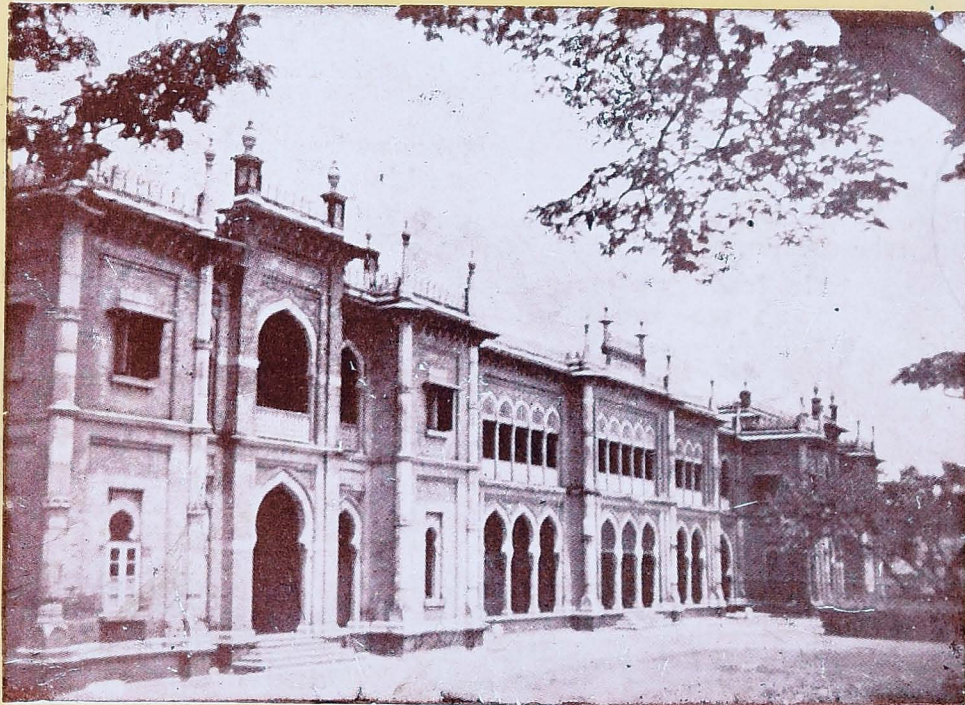


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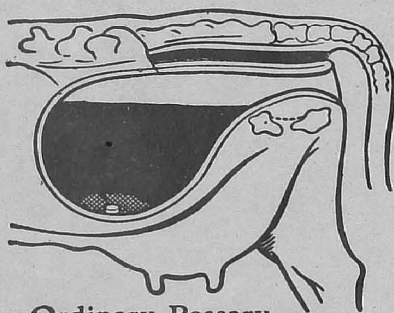
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Volume XV
March 1957

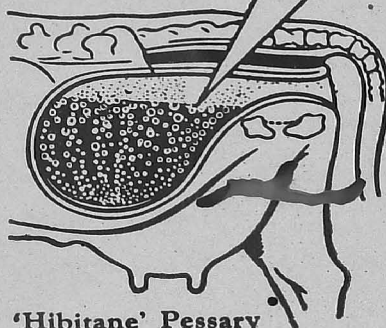


Editor
A. SOMASUNDARAM

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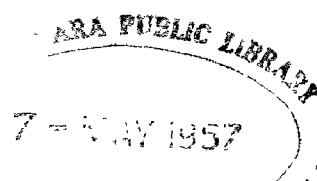
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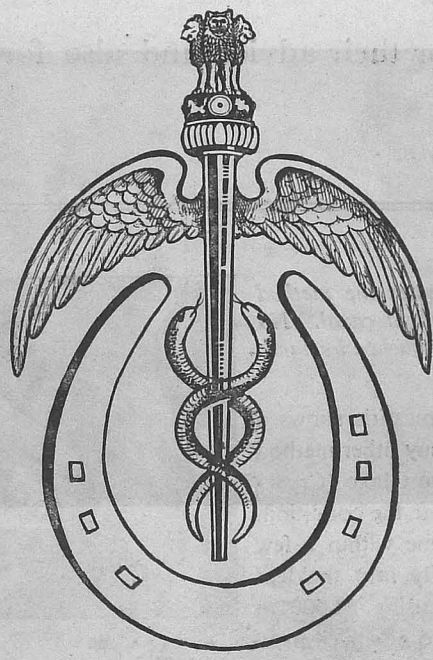
Madras Veterinary College Annual

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ACKNOWLEDGEMENTS

We extend our grateful thanks to the following:

Sri Jambulingam, the College Artist for the Photographs and drawings

Mr. A. Y. Krishna of IV year for the Ranipet group photograph

Mr. Krishna Reddy of III year for the Social Service League photograph

Mr. Narahari of IInd year for the Centenary Exhibition photographs

Mr. S. Basheer Ahmed of IInd year for the Centenary Sports photograph

M/s. Gnanodaya Press for getting the Magazine ready for publication in a very short time.

M/s. Klein & Peyerl for their advice and also for the excellent blocks they have given us.

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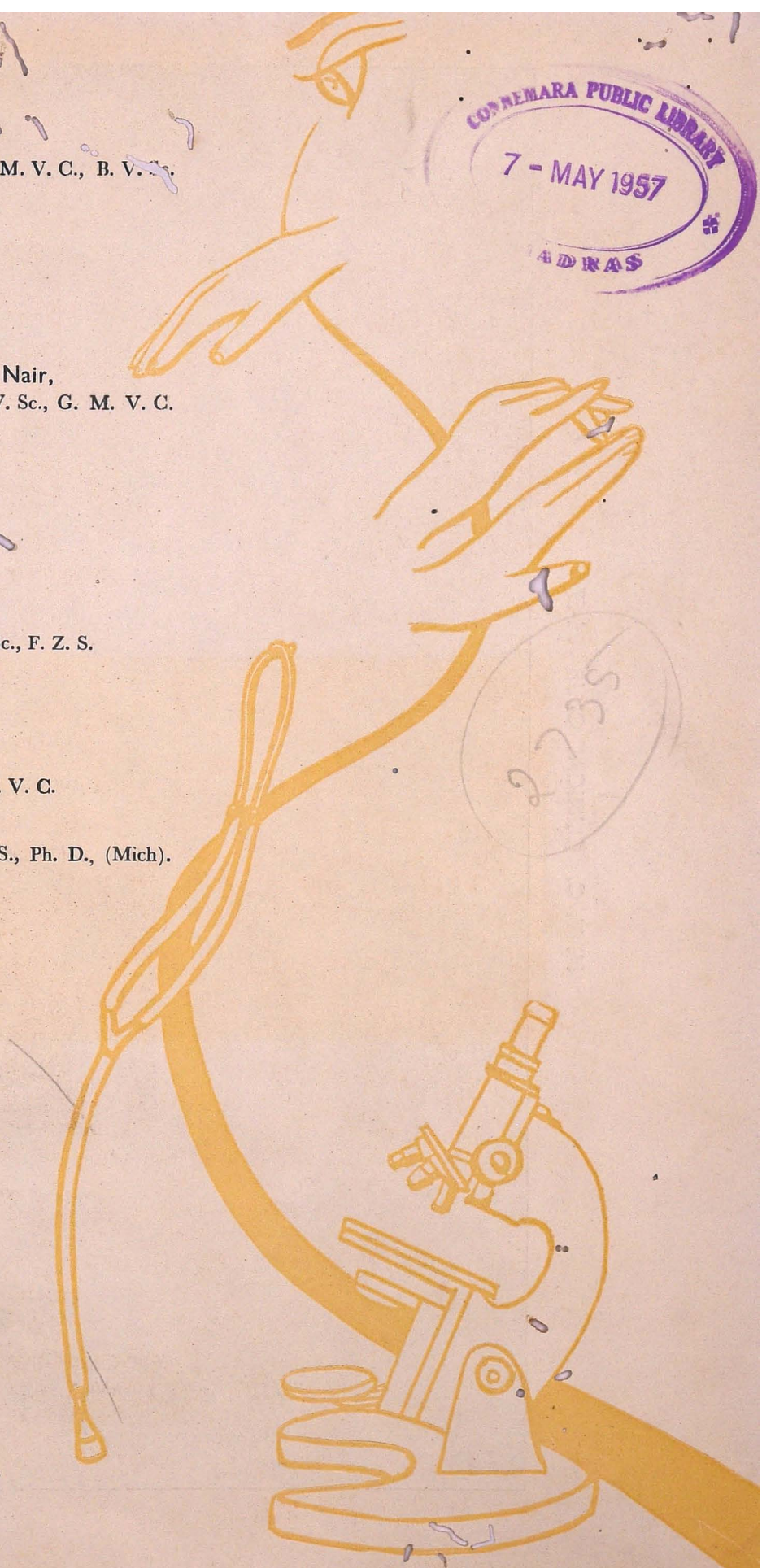
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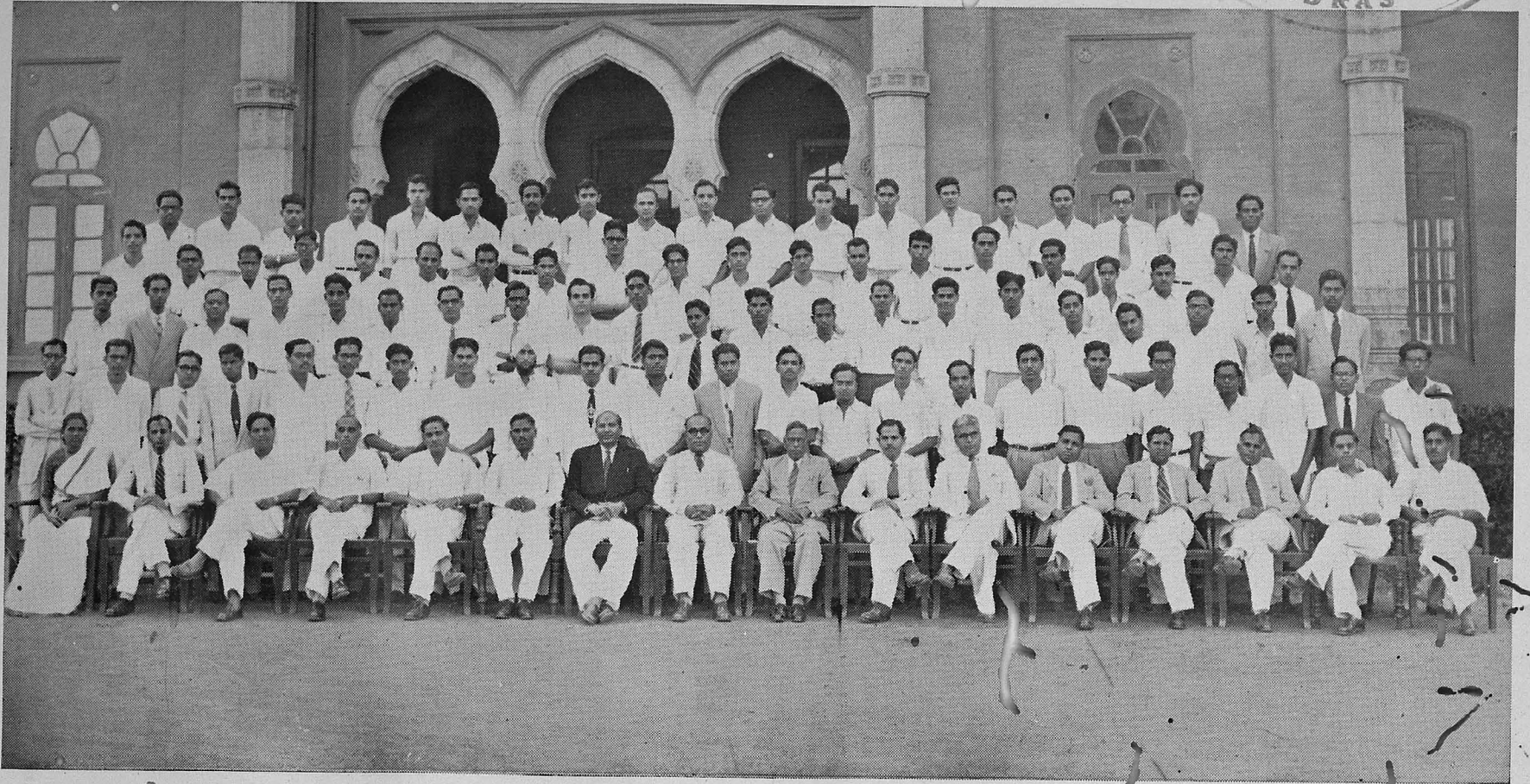
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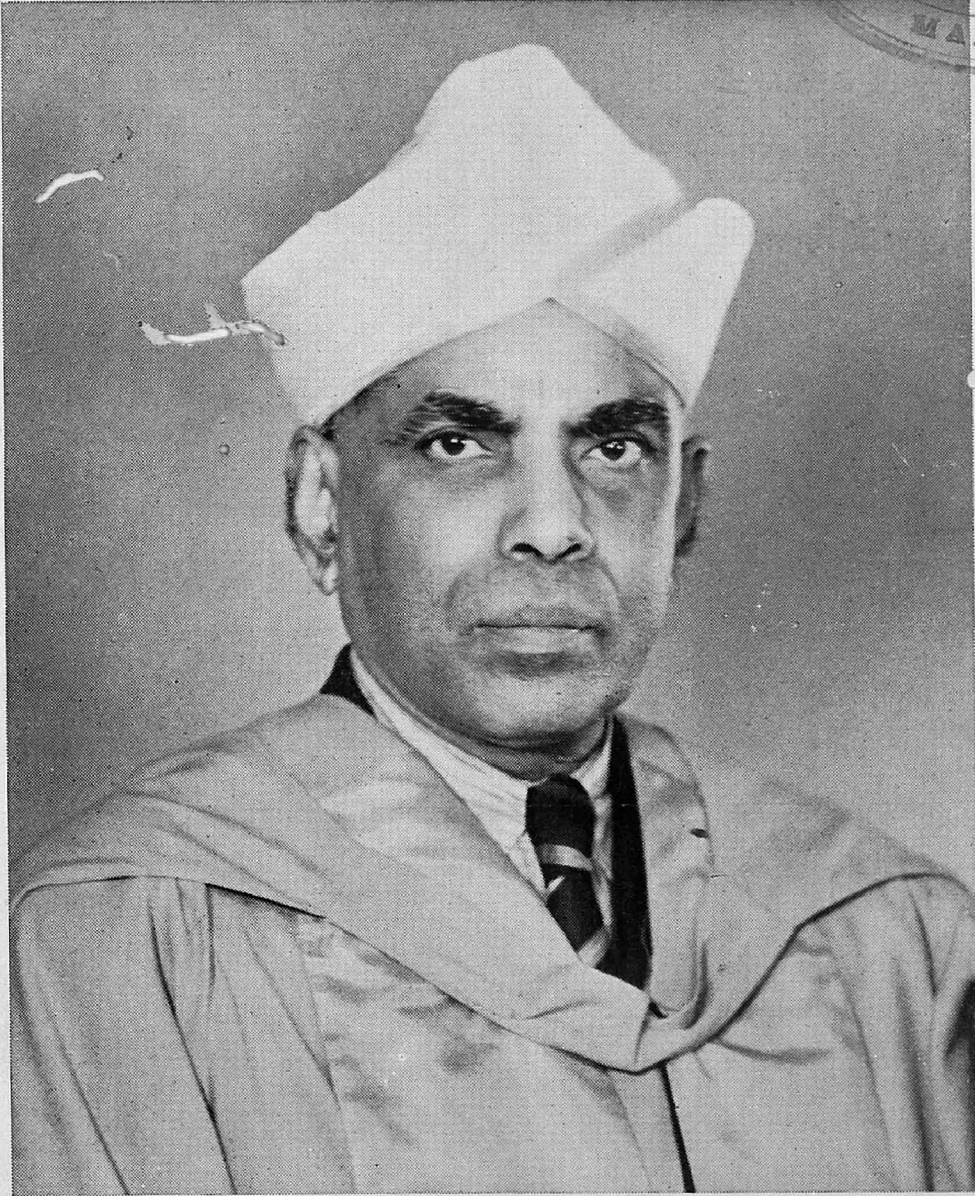
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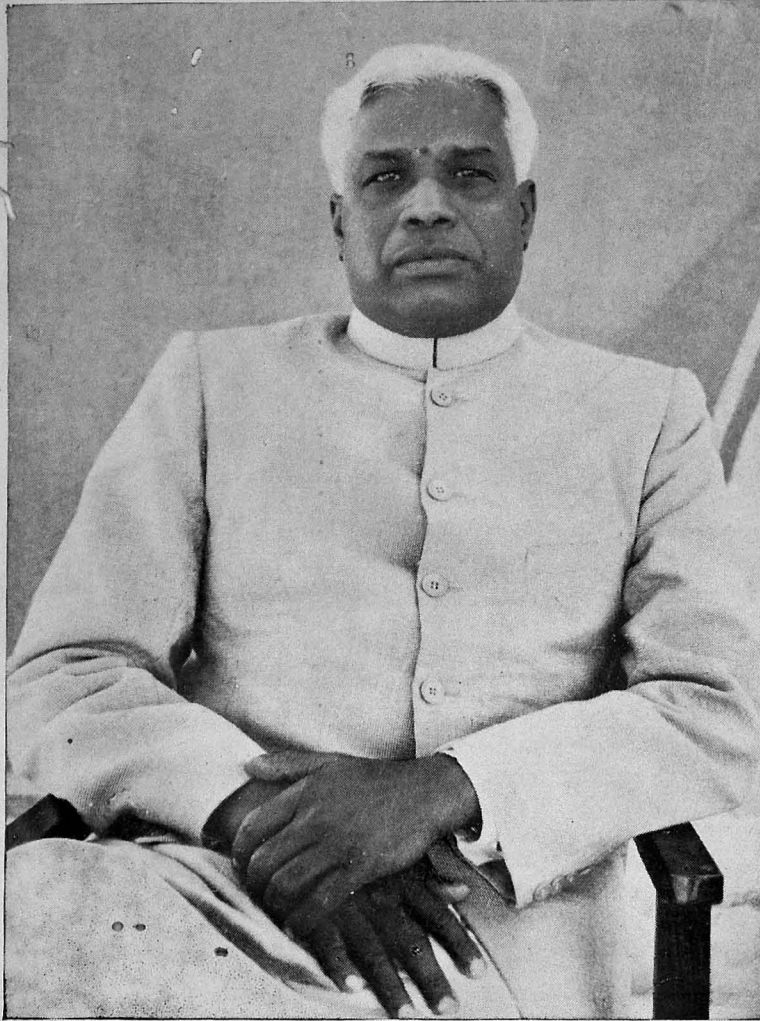


