popularity with all strata of people. He was rightly described as a "Laughing Philosopher" by a well known English writer in his book on late Sir Sayajirao.

His services were recognised by conferring on him the title of "Rajya Ratna" by the State and was a recipient of various war medals.

He leaves behind him only one son who is a Dy. Superintendant in the P.R.C. of the Bombay State.

We offer our heart-felt condolences to the members of the bereaved family.

Major W. V. SOMAN, (Retired),
Baroda State Force.

Dr. P. N. Sivarama Iyer

We regret to record the sad demise of Dr. P. N. Sivarama Iyer, G.M.V.C., Retired District Veterinary Officer, Madras State, on 29-1-59 in his native village of Pazhmaneri in Tanjore District, after a short illness. He passed out of the Madras Veterinary College in 1915, joined the then Civil Veterinary Department, Madras, and retired in 1946 as a District Veterinary Officer. He was a highly conscientious officer, who was popular wherever he was and had a smile for every body.

We offer our heartfelt condolences to his son Dr. P. S. Natarajan, who is himself a Veterinary Surgeon and to other members of his family.

Reviews

Surgical Principles and Technics.—By Williard F. Guard, D.V.M., Chairman, Department of Veterinary Surgery, The Ohio State University, Columbus, Ohio. 2nd. Ed., (1953). Lithoprinted and Cloth-bound. 8.5" x 11". x + 244 pp. Published by W. F. Guard, 2274 Yorkshire Road, Columbus-21. (Ohio U.S.A.)

Though first published in 1951, Surgical Principles and Technics written by Dr. Guard, has only recently been introduced in its second edition of 1953 to the students and teachers of Veterinary Surgery in India. This book marks a distinct improvement upon the other stereotyped classical publications on veterinary surgery, in as much as the treatment of the subject in its various aspects and branches is fully based on modern concepts of surgical techniques, with much of the unnecessary theoretical part that used to cover a major portion of the older books, carefully pruned out, yet not excluding what should rightly be included. The author is himself an excellent surgeon of international repute, and has contributed considerably from his own practical knowledge and experiences in the ordinary course of his duties as a teacher of over 40 years standing and consulting and operating veterinary surgeon to several well-known livestock and racing establishments in the United States of America. This book has a modern practical approach to all surgical problems, and the treatment of the subject is simple, vivid and easily intelligible. It is profusely embellished with 283 clear photographs, diagrams and illustrations, which greatly

facilitate the readers' work in understanding the details of different operative procedures in an interesting and intelligent manner.

The book comprises of eight chapters: the first two that are probably the hall-mark of the book, being on "Wound Healing" and "Presurgery" that give a really superb description of the fundamental principles and operative technics of veterinary surgery, designed to prepare the students to grasp easily what follows in the remaining six chapters on: "The Eye and Accessory Glands", "Equine Operation", "Bovine Operations", "Castration of Farm Animals", "Canine and Feline Operations", and "Additional Technics and Case Reports". The sequence is logical. The indexed outline of student assignments for operative practice given in the beginning of the book is systematically arranged and well-planned.

It is, indeed, a matter of great pride and privilege for our fast-developing country to have the author of this book amidst us in India just now on a two-year assignment as T.C.M. Expert in Veterinary Surgery, to train our teachers and students in the latest advances in operative techniques applicable in the surgery of domestic animals. Although quasi-permanently attached to the Bikaner Veterinary College in Rajasthan since August, 1958, he has already given turns at the Hissar and Patna Veterinary Colleges, and attended the last All-India Veterinary Conference held at Bangalore. It is hoped that before Dr. Guard leaves India on the completion of his assignment, he would have succeeded in giving our Colleges a blue-print of an ideal Veterinary Surgery Section, with full details of plans, lecture and operation theatres, equipments, surgical instruments, X-ray installation, library, staff, etc., etc.