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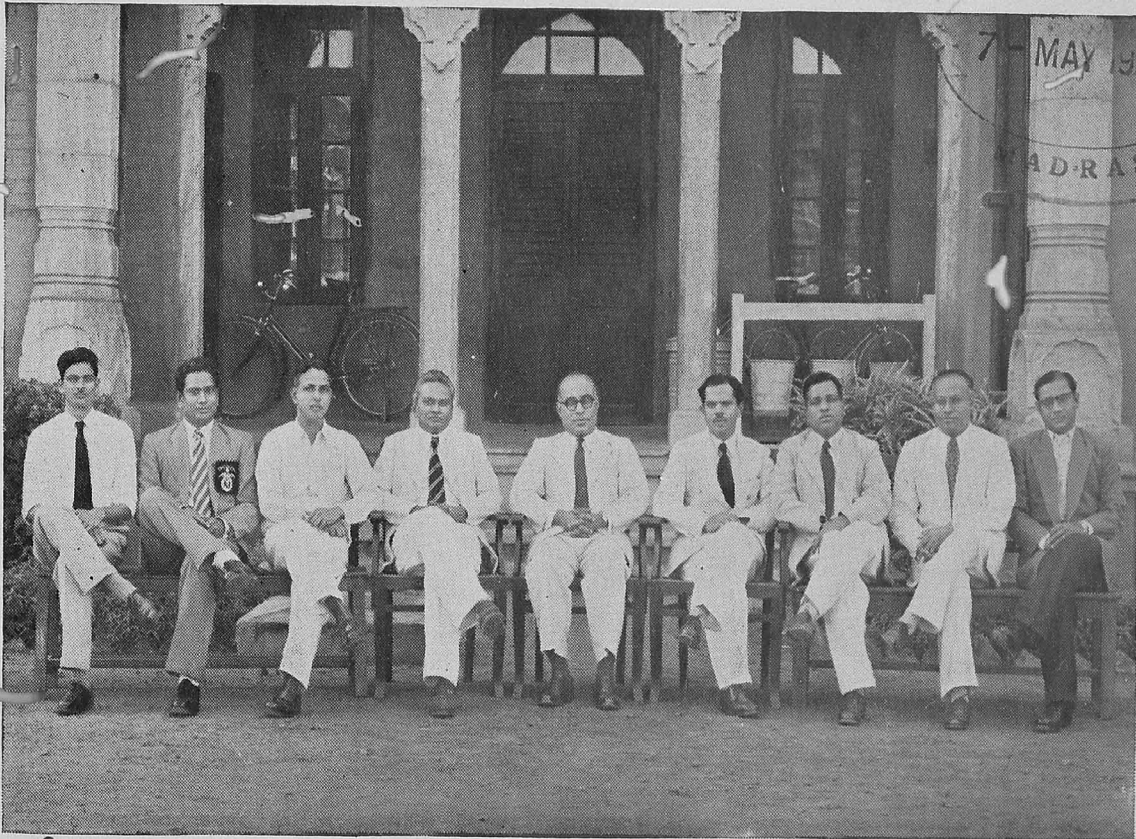


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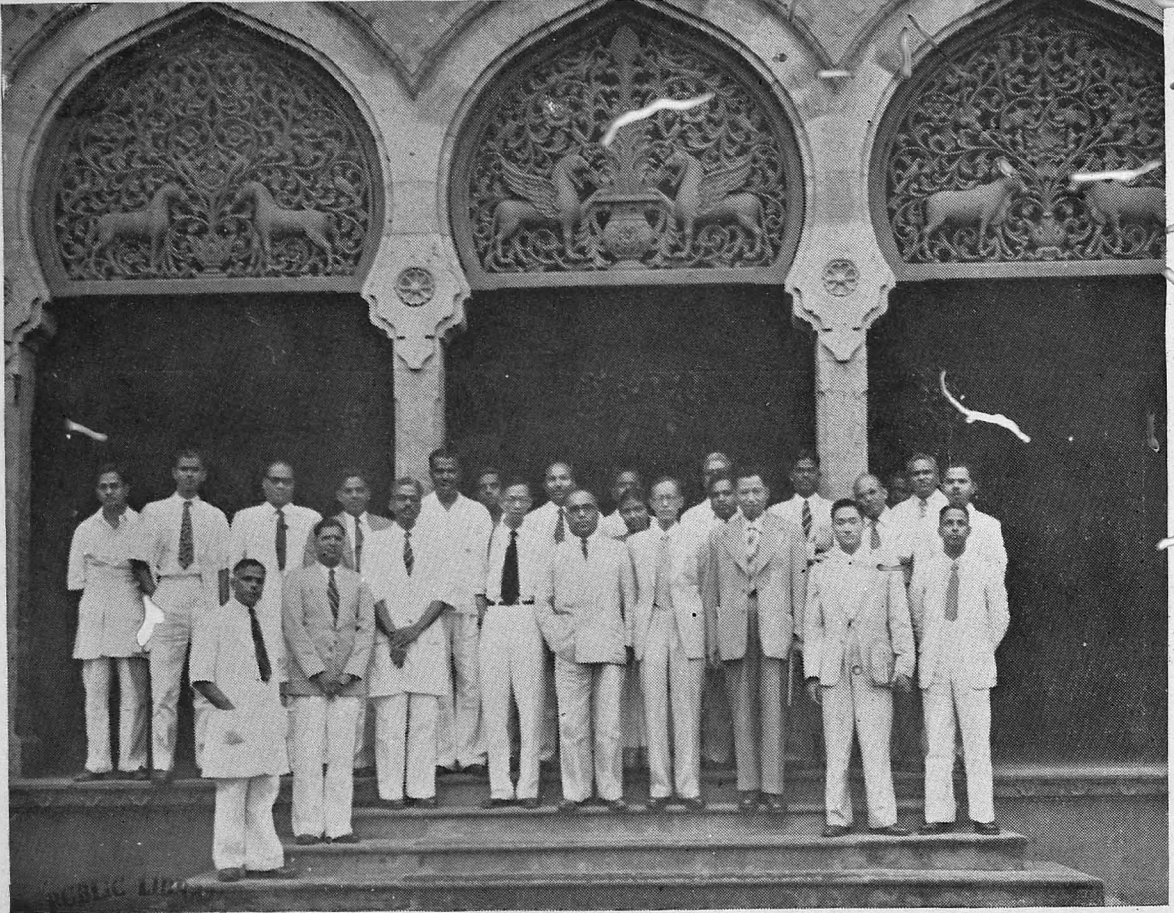
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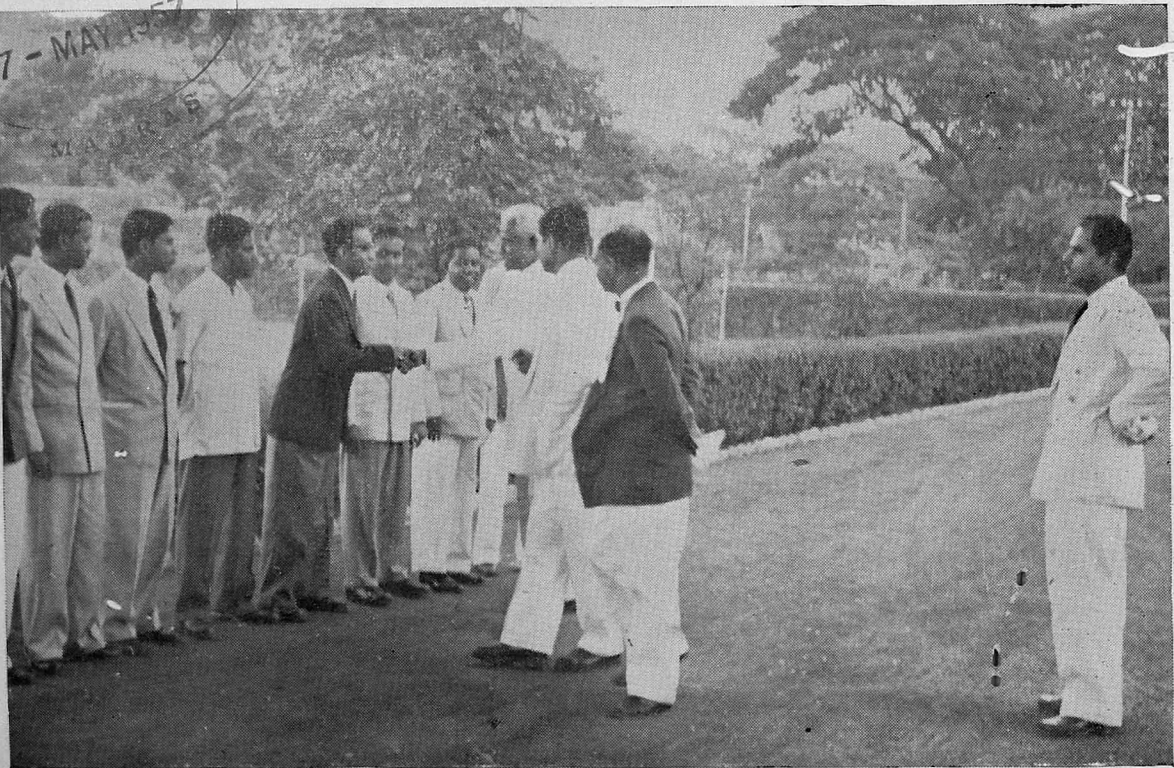


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CHINESE AGRICULTURAL MISSION IN OUR COLLEGE



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Student Chairman introducing the New Graduates to the New Director at the Graduates Reception



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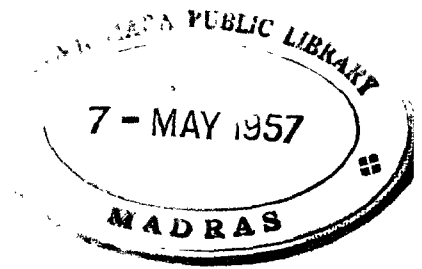
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Editorial



WE are indeed glad to bring out this Fifteenth Volume.

Happily this coincides with the Madras University Centenary celebrations.

Dr. Sir A. L. Mudaliar, the Vice-Chancellor, has rightly called it a noteworthy centenary. Therefore, the organisers spared no pains in celebrating the happy event in a fitting manner with all the pomp and pageantry that such a rare occasion deserved. Facing the famous Marina and adjoining the University Library and Senate House, a huge pandal was specially erected with appropriately decorated gateways. It was indeed, a sight to see. Besides, a highly educative and interesting exhibition also was organised near Engineering College, Guindy. The public of Madras, as expected, responded well. The staff and students of all colleges naturally showed great enthusiasm and readily cooperated with the organisers to make this event a grand success.

The student contribution from our college for Centenary celebrations was about 50 general 100 exhibition volunteers. About 100 of our students took part in the colourful march-past in the Centenary Sports. Many of our students thrilled the spectators in the sports. Our exhibits in the exhibition attracted large crowds. Our students staged an English drama in the Open Air Theatre of the exhibition grounds, which was appreciated by one and all. The way in which our student demonstrators gladly explained the various little known aspects of Veterinary Science has evoked great interest in and respect for the subject in general and our college in particular. The exemplary conduct and the sense of discipline displayed by our students have evoked great appreciation of one and all. We take pleasure in mentioning that we secured a B. Class Shield as a token of appreciation by the Madras University for the excellent exhibition arranged within our stall.

* * * *

Any reference to the Centenary celebrations would be incomplete without mention of the personality of Dr. Sir A. L. Mudaliar. It is indeed a fitting tribute to his genius in Medical Science that the World Health Organisation has elected him as its Vice-President. It is also recognised that he is an eminent educationist. We are lucky to have him as our Vice-Chancellor which makes available to us his profound knowledge and mature thinking in these times of stress and strain.

Finally we should congratulate the organisers on having successfully piloted the celebrations in such an impressive and magnificent manner.

* * * *

Coming to national affairs, there is no doubt that India is making rapid progress in all aspects of its life. Compliments are being rightly showered on us daily by competent and unbiassed foreign experts. But the common man does not seem to have felt the impact of progress, the reason being that the fruits of progressive development have not yet reached him. Some dams have been built; some are nearing completion. And all this could not be done in a day or a year. We hope that by the end of the Second Five Year Plan the

common man will begin to feel the great rebuilding of India that went ahead against all odds.

* * * *

India is admittedly an Agricultural country. Our Government is also aware that industrial progress alone will not suffice. That is why great stress is being laid on agricultural progress also. We believe in balanced progress. Just as machinery and manufacturing plants are required to utilise the available raw materials for industrial progress, we must develop the resources of internal wealth of the country to help the agriculturists. Our agricultural progress depends mainly on the health of livestock and the attendant efficiency of utilising the cattle wealth of India. And here come the Veterinarians. This fact has been recognised as aforesaid by our planning experts in their first and second five year plans. But they have not taken into consideration the most vital factor, and therefore the progress in this field is rather slow.

We may here venture to assert that the attractiveness of the profession is lost because of the low pay scales of veterinarians. Our agriculturists, being poor, cannot afford to pay the veterinarians, and in turn, the veterinary doctors with a few exceptions, who are assured of their pay cannot put their whole-hearted life into their profession. Thus the agriculturist loses the very valuable assistance and advice of a trained Doctor while the doctor in turn does not find an outlet for his knowledge. He just plods on and retires. The net result of all this is the irreparable loss to the country.

Therefore we suggest that a committee of professional and non-professional be set up to probe into this question of increasing pay scales of veterinary doctors so that they may also join hands with the Government in its attempts to make available trained doctors ready for wholehearted cooperation.

The growing demand for veterinarians from Animal Husbandry departments, Municipalities, major Panchayats, Community Projects and National Extension Service schemes all go to show the need for well-paid veterinarians who look upon their official duties as their own and thereby go all out to embrace the Animal wealth of India.

* * *

Also we strongly suggest that a fresh attempt be made to hasten the coming into existence of the All India Veterinary Council. Though this idea has been in the air for a long time, it has not taken any definite shape in spite of the fact that such pooling of energies and knowledge of all the veterinarians is considered essential in the interests of the country.

We are glad to note that out of two persons selected for Fundamental Research in Veterinary Science is one from our college. We hope the Government of India would increase the number of fellowships in all the departments. It is indeed a pleasure to record here that Madras Veterinary College is going to be upgraded into Southern Regional Veterinary Research Institute and that the M.Sc. and M.V.Sc. courses are also to be introduced shortly in our college.

We thank the Government of Madras for granting Rs. 9.8 lakhs for the new hostel for us, which, we are sure, will relieve our long felt need.

* * * *

News: We wish to place on record the visits of these foreign experts to our college :

1. Technical Committee on veterinary Education constituted by the Indian Council of Agricultural Research, New Delhi on 25-7-56, consisting of Sri. L. Sahai, Director, I.V.R.I., and Sri. J. V. A. Nehemiah, Secretary, I.C.A.R.

2. E. J. Long, Leader of the group of Tennessee University Team on 10-8-1956.

3. Members of the Official Chinese Agricultural Science Study Mission on 19-11-1956.

4. A team of Soviet Educationalists who arrived in Madras in connection with Soviet Education Exhibition on 2-1-57.

5. T. W. Gullickson, Department of Dairy Husbandry, Minnosota U.S.A. Animal Nutrition Adviser to the Government of India visited our College on 15-2-1957.

* * * *

We wish to record our deep appreciation of some of the achievements of our students.

1. **Mr. S. Kamalesan:** He is the champion boxer in the Light heavy Weight Class in the Inter-collegiate Boxing tournaments during this year. The spiritual songs rendered by him were so good that Radio Ceylon recorded the same for being played every Monday evenings.

2. Our Foot-ball team during the year under the captainship of Mr. T. Prabhakaran are playing very well and as a result our team won the May & Baker Shield in Inter-collegiate Football tournaments.

3. Mr. Sreedaran, is one of the best foot-ballers of our college. No wonder he represents this college for the second time as a member of University Football team.

4. Mr. S. Dawson, our football player has an uneasy way of putting in goals and savings the situation when everything appears to have been lost.

5. Mr. Md. Ghosullah. He is the runner-up for the pin weight title in both Inter-college and Inter-University Boxing tournaments held during the year.

6. Mr. R. Solomon-He was selected to represent the Madras Division in 1500 Metres race during the Inter-divisional Meet held in the city in 1957.

* * * *

We wish to congratulate the following and place on record our best wishes for their continued success and prosperity.

1. Dr. M.C. Chellam who has been promoted as Deputy Director of Animal Husbandry, Key Villages Scheme, after his return from Stockholm. We are fortunate to receive lectures for the first time from him on the subjects of Gynaecology and Obstetrics.

2. Dr. G. Venkatachalam, formerly Superintendent, Livestock Research Station, Hosur Cattle Farm, an ex-editor of our Association, has come back to our college as Research Officer in Nutrition. We have no doubt that his knowledge of the subject coupled with his mature experience, will be a great asset to our college.

3. Dr. V. Ratnasabapathy, who recently returned from U.S.A. after receiving Ph. D. in Animal Husbandry, has been promoted as Lecturer in Animal Husbandry, Agricultural College, Coimbatore. He was also the official foreign delegate representing Missouri University, U.S.A. at the University Centenary celebrations.

4. Dr. S. Damodaran, who recently received M. Sc. from Madras University, has been promoted as Lecturer in Department of Anatomy.

5. Dr. Sanjeeva Rao, a Research Scholar in Department of Animal Genetics, who has recently joined the Madhya Pradesh State as Assistant Research officer (Poultry).

6. Dr. G. S. C. Ranga Rao, the Rao Bahadur Dr. R. Swaminatha Ayyar Surgery Medalist 1956, who has recently joined the Veterinary College, Mhow, as Research Assistant.

7. Dr. Venkatakrisnan who was recently the recipient of the Government of India Fundamental Research Scholarship in Animal Nutrition.

8. Sri P. U. Narayanan, our Physical Director, attended and successfully returned from the Hockey coaching camp at Lucknow sponsored by the Ministry of Education (India) as the nominee of Madras University.

9. Dr. V. Ugamaheswaran who was our Asst. Lecturer in the Department of Surgery, left Madras during the year for Hannover (Germany) for higher studies.

* * * *

Finally we wish to place on record our deep sense of gratitude to the following :

1. To our Principal, Sri Bertie A. D'Souza and Sri M. S. Ganapathy, Warden, Madras Veterinary College hostel, for leaving no stone unturned and for taking personal interest in securing such a huge grant of Rs. 9.8 lakhs for the new hostel block.

2. Dr. F.D. Wilson, our Lecturer in Flaying, and Meat Inspection who has recently given an Endowment under University of Madras of Rs. 2,000/- for the award of a medal in memory of his father late Dr. A. J. Wilson, to the best student in the subject of Meat Inspection. We are glad to note that he has adopted such a method to create more incentive among the students. We sincerely thank him for the love he has for the Veterinary students in general and the profession in particular. We are sure our students will rise to the occasion and live upto his expectations.

* * * *

Speaking of ourselves : In conclusion we wish to say a few words about ourselves i.e. the Editorial Section.

We have been fortunate in obtaining interesting articles from a good number of competent persons to write on different subjects. On the commercial side, we are proud to say that the advertisement revenue of this volume has broken all previous records. This has enabled us to donate on behalf of the editorial section a curtain for our Open Air Theatre. As an incentive for more and better articles in future, we have revived awarding medals for best contributions of articles from students.

Our term of office will come to a close with this issue. Myself and my associate take this opportunity to record our thanks for the kind cooperation we have received from all quarters which made our work light and pleasant. We shall be failing in our duty, if we do not express our gratitude to the Editorial Board, to our President, Dr. Bertie A. D'Souza and Vice-President, Dr. K. P. Chandrasekharan Nair for their advice and guidance in times of need.

JAI HIND.

Somasundaram, A.

A RETROSPECT OF THE YEAR 1956-'57



The academic year is coming to a close. Over 80 seniors will take ^{the} Final qualifying examination this year, and we wish them the best of luck and a bright future. Qualified personnel are in need today for the various animal husbandry schemes calculated to improve livestock and increase essential foods like milk, eggs and meat. Incidentally the problem "after qualifying, what next?" need not disturb the young veterinarian as the scope for employment is large and varied in the great adventure of our nation-building endeavour. So it is the pattern of the course and training in the college ~~that~~ reflects the needs of the country and this is programmed and shaped from time to time ^{to} provide the kind of technical personnel, who are scarcely available for the urgent work.

There is dearth of qualified veterinarians in the whole country. The many schemes of the Second Five Year Plan await implementation and are faced with the problem of this acute shortage of technical men. The Indian Council of Agricultural Research with assistance from the Central Government, have come forward to assist and strengthen the old Veterinary Colleges like ours to admit more students. The financial aid so promised, is to defray the expenditure involved on a building programme for hostel, class rooms and laboratories and the provision of equipments and apparatus to meet the increased teaching load and additional staff. We are thankful to the Indian Council of Agricultural Research for the generous help it has given, for the first time to this old college, which has done so much for the cause of veterinary education in the whole country during the past fifty years. The admission of students to this college which remained at 80 in 1950 has been raised to 100 in the academic year 1955-56, and to 120 in the year 1956-57.