Dr. Guard book is strongly recommended for adoption as a text-book in Veterinary Surgery in the Indian Veterinary Colleges. It has already had sales in no less than 36 countries of the world to date.

A. C. AGGARWALA, Lt. Col.,
RADHEY MOHAN SHARMA.

The Madras Veterinary College Annual.—The XVII Volume of this magazine has made its appearance this year on the College Day on 9-3-59. Due to 'paper famine' in Madras, the usual standard in the get-up of this journal is not there. But the contents have more than compensated for the loss of its external appearance.

The Principal's report is a magnificent record of the all-round progress this institution is making. An additional Hostel block to accommodate 250 students at a cost of Rs. 9.8 lakhs; a three-storied building costing about 8.9 lakhs to accommodate the Departments of

Genetics, Nutrition, Physiology and Dairying; an X-Ray building costing Rs. 25,000/- are some of the new additions already made. The Government have also sanctioned a further sum of Rs. 17.5 lakhs for additional buildings for the Regional Post-graduate and Research Centre. The foundation stone for a Clinical Block was also laid on 9-3-59 by the Director, Dr. D. Pattabiraman. The progress made is not merely in cement and mortar but the College is fast establishing itself as a Centre of international repute through its good work. The early pioneers who struggled hard to place this college on her feet may well take pride at the tremendous progress this college is making.

On an average about 142 cases are treated every day at the College hospital. The College provides the following facilities for Post-graduate studies:—(1) For P. G. Research work leading to the award of the M.Sc., Ph.D., and D.Sc., degrees of the Madras University. So far six M.Sc. and 3 Ph.D., degrees have been awarded and 20 more have registered for the M.Sc. degree. (2) A regular advanced P. G. course of studies leading to M.V.Sc. degree. Eighteen students have registered for this. Nine women Graduates have so far passed out of this College.

507 books, 160 periodicals and 160 pamphlets have been added to the Library. Books and periodicals worth about 12,298 Dollars are expected to be supplied by the T. C. M. during the year.

The extra curricular activities of the students are really praise worthy. They won the Inter-College shield for putting up the best dramatic show during the Cultural Week. The Principal records that the conduct and character of the students during the year have been quite exemplary. The annual is a useful compendium of all the activities of this great institution, with a few interesting professional articles by the staff and the students.

Mruga Samrakshnavum Kozhi Valarthalum (Animal Husbandry and Poultry Keeping) in Malayalam—By DR. K. J. Simon, G.V.Sc., D.V.M. Publishers, Mrs. Poppy Simon, East Fort, Trichur. Price Rs. 2.00.

This is a comprehensive book written in good and flowing language (Malayalam) and deals with those aspects of animal husbandry and poultry keeping that are so essential for enlightening the farmers on this important branch of useful knowledge, particularly at the present moment, when the Government of the country is paying their attention on animal husbandry matters on an unprecedented scale. Very likely this book is the first of its kind in Malayalam and the author deserves praise for his efforts.

The book consists of several chapters dealing with different aspects of animal husbandry. There are chapters on different breeds of

cattle, artificial insemination, cattle feed, principles of nutrition, and allied topics. In addition, the book contains valuable information on care and management of pregnant cows, stud bulls, work bullocks, buffaloes, calves etc. The last few chapters deal with dairying and poultry husbandry.

The information contained in the book is essentially practical and, as a result of the author's experience he has been able to offer much valuable and helpful advice.

The book can be strongly recommended to any farmer who is conversant with the language as well as to students in secondary schools having vocational course.

C. K. VELAYUDHAN NAYAR.

ERRATA

Page 215, Abstract No. 2, Line one—Read Herd for Head.

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Editor,

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I. V. J.

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Printed by T. Kannabiran, at The Paramount Press, (Proprietors: Jaya & Co.) High Road,
Triplicane and published by Rao Sahib T. Vinayaka Mudaliar, G.M.V.O., Editor,
The Indian Veterinary Journal, 28, First Street, Vidyodaya East, T'Nagar, Madras 17.