It is well recognised that a cheaper agency of technical personnel, in the nature of stockmen are quite essential to assist the Veterinary Assistant Surgeons in the various livestock schemes and cattle disease control endeavours in this State. With this in view, admission to the Stockmen School at Hosur, for the course of 11 months duration, was doubled and, 100 students were admitted during the year. But, as the number of students admitted were found too inadequate to meet our needs, two additional schools were opened, one at Pudukottai and another at Orathanad in Tanjore district, each with 50 students. In all above 200 students are trained for the Stockmen profession at the three schools functioning under this College.

In addition, to provide technical men with advanced training in Veterinary Parasitology, a Post-graduate course of one academic year was introduced in this college with a grant from the Indian Council of Agricultural Research. This is a comprehensive course specially designed to train veterinarians for the survey and control of parasitic diseases in domestic animals. The first batch of six students from all over India took the course and another batch of five students drawn from different States are now under training.

In addition a number of junior staff members and a few students are working in various departments for the M. Sc. degree and one for the Ph. D. by research. Besides a post-graduate degree, the M. V. Sc. Degree course of two academic years, has since been passed by the Board of Studies in Veterinary Science, in the University. It is expected that the regulations and syllabus for the M. V. Sc. Degree course will receive the approval of other academic bodies and the course will be introduced in the college for the benefit of the veterinary profession, thus offering exten-

siye facilities hitherto lacking for veterinarians, for post-graduate education in this country. Consequent to the changes recently introduced in the scheme of University education, the students wishing to pursue the professional courses of Veterinary, Agriculture, Engineering and Medicine, will undergo a year's pre-professional course in the respective professional colleges from the academic year 1957-58. The subject for study prescribed for the pre-professional course in Veterinary Science will be Chemistry, Physics, Botany, Zoology, English and Statistics, and in consequence the present duration of four years and one term for the course of B. V. Sc. in this college will be raised to five years and one term from the next academic year. Taking advantage of the Regional Sterility scheme introduced in this college, a separate department for Veterinary Obstetrics and Gynaecology, is being built up. The Final Year students now receive special instructions in the theory and clinical work in Veterinary Obstetrics and Gynaecology by the Regional Sterility Officer.

Though the various subject-departments of the college have outgrown in size, there has not been a proportional increase in the facilities, by way of accommodation. This position is further aggravated by the increased admission of students and an increase in teaching staff and teaching load. We are grateful to our Government for appreciating our needs and for their generous sanction of Rupees Seven Lakhs for a three-storied building to accommodate six departments of this college, and another Rupees Ten Lakhs for the construction of a suitable hostel to relieve the acute congestion and increase the accommodation for the students. To relieve the immediate unhealthy congestion of students in the hostel, pending the completion of the new buildings, Government have been pleased to sanction a generous loan to repair and reshape the existing temporary building in the newly acquired grounds for hostel purposes. This work is being completed fast and will help a great deal to ease the difficult problem of accommodation. The foundation stone for

the new hostel was laid by Hon'ble Sri Bakta-vatsalam, Minister for Agriculture on the Hostel Day and the foundation stone for the college buildings was laid by the Minister for Finance, Hon'ble Sri C. Subramaniam, on the College Day. The work on both these buildings are in progress. We hope that the buildings programme will receive the earnest attention of the P. W. D. and the work would be expeditiously completed, so as to relieve the acute inadequacies in laboratory and class room space, the college is facing.

The Open Air Theatre which was completed by the manual labours of our students and declared open by our Chief Minister, was further equipped by the students this year. Having obtained funds for electrification, the theatre will be electrified and will be available to the students for the full expression of their histrionic talents. It requires no gain saying the fact that by this endeavour our young friends have demonstrated the value and dignity of labour and they have come forward to take up another project in the value of Hall-cum-Auditorium.

The Department of Radiology has been provided with a modern high powered plant for both diagnostic and therapy work in Veterinary aid. This happy position now permits us to offer better service to the growing clientele that attend our hospital and it facilitates our staff to take up research in this field of veterinary science. A new radiology block is under construction and would be available for use from the next academic year, when the above department will be put to the maximum use. Incidentally the college will be first of the kind in the country to have the above facility for research and study in this field of veterinary science.

The small animal operation theatre has been equipped with the receipt and other equipments, the modern hydraulically operated operation table, which was designed and made by the college. The large animal operation theatre is now receiving attention. We are looking forward to the arrival of the Winsot's

operation table, and are planning and designing the model for a hydraulically operated large animal obstetrical table for the Obstetrics and Gynaecology department. We have been fortunate this year to have been the recipients of a generous grant for the purchase of additional apparatus and equipments for the various departments. Another generous grant was specially available to equip the Animal Nutrition department to take up research on different problems confronting the entire State. While no efforts are spared to have the departments equipped with the resources made available, the unexpected Middle-East crisis has hampered our endeavours a great deal.

We are particularly grateful to the American Technical Cooperation Mission for the most unexpected assignment of a few equipments to this college very recently.

In keeping with the developments in the college, eleven departments were graded to Professors. In connection with increased teaching, 2 Lecturers, one each for Physiology and Anatomy, were appointed in addition to a number of Assistant Lecturers. Two more Lecturers, one for Surgery and another for Medicine will be filled up in the next academic year. A separate Professor for the subjects of Therapeutics and Toxicology, will be appointed in order that this subject may receive greater attention in teaching and research. We look forward to the motor ambulatory clinic, so as to give our students opportunities for veterinary and animal husbandry extension work in neighbouring rural areas taken up under Community and National Extension Service Blocks. The new college bus, in place of our old one, which is now out of commission, is now available for the student tours and transport in comfort.

Most of the departments of the college have on hand the respective problems of research, besides teaching. The results of some of the work were published and others will be released. Two University post-graduate students have completed their work and we wish them a bright future. The Government of India

have assigned two senior Fellowships of the value of Rs. 200/- for fundamental research in this college. The scholarships have been allotted to the department of Animal Nutrition and Veterinary Pharmacology this year. We hope it will be possible for the Government of India to grant six Fellowship to this college every year to encourage worthy men to pursue fundamental research in this important field of animal husbandry and veterinary science.

Our library is being enlarged to meet the growing needs of the under-graduate and post-graduate students. The library service is now open to students and staff from 10 a. m. to 8 p. m. every day.

Our University Centenary celebrations were conducted on a very large and magnificent scale under the leadership of our distinguished Vice-Chancellor, Dr. Sir A. Lakshmanaswamy Mudaliar. We are happy that our students and staff actively associated in the various functions and also contributed a substantial donation. On the occasion of this Centenary Celebration, it was very generous of Sri F. D. Wilson, Lecturer in Meat Inspection and Flaying, to institute an Endowment for a sum of Rs. 2,000/- in the name of his late father Dr. A. J. Wilson, for a prize in Meat Inspection to the best student in the Final Year. We gratefully appreciate this gesture of Sri F. D. Wilson and we thank him immensely for the substantial sum. I am sure the Madras Veterinary College will always remember him, through posterity.

For the first time in the history of our college we have endowments for a prize in every subject, in the Final year to be awarded by the University at the annual Convocation. The college participated in the University Centenary exhibition and mainly through the efforts of our staff and students it was a great success, leading to the award of a Silver Shield. The entertainments given by the college students were highly appreciated at the various Centenary functions, and every one of these actors, musicians and songsters deserve special congratulations for their natural talents.

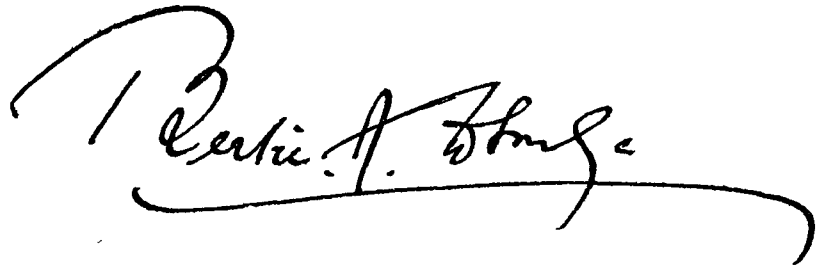
In the college sports men have made a record this year in most of the inter-collegiate sport meets. The college Foot-ball team deserves special recognition and congratulations for the uniform success it had in all the league matches and their signal success in seizing the much coveted "May & Baker" Shield this year.

This year will be remembered for another important event namely the support the Tennessee University proposes to give under the American T. C. M. Arrangement to the Southern Regional Veterinary and Agricultural Colleges. Under this arrangement the above American Land Grant College proposes to help us to strengthen our teaching departments and the Faculty by supplying equipments and books and providing senior teachers of this

college with opportunities for learning in America.

We Welcome, Dr. Erren J. Long and L. D. Horlacher, among us. These two genial personages experienced and well known professors in their respective fields, are already in our region and are doing their best to further the objectives of the T. C. M. and Tennessee University arrangements..

The year has been encouraging and bright. A very busy and active one though—I am sure, that given sympathy and more appreciation, we will keep aloft the good reputation of the Madras Veterinary College for its standards and service to the improvement of livestock and development of animal industries in the South.



Principal

MADRAS VETERINARY COLLEGE.

Address by Dr. M. S. RANDHAWA, D.Sc., I.C.S., F.N.I.,
Vice-President, Indian Council of Agricultural Research, New Delhi
Delivered on the 22nd November, 1956 at the 27th Meeting of the
Advisory Board of the Indian Council of Agricultural Research.



Gentlemen,

I have great pleasure in welcoming you to the 27th meeting of the Advisory Board of the Indian Council of Agricultural Research. A number of significant changes in our organisation have taken place since our last meeting. Coordination between the commodity committees and the I. C. A. R. has been stressed for long. This has now been achieved by the enlarged Board of Research and Extension which apart from containing the specialists of the I. C. A. R. has also as members the Directors of Central Research Institutes, the Directors of Commodity Research Institutes as well as the Secretaries of the Commodity Committees. The utility of this Board on the extension side would also be greatly increased when the representatives of the Ministry of the Community Development are also included. The newly constituted Board has already made a list of results of research schemes which have been completed and which can be passed on to extension workers for general adoption. It has also indicated the items on which work may be intensified and has further indicated the problems on which research schemes should be initiated. It has further recommended that the results of research schemes of the Centre as well as of the States should be classified under two categories, viz. (i) those which can be passed on to research workers and agricultural extension workers and (ii) which can be passed on to Village Level Workers and farmers.

Gap Between Research and Extension

The gap between research and extension is pointedly indicated by a number of facts.

Though it has been known since 1945 that paddy straw washed with water and reinforced with lime becomes a palatable and nutritious food for cattle, no effort has been made to disseminate this finding in practice. Breeding of wheat which is resistant to all the three rusts is one of the major achievements of the I. A. R. I. If the hill areas are saturated with rust resistant wheat, the incidence of rust on wheat in the plains would decrease which will result in a very large increase in the production of wheat. Similarly, saturation of other areas with high incidence of rust with rust resistant wheat seed would also be of great value. It is unfortunate that no steps have been taken by the States to multiply rust resistant wheat seed according to their requirements. There are a number of findings of research workers which are of practical value and which have not reached the farmers on a sufficiently large scale. If we apply the findings of our research schemes on a large scale there will be a sizeable increase in food production. This indicates the need of closer liaison between Research and Extension organisation.

Liaison Between Research and Extension

It is very necessary that a close liaison is built up with the staff of the N. E. S. from Development Commissioners down to the Village Level Workers on one side and the research staff of the I. C. A. R. the States as well as of the Commodity Committees. It was with this object that the Development Commissioners of some States have been requested to attend the meetings of the Commodity

Committees such as the Indian Central Jute/Coconut and Lac Cess Committees. It has further been recommended by the Board that the results of research work in agriculture as well as on animal husbandry, whether done under the I. C. A. R. or the Commodity Committees, should be compiled subject-wise, crop-wise and State-wise and published in the form of booklets and widely circulated among the extension staff as well as agricultural colleges and agricultural staff of the States.

Regional Research Stations

Another field in which coordination between the I. C. A. R. and the Commodity Committees is necessary is that of research. I am glad that a scheme for regional research stations and sub-stations on cotton, millets and oilseeds has been drawn. These are rotation crops and as such an arrangement of this nature is possible. This will not only enable us to tackle agricultural problems relating to those commodities on a regional basis but at the same time will ensure efficiency and economy in expenditure. Moreover, research on cross-commodity problems would also be carried out on a rational basis. These regional stations would also provide coverage for fundamental research applicable to wide range of agro-climatic conditions.

Research Workers and Farmers

It is unfortunate that some of our research workers still live in ivory towers. It is very necessary that the research workers should no longer remain isolated from farmers. In China, I am told, the research worker occasionally spends a part of his time in the villages and stays with the farmers so that he can have a better appreciation of the field problems. His whole outlook and mind get attuned to the difficulties of the farmer and this guides his attitude towards research. Our research workers should also visit the villages and see the cultivation practices of progressive farmers. Only by watching the work in the field that they would be able to improve the farmers' agronomic practices. Thus they would be in more intimate touch with

the farmers and their problems. It is also necessary that the research workers instead of depending upon farm assistants also handle some of the agricultural operations personally.

Agronomy

Although extensive research has been carried out in the past, there are still great deficiencies in our knowledge of correct agronomic practices which can be recommended to growers. Dr. A. B. Stewart, in his report on Soil Fertility Investigations in India, had particularly made a reference to these deficiencies, and had suggested that an attempt should be made to translate the results of agronomic experiments conducted on Government farms into cultivators' practices. The Indian Council of Agricultural Research prepared a scheme for simple manurial trials on cultivators' fields but as these trials did not have a wide coverage, the results did not come up to our expectations. A revised plan has now been prepared in which provision has been made to carry out simple fertiliser trials on cultivators' fields on the basis of the existing information. The object of these trials is to prepare manurial schedules suitable for different agro-climatic regions of the country. The scheme will also help in demonstrating to the farmers the suitability of new fertilisers, namely, uria, ammonium sulphate nitrate, calcium ammonium nitrate, etc to be manufactured in the country.

The council has also prepared a plan of model agronomic experiments to be conducted in different parts of the country. This scheme envisages investigations on irrigation-cum manuring, the residual effects of fertilizers, rotation-cum-manuring, phosphatic manuring of legumes, fertiliser placement, seed rate, spacing, etc and will deal with six major crops, namely, paddy, wheat, jowar, maize, oilseed crop and cotton. Thirty-four centres have been selected on the basis of soil-climate complex with special reference to the requirements of the river valley and other irrigation projects. The results of these experiments will enable us to make the best use of irriga-

tion water in combination with fertilisers and other agronomic practices.

Planting Distance

It is desirable that the optimum distance between plants and between rows in respect of each crop is worked out by the Agronomists. The square and rectangular system of planting has been found useful in crops such as paddy, jowar, etc. In small holdings much work is largely done by manual labour and this system of planting can be very paying. In any case this is an item which should figure prominently in agronomical research programmes in respect of various crops.

Fertilizers and Organic Manures

During the 1st Five Year Plan period the consumption of sulphate of ammonia rose from 2.8 lakh tons in 1951 to 6 lakh tons in 1955. By the end of 2nd Five Year Plan period, it is proposed to raise the consumption of nitrogenous fertilizers to 18.5 lakh tons in terms of sulphate of ammonia. No doubt, the application of nitrogen in the form of chemicals is useful but it is desirable if the chemical fertilizers are used in conjunction with organic manure. The practice of green manuring should be increasingly popularised. Cultivation of green manure shrubs such as *Sesbania* and *Glyricidia* along the boundaries of fields in suitable areas should be widely popularised. Prejudice against the use of human organic waste as manure should be conquered. It is estimated that one person yields 1 kilogram of nitrogen per annum. From this source alone 36 crore kilograms of nitrogen would be available which is equivalent to about 30 million tons. For effective utilisation of human organic waste it is desirable that a large scale programme of trench latrines is carried out in villages, in the community project and N. E. S. areas. The sewage of the town which in the case of town like Bombay goes to the ocean should be utilized for agriculture. Unless man returns to the soil what he has taken from it, soil fertility would certainly go down.

Deep Water Paddy for Pits along Railway Lines

I am glad to note that there are some schemes on deep water paddy. There are a large number of pits along the railway lines in a number of States which can be used for cultivating deep water paddy. Already useful work in this direction has been done in Assam and West Bengal, and in other States also it is desirable that deep water paddy is developed. This alone will give a measurable increase in our food production.

Regional Research Stations for Horticulture

The Indian Council of Agricultural Research have accepted the recommendations of the Horticulture Committee for intensification of research on the more important fruits grown in the country. According to this recommendation, the country has been divided into five agro-climatic regions so that the problems of basic research would be dealt with at the fruit research station to be developed in each region. In view of the varied nature of the problems and the number of fruits to be investigated in the different regions, a number of sub-stations will also be set up in each region in cooperation with the States concerned. The chief officer of each regional station will be primarily responsible for framing the research programme of the region in consultation with the State horticulturists and will also provide higher technical guidance. The following five Regional Research Stations will be developed.

1. Southern Tropical Zone

Main Station at Kodur (Andhra Pradesh) with a sub-station each in Mysore and Madras;

2. Central Tropical Zone

Main Station at Poona with a sub-station at Nagpur;

3. North-Eastern Sub-Tropical Zone

Main Station at Sabour (Bihar State) with a sub-station each in Assam and West Bengal;

4. North-western Sub-Tropical Zone

Main Station at Saharanpur-Rishikesh with three sub-stations - one each in eastern Uttar Pradesh, Punjab and Rajasthan ;

5. Northern Temperate Zone

Main Station at Mashobra (Himachal Pradesh) with a sub-station each in the Punjab and Kashmir.

All-India Fruit Shows

All-India Fruit Shows are now being held under the auspices of the Indian Council of Agricultural Research. An Exhibition Officer (Hort.) has been appointed for this work. During the current year two Shows have been held. The first All-India Grape Show was held at Hyderabad and the first All-India Citrus Show has recently been held at Bangalore. Another Citrus Show will be held in New Delhi about the end of December this year. These Shows are very popular with the fruit growers, attract a large number of visitors, and have provided stimulus to horticulture.

Awards for Horticulture

To encourage proficiency in fruit growing the Indian Council of Agricultural Research has formulated a fruit crop competition scheme for judging the best orchards in the country. Judging would be done not only on the assessment of the crop yield but also on the standard of fruit growing practised by the fruit grower. A uniform procedure of judging would be adopted both at the State and the All-India levels. Growers of important fruits like mango, sweet, orange (Malta, Mosambi, etc.), santra, orange, banana and apple will participate in these competitions. The best grower will be given a certificate of 'Udyan Pandit' each year, like the certificate of 'Krishi Pandit' awarded in crop competitions. He will also be awarded a cash prize of Rs. 5,000/- for this distinction.

Floriculture Committee

The subject of ornamental gardening which has been very much neglected has at last been

given its due place in Horticulture by the organisation of the Floriculture Committee for which step credit is mainly due to our Minister for Food and Agriculture, Shri A. P. Jain who comes from the garden growing district of Saharanpur and takes deep interest in horticulture as well as to Dr. P. S. Deshmukh, Minister for Agriculture who has also appreciated the necessity of giving due recognition to this subject. The Indian Council of Agricultural Education at their last meeting held at Lucknow in August, 1956, recommended that landscape gardening should be introduced in the syllabi of Agricultural Colleges. As the Floriculture Committee has only recently been organised and a number of States were busy with their reorganisation plans, the number of schemes which were received for consideration were comparatively few. However, a start has been made and I believe other States will take interest in this subject as well. In the State of Assam with its plentiful rain fall and wide and varied flora, there is considerable scope for building up an ornamental garden with an orchid house in which collections of orchids from Sikkim, Bhutan and Assam can be placed. Apart from these, plants like Azaleas, rhododendrons and camelias, exotic as well as indigenous, can also be collected in the garden. Such a collection would become very important in few years and the place where it is housed will become Mecca of botanists as well as lovers of flowers.

Animal Husbandry

Animal husbandry development, by its very nature, is a more complicated and much slower process, and the results are often difficult to achieve and seldom so spectacular as in plant husbandry. Consequently, great amount of strenuous labour and patience are required not only in the planning and execution of research in animal husbandry problems but also in the application of the results of researches. Nevertheless, we must gear up our machinery for research as well as development so as to ensure that one is not divorced from the

other. Thus, our research programme should be realistic enough to quickly provide the answers and the techniques for the efficient implementation of our development plans, and the latter should be based on sound lines and yet be sufficiently elastic to permit of maximum advantage being taken of the knowledge and results obtained through the researches.

The ultimate goal of animal husbandry research and development is preservation of our livestock and livestock resources and their progressively increasing improvement and exploitation for the benefit of mankind. We have, accordingly, to devise ways and means of not only maintaining our animals in a state of sound health and protection from diseases but also increasing their protective capacity as quickly as possible.

Disease Control

Some decades ago the toll taken by diseases was so heavy that it had become impossible to even think of planning any concerted programmes of improving our livestock breeds. Naturally, therefore, veterinary research in earlier years was directed chiefly towards acquiring a better understanding of animal epizootics and developing efficient methods for combating them. We may well be proud of our many achievements in that field when we recall such noteworthy examples as the progressive improvement in the methods of immunization against our livestock enemy no. 1 - rinderpest - culminating in the production of the goat tissue vaccine and the visualisation of its complete eradication from the county with the help of that vaccine, and the development of an efficient vaccine for immunizing poultry against Ranikhet disease, which had once threatened to annihilate organised, poultry farming in particular and our poultry in general. During recent years we have seen the development of more efficacious vaccines for many other diseases, like haemorrhagic septicaemia, fowl pox, fowl spirochaetosis, which are only a little less important than rinderpest and Ranikhet disease. You have now before you a number

of schemes pertaining to disease problems, and I am sure you will agree that most of these problems deserve our immediate attention.

Rinderpest Eradication Scheme

Our 'pilot' scheme for the eradication of rinderpest, which was in operation in the Southern India, has now given place to the All-India scheme for eradicating the disease from the country. The 'pilot' scheme has given us much valuable experience, and we are now confident of achieving our objective during the course of next 2 or 3 years in all the States. It is, however, important that no State should lag behind, and I trust every State Government will attend to this task with the priority that it deserves. Eradication of rinderpest from India is a project of very great magnitude, the like of which has probably not been undertaken before in any field of human endeavour. The invaluable economical and other benefits that are likely to accrue from a successful attainment of the objective, for all times to come, cannot be measured.

Animal Nutrition

In the field of animal nutrition we have already acquired a considerable amount of useful knowledge about the food requirements of our animals for maintenance of health and for the various forms of production, such as work, milk, eggs, wool etc. Researches conducted in India have taught us that the standards prescribed in western countries do not strictly apply to India, and we shall have to study all aspects of animal nutrition under the conditions obtaining in the different parts of the country and under varying conditions of climate and agricultural practices. Under a co-ordinated schemes financed by the I. C. A. R., three Regional Nutrition Research Stations have already been set up, and it is hoped a fourth station will start functioning soon. The proposals of the Second Five-Year Plan also include the setting up of four Regional Livestock Research Institutes for conducting research on breeding, diseases and nutritional problems of regional importance. I believe the States are also taking necessary steps to strengthen and expand their existing

research nuclei for tackling problems of strictly local importance and for introducing the application of results of researches conducted at the Central and Regional Research Institutes.

Cattle Breeding

The most noteworthy step that has been taken in recent years in the field of animal breeding is the comparative study of selective breeding and cross-breeding or grading up with better foreign or indigenous breeds, for the improvement of our non-descript and unproductive breeds of cattle, especially in hilly and heavy rainfall areas. The results of this investigation should provide a definite answer to the question: what breeding policy should be adopted in such areas?

You are also aware that some years ago, in consultation with the FAO experts, we had sanctioned a co-ordinated scheme on cattle sterility, primarily with the object of improving the teaching of animal gynaecology and obstetrics in our veterinary colleges and conducting investigations in diverse problems concerning infertility in cattle. The existing scheme provides for one central station and 6 regional stations located in the veterinary colleges. The officers-in-charge of the respective centres have undergone advanced training in the subject at Stockholm. There are 14 veterinary colleges in India, and it is highly desirable that the cattle sterility scheme be extended to the remaining veterinary colleges also. Consequently, we have invited the remaining States to submit their schemes on sterility, and we are also persuading the FAO to arrange another course at Stockholm. There is some hope that the FAO would be in a position to organise a fresh course at Stockholm during 1957-58.

Surplus Cattle Problem

Out of the world population of 800 million bovines India has as many as 203 million or slightly more than a quarter of the world's total. Other big countries like the U. S. S. R. or the U. S. A. have only a fraction of this number. The U. S. S. R. has only 63 million

bovines and the U. S. A. 84. China has only 18 millions. India has in addition 38 million sheep and 56 million goats. Though there are as many as 26 breeds of cattle and 6 breeds of buffaloes in India, the high class animals in these breeds form only a small proportion, estimated to be roughly 10 per cent. The owners of these animals are poor and resourceless and the fodder position is extremely difficult. The available resources in feeds cannot maintain even a half of the existing population in an optimum condition of health and production.

Two main purposes for which cattle are maintained in India are the production of milk and production of work bullocks. The cultivable area in India is 295 million acres. The number required to cultivate this area, assuming that their capacity is 12 acres per pair, is 24.6 million pairs. The actual number of bullocks available is 33.7 million pairs. Including the number required for carting, irrigation, etc. it is estimated that the number of bullocks is much in excess of requirements. With the introduction of co-operative farming the number of bullocks required would also decrease. Mechanisation of agriculture would also in due course greatly reduce the number of bullocks required for agricultural operations. It has been estimated that about 1 lakh bullocks have already been replaced in agricultural operations by tractors and oil engines in the last five years. With increasing mechanisation of agriculture this process would gather momentum. The economy of the country is severely strained by the burden of useless cattle and it is time that we face this problem in a realistic manner so that the competition between man and animal for the limited food resources is reduced to the minimum. With the increasing population we will have to decide whether to feed the man or the unrequired animals.

Ideal Type of Cattle

A valuable suggestion that has been made to us is that for each breed of cattle and buffaloes we should lay down definite standards of an 'ideal' from the point of view of conformation

and that our breeding policies should aim at achieving that ideal. A Special Committee has been constituted to examine the suggestion in detail and make its recommendations to the Council in due course.

From West Bengal has come a very interesting scheme, which aims to work out the economics of specialized dairy farming through exploitation of land for milk production rather than food-crop or cash-crop production. The nutritive value of milk needs no emphasis, and we shall watch the progress and results of this scheme with interest.

Poultry

I expect you are all familiar with our poultry development plan. Commercial hatcheries should be set up in all the States so that the development of poultry may be expedited. At present only in Madras and Travancore-Cochin States some work is being done under the schemes sanctioned by the I.C.A.R. This work should be extended in all the States. Incubators should be purchased and distributed to the Extension workers so that the people in villages may be made to take interest in poultry development. Subject of standardised poultry feeds also require our attention. Meat of unrequired animals such as pariah dogs, cats, flying-foxes, etc. can be suitably converted into poultry feed of a highly nutritious nature. Not only this will increase egg production but at the same time these unwanted pests would be eliminated.

Literature on poultry finds an important place in our publication programme. I am glad to inform you that an excellent book dealing with all aspects of poultry husbandry has recently been prepared, and printed copies will soon be available. Moreover, our Poultry Committee, which met last month, has drawn up a fairly exhaustive list of subjects on which we hope to produce a series of small bulletins in due course.

Sheep

As you now, the proposals of the Second Five Year Plan also include a comprehensive

scheme for the development of Sheep and improvement of wool in the sheep-raising tracts of the country. Our Sheep and Wool Committee this year had under consideration a scheme for the definition, commercial evaluation and manufacturing trials of graded wools of the principal breeds of sheep. An *ad hoc* Committee has been set up to closely examine this important scheme and make its recommendations to the Council.

Technical Personnel

For a satisfactory execution of our various research and development programmes we shall require the services of a large number of suitably trained personnel. We have during the last two years or so taken adequate measures to cope with the greatly increased demand in numbers of veterinary personnel, and we are now marching ahead with our programmes of improving the quality of our personnel. As a first step, we are arranging special training seminars in anatomy and bacteriology in Calcutta and at Izatnagar during the next summer vacation for acquainting teachers with advanced knowledge and latest coaching techniques in these subjects, and we hope to make similar arrangements for other subjects in the summer vacation of 1958. In the case of anatomy particularly we are lucky to have been favoured under the inter-institutional arrangement with U.S. land-grant colleges with the services of an expert of Dr. Grossman's eminence, and in fact he has already revolutionised the techniques of embalming etc. in his work at Bikaner. We have decided to take immediate advantage of the techniques introduced by him and we have asked the States to depute their anatomy teachers immediately to Bikaner to learn those techniques. I trust the States concerned will take the maximum advantage of those special courses which we are arranging for the benefit of their veterinary teachers.

Veterinary Education

Some of the other measures of veterinary education and research under contemplation are (a) setting up of a post-graduate college at

Izatnagar for providing within the country the highest possible training in certain animal husbandry subjects, (b) raising selected veterinary colleges to the post-graduate level, so that they may serve as regional centres for advanced study, and (c) setting up of regional livestock research institutes. We have already taken up correspondence with the States on these subjects, and we expect all the States will make the best use of these programmes.

Tribute to Dr. P. N. Nanda

As members are aware, Shri P. N. Nanda, our Animal Husbandry Commissioner has proceeded on leave preparatory to retirement. When he joined the Council in 1947, he had behind him a wide and varied experience of several years as a Divisional Officer, as Superintendent of the largest livestock farm in the East and as Director of Veterinary Services in two major States. He brought this rich knowledge and experience to bear on the work of the Council and on the deliberations of this Board and its various Committees. His services to the Council and the country at large have been invaluable, and we all deeply appreciate the good work he has done. He was a pleasant colleague, and a good worker, who had developed an All-India view of animal husbandry problems of India and his departure on retirement is a very severe loss indeed to the Council. Let us hope his knowledge and experience would be available to the country in some other capacity.

Publications

I am glad to note that the Indian Council of Agricultural Research have made considerable progress in their publication programme. An excellent monograph on Rice has just been printed. A monograph on Mangoes, a book on Ornamental Flowering Trees are in the press. Books on Poultry and Horticulture will be sent to the press by the end of next month. Monographs on Cotton, Jute,

Coconut, Tobacco and various Oilseeds would be ready by the close of next year. A series of monographs on Algae and Fungi have been planned and I hope these would also be available by the end of next year. A new magazine on Horticulture has been started and has been greatly appreciated by those who are interested in gardening. The quality and lay-out of books and journals has been improved and I hope when the publication programme of the I.C.A.R. is successfully implemented, a great step in agricultural education would have been taken. In fact, by providing a series of books on agriculture and animal husbandry, the I.C.A.R. will be laying the foundation of a sound agricultural education based on local material and talent. These books are not only required in India but would also be of use in other countries of far-Eastern region where the problems of agriculture are similar.

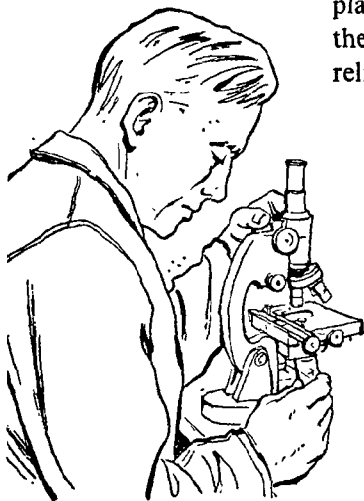
Very creditable work has been done in giving a push to our publication programme by Dr. B.N. Uppal, our Agricultural Commissioner, and Shri P. N. Nanda, our late Animal Husbandry Commissioner. I also appreciate the interest which has been taken by Dr. B. L. Sethi, Secretary, Indian Central Cotton Committee, Dr. P. J. Gregory, Secretary, Indian Central Coconut Committee, and Dr. Sankaran, Secretary, Indian Central Oilseeds Committee, in the publication programme of their Committees. I also appreciate the good work done by Shri M. G. Kamath, Editor, Indian Farming, and Shri Prem Nath, Editor, Books, who ably edited our books and publications. I also appreciate the work done by the Art Section under the direction of Shri N. S. Bisht in providing artistic layouts for our publications. Dr. P. S. Deshmukh, Minister for Agriculture, has taken keen interest in our publication programme and his encouragement has provided stimulus to us in our publication programme; and I thank him cordially for his patronage.

*Whose
responsibility?*

The total annual loss of livestock and livestock products resulting from animal disease still constitutes a serious economic problem; but it is well recognised that much of this loss is preventable. Responsibility for the maintenance of a healthy farm-animal population rests with the veterinary surgeon.

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VA313-54

To my young colleagues of the Veterinary College, Madras!

The Story of the Wandering Nematode

By

CHUSABURO SHOHO,

(c/o Veterinary Research Laboratory, Peradeniya, Ceylon.).



In the summer of 1956, I undertook a short trip to South India from Ceylon, where I had been working since the end of the previous year. Shortly before the departure for this trip, my Ceylonese colleagues succeeded in inoculating the infective larvae (artificially bred in the mosquito, *Armigeres obturbans*) of *Setaria digitata* into the susceptible Jamnapari, and Jamnapari - Ceylonese cross bred goats.

The tedious work, namely, to find out the suitable carrier cattle for our experiment, to breed several hundreds of mosquito nymphs till the adult stage, for allowing them to suck the blood of the carrier-cattle, to keep them alive for about 2 weeks, and at last to dissect them to find out the infective larvae would have been impossible without the patience and the technical skill of Mr. Nair and other laboratory workers. Even to find out one suitable carrier cattle for the running experiment is not easy. I suggested to them to find out a bovine with more than 30 microfilariae in one droplet of the peripheral blood, or else we should use too many mosquitoes and not be able to manage the work under our present circumstances. These difficulties were overcome by repeated visits to the slaughter house, and finally they found one, after blood-examination of more than 60 cattle. During 2 weeks for which the fed mosquitoes were kept alive, many of them died out, even though we took precautions to protect them from the attacks of ants, cockroaches and spiders, the latter two of which were not to be seen at day time. Thus, we would never get more than 50% alive, 2 weeks after

feeding. All mosquitoes in a cage will never attack the cattle at the same time, and the unfed should be brought to the animal a second time on the following day, while a considerable number of them will die out over a night. The mosquito starts feeding in the evening, when other people are at leisure and rest. All these troubles were overcome by my colleagues and they were ready to dissect the infective larvae out of the mosquitoes for inoculating them into the goats (about 100 in an average).

After ensuring the artificial inoculation of the infective larvae into the susceptible goats, I set myself on the trip to India, leaving all experimental animals in the hands of the Ceylonese colleagues. The first nervous sign, which we could expect from past experiences in Japan, should come about 3 weeks after the artificial inoculation. I decided to come back to Ceylon after they had informed me about the detection of the first nervous sign among our experimental animals.

The most pleasant time during my trip in India I spent in Madras, where I touched the Indian soil for the first time and had the opportunity of talking with Indian colleagues. I admired the Veterinary College, because its activity could be perceived by the active attitude of the colleagues there.

In the poor East, we should not expect too much of buildings, but only equipment and the means by which scientific work can be promoted. Also important is the freedom of discussion and fair protection of the work by

the authorities, or else workers sometimes cannot come out from the false view into which they have fallen unconsciously, and they cannot perform their work with an active attitude. The quality of the work is not always concomitant with the magnificence of the building or the position one possesses. We know that the most outstanding work in Biology was made by one monk, Gregor Mendel, in a garden attached to a monastery. The tedious work of inseminating artificially, observing the phenomena and finally of analysing the results were done by him, not in one trial, but in numerous trials. The teachings, which our fore-runners had left are not the story of the past time, but only guiding factors for our present and future work. Whatever the circumstances might be, whether in the scientific laboratory or in the field, the achievement of one's work is left free to one's spirit, endeavour and patience. In the East, we need not be disappointed by not having any facilities, which other workers might have.

By exchanging our knowledge we can cover the gap, which we may find to be material, and can take a steady step one by one. However poor and humble they might be, our present circumstances are much better than those under which our fore-runners worked.

During our conversation, your Principal, Dr. D'Souza asked me to give a talk to you, but I hesitated to accept it, because we, Japanese, all are educated in our national language in all subjects of natural science. Therefore it is, for most of us, a great task to talk in English. Instead, I promised to send him a paper later on as this could be done with much ease.

In the Madras Veterinary College Annual 1956, which I got with other publications at this time, was a short article on "Host-Parasite Relationships in Zoonoses", towards which my attention has been directed for several years. This theme which the writer, Victor, approached modestly in the paper, seems to be now

opening up a vast and new field of research both in the Medicine and Veterinary Medicine. Peculiarly, in medical helminthology, even though many investigations were done on the experimental animals (mostly abnormal hosts), it is generally accepted, that the human being is the exception for the infection with some helminths of animal origin, unless evidence natural of infection has been brought out by some workers.

As is well known, contrary to virus, bacteria, and protozoa, helminths should undergo development outside of the final host body in its characteristic way. Independent of the possible route of infection, with or without an intermediate host, according to their respective way of life cycle, the helminth individual, which infects the host body, occupies a relatively small dimension, compared with that of the host body at the earliest stage after infection. Whether the host in question is normal or abnormal, the development of the helminth may proceed or be arrested, or the worm itself destroyed. In most of the latter cases, the relatively small size of the worm makes the examiner overlook the causal agent, unless special precaution is taken or special technic is employed to detect it. As the helminth does not multiply in the host body, except that it lays eggs or discharges microfilariae, when once it reaches the adult stage, and there is no technic, as in the bacteriology or virology, which enables us to multiply the parasitic organism artificially, thus making their recognition easy, the detection of the larva or the young immature worm from the mass of the host body is accompanied by great difficulties. This is one of the reasons why a disease of this type, caused by such an agent had remained without any clear understanding of its cause until recent years.

The symptoms may be distinct when once the organ, which is affected by them, is vital and has not the ability of regeneration such as the central nervous system, or when huge number of them affects an individual in a relatively short time or by repeated infections

in a considerably long time. The representative example for the former may be found in "Cerebrospinal Nematodiasis", due to *Setaria digitata*, in the abnormal* hosts, such as sheep, goats and horses (but all imported breeds), while several fine studies by Beaver et al., on visceral larva migrans, due to *Toxocara canis* larvae in human beings represents the latter. To avoid repetition I would merely mention here my studies which appeared in *Ceylon Vet. J.* for your perusal (I; 16; 1952) and (IV, 6, 1956). As for the latter, some introduction may be necessary, for I fear the literature may not be available in the veterinary schools. Beaver, Snyder, Carrera, Dent and Lafferty (*Pediatrics*, Vol. 9, No. 1, 7., 1952) examined three children (two white and one negro), suffering from chronic eosinophilia and found the nematode larva in the livers, by biopsy and determined it to a larva of *T. canis*, which should have invaded into them under certain circumstances.

A little later, Smith and Beaver (*Pediatrics*, Vol. 12, No. 5, 491, 1953) tried to give the embryonated eggs (about 200) of *T. canis* to two mentally defective infants and could confirm that they remained asymptomatic but developed eosinophilia which persisted for more than 13 months. Another report by Brill, Churg, and Beaver (*Am. J. Cl. Path.*, Vol. 23, No. 12, 1208., 1953) dealt with allergic granulomatosis associated with larva migrans, in which a *Toxocara* larva was found in a pulmonary nodule with a syndrome of eosinophilia and disseminated visceral lesions. I, myself, exchanged opinion with Prof. Beaver at this stage on the possibility of penetration of the same larva into the central nervous system of human beings.

In one of our experiments, tried on *Macaca cyclops*, a Formosan monkey, which got 100,000 embryonated eggs of *T. canis* and was sacrificed a month later, we could find out that the lesions (microscopic malacic lesions) in the hemisphere and the brain stem were identical with those caused by trauma of nematodes or their larvae.

Accordingly, the pathological findings admitted use to suppose that they may be found in the CNS of human beings since once the visceral larvostasis by them was found in human beings. This supposition, coming from analogy, was proved by Dent, Nicholas, Beaver, Correria and Staggers (*Am. J. Path.*, 32, 4., 1956) in a case (a dog-lover, a young white man) with eosinophilia and nervous disturbances. One, who ever engaged himself in a work of such type, will know how tedious it should have been for them, to find out small larvae in that voluminous CNS of human beings. The patience and endeavour, which is not touched at all in the paper, should be appreciated in silence. To find out a single causal nematode larva, which was found in a single histologic section, cutting sections of one complete eye (more than 2,000) was necessary for Wilder-Campbell (*Am. Acad. Ophth. Oto*, Nov. & Dec., 90, 1950).

When Dr. Innes came in contact with me for the first time, I knew that it was necessary for him to cut more than 100 blocks, only for confirming our explanation of the nematodal cause of the Ceylonese paralytic goat. How many sections he cut from each block, I do not know. One, who averts his eyes from such work, and does not understand the essential meaning of the laborious work and only wants to criticise the results of the work with common knowledge of pathology, will fall into a trap, into which other workers fell and struggled. You can see this in all papers by the Japanese workers on paralysis of sheep or goats: Emoto, O., (*Schweiz Arch. Tierheilk.*, 69, 297., 1927); Kimura and Niimi, (*Transactiones societatis pathologicae japonicae Liber*, 29, 466, 1939); and Do., 30., 539., 1940.; Yamagiwa, (*Zikken Igaku* 25, 485., 194.), and Do., 25, 575., 194.); or by Innes (*Br. Vet. J.*, 107, 187., 1951), before the aetiology was cleared or was made known. And some who do not at all want to do the pathological examination, will fall into the trap, as a foreign worker fell into (*J.A.V.M.A.*, CXVIII, 385, 1951). The

*Refer to my article in the coming number of *Ceylon Vet Journal*.

victims of such a way of thinking are not few in number, because the major tendency of etiology research at the present time is in the minutest unit, such as the virus or chemical substances, and therefore they rely more on the chemical or micro-organismal technic. In reality, this has influenced the researches of the disease of the CNS, even after the successful transmission experiment. You can trace this in all works done by Japanese, American and British researchers on the mosquito-borne viral encephalitis (Jap. B., encephalitis) of human beings and domestic animals. All these works, without any considerations of the possible association (or confusion) of the mosquito-borne nematodal disease of the CNS, are incomplete.

However simple and naive the technic is, the significance of the findings, coming from the result of such technic, remains as such while earlier knowledge may undergo modifications, even when it was acquired from much complicated technic. In the case of cerebrospinal nematodiasis, in which the tiny worm (1-2 cm. long) penetrates into the relatively soft tissue of the CNS with vivid movement (no one could observe this, but we can assume it indirectly from the attitude of the same worm in the aqueous humor of the anterior chamber of the horse's eye), the possibility of detecting the worm from the CNS becomes hopeless, if the examinations were made in long-standing cases. After the worm has passed the cranio-vertebral barrier and succeeded in getting into the cranio-vertebral cavity, it is not always that it remains inside it. As it came in, it can go out, as we can observe indirectly in the case of the worm in the eye of the horse. In such a case, we could find lesions only when it has left behind the actual damage during its stay inside the cavity. The minuteness of the worm in question on one side, and the wandering propensity of the young immature worm on the other, have tempted the workers, not to regard the worm found in relatively few cases as the causal agent. As observations on various cases of cerebro-spinal nematodiasis (due to the larvae or

the adult) with asymptomatic course have been made (Sprent: *Parasitol*, 45, 32., 1955) and Ljubimow: *Diss. des Moskau Vet. Inst*, 1945), the demonstration of the worm in the CNS alone is no longer enough to explain the nervous symptom (the details of my opinion are dealt with in the next *Cey Vet. J.*)

Coming back to the problem of *T. canis* which has been proved to be a menace to public health, we would find that we know only a little about its life cycle. All literature, dealing with *T. canis* will tell you that the intra-uterine infection is the relatively common route of infection. No worker has denied that the extra-uterine infection can occur, but we find no one who has proved it exactly. Recent works in Russia and Japan indicated that nearly all puppies harboured the larvae already at birth, and nearly all adults did not harbour the adult in the intestine (this opinion was contradicted by bringing out the evidence of the positive eggs of *T. canis* in the faeces of adult dogs, but until now we have not yet succeeded to get even one worm from the adult. It should be mentioned that the bitch with puppies will lick the faeces of puppies, or any other dog living near a bitch with suckling puppies can do the same. If this happens both the eggs and the naturally passed worm can be consumed by the adult dogs). I, myself, tried to infect artificially puppies, about one and half month old, by giving them the embryonated eggs of *T. Canis*, after they had previously been treated with an anthelmintic. One and half months later, dissections of these young dogs were performed with the positive findings of multiple tiny spots in various organs and tissues. Microscopically we found these were the nodules of the larvae. The development of the larvae in these cases were arrested even in the normal host, dog, during one and half month, after which the new born puppies will generally contain the adult worms in their intestine. In short, *T. canis* infects the normal host in the extra-uterine stage, but no one has proved that the embryonated eggs, given in

the post-natal stage, can develop into the adults in the same individual.

The life cycle of *T. canis* seems to be similar to that of *Neoscaris vitulorum*, on which Dr. Anantaraman is working. Perhaps in both we will not be able to get clear evidence regarding the life cycle, unless some new methods are evolved for the experiment.

From ancient times till the present, the dog has always been a good companion of the human being, whether he is rich or poor, in the utmost modern metropolis, or in the remotest polar region. It is only few years ago that the phenomenon of visceral larvostasis in connection with chronic eosinophilia has become the object of medical research. You could see, from this fact alone, the significance of the "Host-Parasite Relationships" and perhaps will join me in forecasting about the nature of other diseases on the same principle. For the veterinarians, the finding of visceral larvostasis in calves by *Ascaris lumbricoides* by Kennedy (*Cornell Vet.*, XLIV, 531, 1954) may be of interest.

In Bombay, during my trip to India, I received a letter from Ceylon telling me about the success of our transmission experiments. The first nervous sign was observed on the 23rd day after the transmission. Soon after that, I came back here to continue my work. Very many scholars (more than 40) have collaborated together for about 4 years with a fund of about one million yen (the wartime yen had more than 200 times value of the

present one) to find out the cause of the disease during the war time. All factors, except the nematode, were found to be negative, and then the final work was made for the nematodal cause. Without the collaboration of many experts, the work might not have been accomplished.

Four years ago, I met Dr. Crawford at Weybridge and had a talk about the story of the research on goat paralysis. We confessed that he could find no cause, in all his trails in Ceylon, and one thing he did not touch was the helminthic factor. In Korea, the young scholar who insisted on the importance of the nematodal factor at the earliest stage of the work, quite the commission of the research. Compared with that pioneering work, the work in Ceylon progressed quite smoothly in a relatively short time. Unfortunately, the work is not yet completed, because the majority of the materials are still in formalin. I hope I can manage all before I finish my service in this country.

Finally you will permit me to repeat the words, which I happened to find on the page of the work by my colleague, Victor :

"Our greatest glory consists not in never failing, but in rising every time we fail"—Goldsmith.

Our life in research work is nothing but a procession of failings, but with a gradual rise to the destination, which some may reach luckily, while others not.

A bone to the Dog is not Charity. Charity is the bone shared with the dog, when you are just as hungry as the dog.

—JACK LONDON

The Use of Aircraft For Grassland Improvement

By

G. VENKATACHALAM, B.SC., G.M.V.C. M.S. Ph.D. (Michigan)

(Research Officer, Madras Veterinary College)



The Farmers in other countries like New Zealand are convinced of the future of the aeroplane as a new farm implement; and the farmers in the United States of America have formed into a Farmers' Flying Club. Aerial surveys and mapping of the grasslands are economically undertaken on a nation-wide basis. Aerial top-dressing the pastureland with chemical fertilizers and lime restores the fertility of the soil and thus, balances the economy of Agricultural and Livestock industry. Also, it combats soil erosion and flooding. Mineral deficiencies such as Cobalt deficiency etc., of the grassland are made good by topdressing with minerals from the air. Satisfactory aerial distribution and control of the seed mixture is made possible by pelleting or cementing seeds into larger aggregates for sowing. The aeroplane plays a vital roll in weed control and in the forest pest control by sprays and dusts. Dusting shallow water for the control of malaria mosquitoes; and spreading poison for migrator grasshoppers are done by aerial methods. Fishes in ponds and lakes are fed by manure from the aeroplanes. Thus, the aircraft is of immense use in varied items of work particularly for grassland improvement.

In India, the use of air craft for the grassland improvement has been recognised and accordingly, a scheme has been prepared under the Indian Council of Agricultural Research. The programme of work under this scheme includes: (1) reconnaissance survey and mapping of grasslands and (2) research on grassland management, fodder pro-

duction, selection and breeding of indigenous and exotic grasses and legumes.

A brief random note on the aerial method of dusting and spraying is given below; and the further details may be obtained from the references given.

Types of planes used:

(a) Military Biplane Trainer-type Aircraft.

(b) Light high wing Monoplanes upto multi-engine transports. Capacity varies from 80 gallons to 1000 gallons of spray mixture. Speed at 75 miles to 150 miles per hour.

(c) Helicopters to fly low and slowly; and to operate in small areas. (Relatively not economic since high initial cost and low acreage).

First, Air surveys are made by sketch mapping or photographic sampling with a special aerial camera by stereoscopic method. Spraying is a better method of application than dusting because the dust is often carried away by air currents after release from the plane. The dust particles do not stick to the foliage and are quickly removed by strong wind or rain. Also, the quantity of dust required is high enough to cost more money per acre. The sprays are less affected by wind and adhere to the foliage much better. The spraying apparatus is not yet standardised on account of its new and rapidly expanding field of use. However, there is a wide variety of distributing devices such as Rotating discs and brushes, nozzles, jets and combinations of these. The proce-

ture in applying aerial sprays over forests is necessarily different from those employed in treating agricultural crops, because of the larger areas involved, the irregular terrain and uneven heights of trees. The forest area is divided into blocks using water courses, ridges and other features of the terrain as boundaries. When the terrain is steep and irregular the pilot must fly along the contours. In contrast to crop spraying in agricultural land which is done 5 to 10 feet above the field, the minimum safe altitude for forest spraying is 50 feet above the tree tops. Wind and convection currents (the warm air rising from the ground) often carry the spray away from the target area. Hence, spraying is usually done in the early morning or evening hours when air movement is at a minimum. (Wind velocity should be less than 10 miles per hour.)

Economics of Aerial Methods. It is estimated that a single plane manned by a pilot and two mechanics could do the work of about 2000 men with hand dusters on the ground. There is also a saving in the precious time of certain seasonal operations. The cost of aerial survey per acre is less than an anna since hundreds of thousands of acres are surveyed at a time. 2000 lbs of seed could be sown in 2 hours at the rate of 10 lbs. per acre.

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(U.S.D.A. United States Department of Agriculture.)

The true test of civilisation is, not the census, nor the size of the cities, nor the crops, but the kind of man that the country turns out.

—EMERSON
c

Some Variations in the Collateral Branches of the Brachial and Median Arteries

By

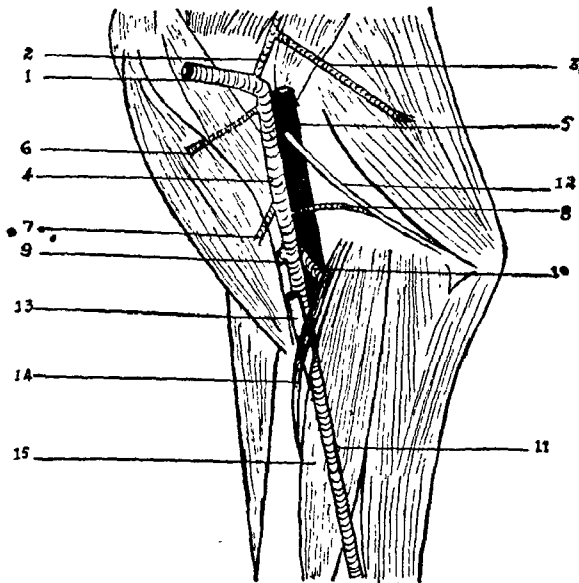
S. DAMODARAN, G.M.V.C., B.V.SC., M.SC.,
(Department of Anatomy)



In the course of routine dissection of a buffalo bull calf, aged about 1½ years, in September 1956 a few arterial variations were noticed in the right forelimb.

The Deep humeral artery which arises as the second collateral branch of the Brachial artery, was absent and its function of blood supply to Caput magnum, amongst others, was taken up by a separate branch arising from the posterior face of the Subscapular artery, about a centimetre above the origin of the latter from the Axillary artery.

branches were large and of the same calibre as the Median artery which is the continuation of the Brachial artery from the point of origin of the Collateral radial artery (Fig. 1.) The Median artery, after passing under the Pronator teres, gained the medial aspect of Flexor carpi radialis at its upper third and then continued its downward course subcutaneously on the medial aspect of the forearm. In the middle and lower third of the forearm, the Median artery was separated from the Median vein, the Median nerve and the



KEY TO FIGURE 1

1. Axillary artery
2. Subscapular artery
3. Branch of 2 to Caput magnum
4. Brachial artery
5. Brachial vein
6. Prehumeral artery
7. Branch of 4 to Biceps
8. Collateral ulnar artery
9. Collateral radial artery
10. Common interosseous artery
11. Median artery
12. Ulnar nerve (cut)
13. Stump of Median nerve (cut)
14. Pronator teres
15. Flexor carpi radialis

FIG. 1.

Lower down the arm, the Common interosseous artery was found to arise from the lateral aspect of the Brachial artery at the same level as the Collateral radial artery. These two

medial face of the Radius by Flexor carpi radialis. The rest of the course of the Median artery was normal.

Remarks: The absence of Deep humeral

artery has been noticed by Chelva Iyengar (1950). He found its absence being compensated by a branch arising along with the Posterior circumflex artery from a common trunk of the Subscapular artery but in the subject reported here, a separate branch was found to arise from the Subscapular artery and supply Caput magnum only.

Srinivasan (1953, 1954) found the Common interosseous artery arising along with the Collateral radial from a common branch of the Brachial artery in two cases but in the subject reported here, it was seen to arise directly from the Brachial artery and at the same level as the Collateral radial artery. Srinivasan (1954) also found the Median

artery pursuing a subcutaneous course as was noticed here.

Summary: The absence of Deep humeral artery, origin of Common interosseous artery from the Brachial artery and at the same level as the Collateral radial and the subcutaneous course of the Median artery in the middle and lower third of the forearm are reported as these variations are of anatomical interest.

Acknowledgements: I wish to express my sincere thanks to Dr. D. Mariappa, Professor of Anatomy, for advice and encouragement and Dr. A. Lakshminarasimhan, Assistant Lecturer for the diagram.

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(Collected by Dr. G. VENKATACHALAM,
B.Sc., G.M.V.C., M.S., Ph. D. Mich.)

It bothers me that the carpenter's boy
Seldom plays with a wooden toy.

That the son of a shoemaker has no shoes
And the gambler's son has nothing to lose.

The sailor's son sits under a tree
While the farmer's son goes off to sea.

The doctor's son has a cold in his head ;
The pshchiatrist's son? He wets his bed.

The writer's son can hardly spell
And the minister's son is headed for hell—

While the millionarire's son is filthy rich,
And the son of a bitch is a son - of - a - bitch.

—JOURNAL OF HEREDITY, 36:91. 1945.

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A CASE REPORT OF CYSTIC CALCULI IN A DOG

By

SOMASUNDARAM, A - FINAL B. V. SC.



A red Irish Setter aged 1 year and 3 months was admitted on 25-1-57 as an in-patient (D.W., I.P. No. 8003) in Madras Veterinary College hospital with the following history.

The animal was treated in the last week of August 1956 in the above hospital for the complaint of urethral calculi. Four calculi were then removed by local manipulation. Again the dog was brought with the history of passing blood clots in urine on 30-11-'56. An X-ray of bladder and urethra was taken and

presence of three cystic calculi (Plate No. 1) was detected and operation advised. The biochemical examination of urine revealed the presence of albumin, haemoglobin, blood cells and triple-phosphate crystals. It was treated with alkaline diuretics and advised immediate operation.

The owner, however, admitted the dog as an in-patient on 25-1-'57 as the symptoms were acute.

Observation

25-1-'57 - The dog was passing blood tinged urine. Blood was seen at the end of micturition. Blood smear - negative. Faeces - negative. Examination of blood: Haemoglobin 8 gms %.

Total Count: R. B. C. 4 million/c. mm.
W. B. C. 12,800/c. mm.

Differential count :
Plymorphs 88%
Lymphocyte 12%

26-1-'57 - T. 101.2°F. Dog was active and alert. Biochemical examination of urine revealed 0.3% albumin, bile pigment, Haemoglobin, and blood cells. Reaction of urine was acid. Dog did not have any motion.

27-1-'57 - T. 101.6°F. The animal was active and alert. Did not pass motions. Urine blood stained.

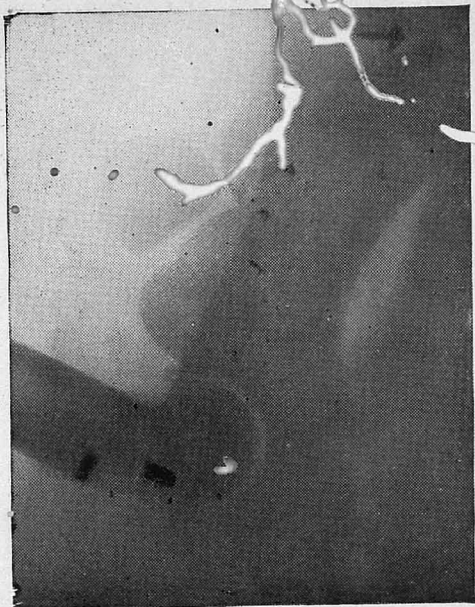
Treatment

Given rest.

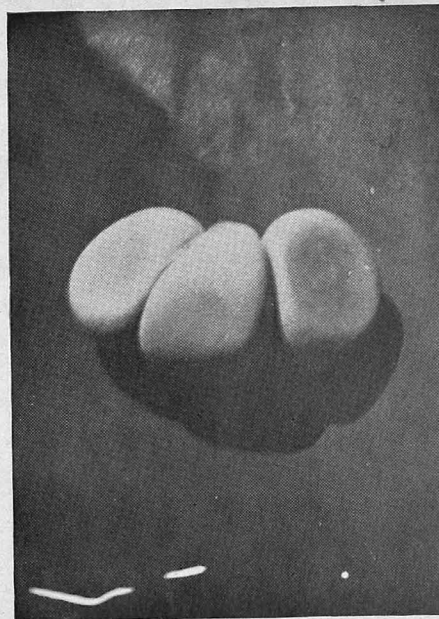
The dog was given the following :
Cal. Sandoz. 10% with Vit. C - 10 cc.
I/V (1)
Given glycerine enema.

Given liquid paraffin orally.
Given glycerine enema.
R/

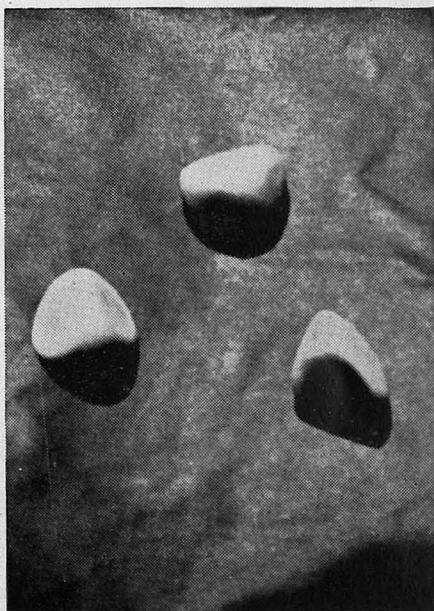
Cal. Sandoz. 10% with Vit. C. 10 cc.
I/V. (2).



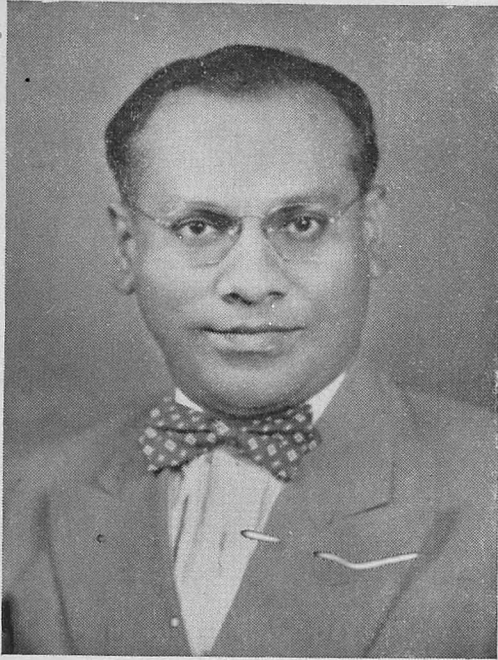
X-Ray Photograph



Cystic Calculi Insitu.



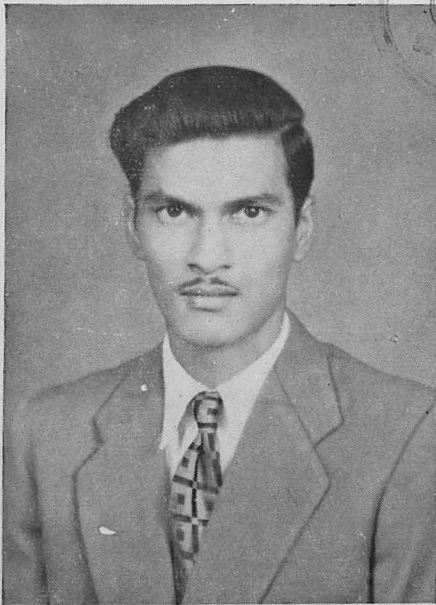
Cystic Calculi with Facets
(Separated)



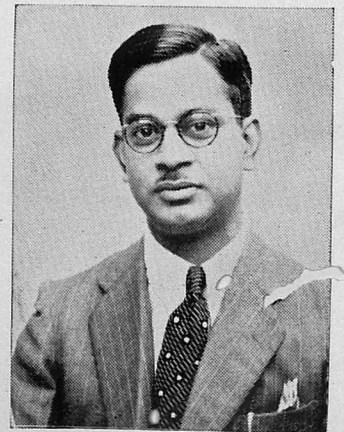
Dr. G. Venkatachalam,
B.Sc. G.M.V.C., M.S., Ph. D. (Michigan)
Our Research officer, Nutrition.



Dr. M. C. Chellam,
G.M.V.C., F.R.V.C.S. (Sweden)
Our Dy. Director of Animal Husbandry,
Key-Village Scheme.



Dr. G. S. C. Ranga Rao, B.V.Sc.
Rao Bahadur Dr. R. Swaminatha Ayyar
Memorial Surgery Medalist: 56-57.



S. Damodaram,
G.M.V.C., B.V.Sc., M.Sc.,
Our Lecturer in Anatomy.

Observation

Treatment

28-1-'57 - T. 101.3°F. Animal was active and alert. Urine blood stained.

The following powders given orally :
R/

Calcium lactas grs. XX
ft. pulv. 2 sig. one B.I.D.

29-1-'57 - T. 101.4°F. The animal was prepared for operation. The area on the left side of the abdomen and in front of the pelvic bone was shaved and painted with the usual antiseptic. A bandage was then applied.

R/
Cal. Sandoz. 10% with Vit. C 10 cc.
I/V (3).
Given a laxative diet.

30-1-'57 - T. 102°F. An enema was given an hour prior to operation.

Given streptopenicillin (1 gm plus 4 lacs) in 2 cc distilled water I/M.

Weight of the animal 60 lbs.

Anaesthesia : A dose of 8 grains of Nembutol in 12 c.c. of sterile distilled water was administered i/v. The injection lasted for 6 minutes. The animal was in deep anaesthesia by the time the injection was completed, as evinced by the absence of pedal, corneal and pupillary reflexes. Visual intubation was done with Magill's oro-tracheal tube size No. 9.

A small incision was made at the postero-superior aspect which exposed the three calculi (Plate No. 2) in the bladder. The three calculi were removed carefully (Plate No. 3) without spilling any urine in the peritoneal cavity. 0.5 gms. of Streptopenicillin was dissolved in 5 c. c. distilled water of which 2 c. c. sprinkled over cystic wound and 3 c. c. into peritoneal cavity. The opening in the bladder was closed with two rows of sutures : one continuous and the other Lamberts using chromic catgut. The muscular incision with peritoneum was closed with a layer of continuous sutures with chromic catgut. Skin incision was closed with a series of interrupted sutures with silk thread. Sulphamezatine penicillin powder was applied. The duration of the operation from skin incision to closure was 30 minutes.

The bandage was then removed and the seat of operation was painted with Harrington lotion. The surface was draped exposing an area of 6" x 3" centering the area that was shaved previously.

Technique : Paramedian incision of 5" length on the left side of the abdomen between the last two teats just beside the sheath and in front of the pelvic bone was made on the skin followed by another incision going through the abdominal muscles and peritoneum to enter the abdominal cavity. The bladder was brought to the surface, and the sides packed with gauge. A piece of silk thread was passed through the serous and muscular coats of organ at either end of the future incision to serve as loops for the assistant to hold in position.

The line of sutures was sealed with collodium flexile. Abdominal bandage was put on with 2 rolls of cotton, one on either side of the sheath to avoid any pressure on the sheath. The animal recovered completely from anaesthesia in 2 hours. Given Crystopen 5 lakhs I/M.

Observation	Treatment
31-1-57-T. 100°F. The animal was active. Bandage was soiled with urine.	<p>Bandage was renewed. Given 25 c.c. Glucose saline I/V in the morning and 25 c.c. in the evening.</p> <p>R/ Caffine citras. Aqua dist. 2 c. c. grs. II Ft. injectio Sig. for S/C use. Diet : Milk with glucose.</p>
1-2-57-T. 100. 9°F. Pulse 94. Soft, M. M. Pale. The animal was active. Urine was blood tinged with blood clots. Passed motions in pellets with slight mucous.	<p>Warm glycerine enema was given, cleansed the eyes with boric lotion and given barley water with glucose in milk.</p> <p>4-30 P. M. Cal Sandoz. 10% with Vit. C. 10 cc. I/V (4)</p>
2-2-57-T. 101. 6°F. Pulse 96 soft. M. M. Pale. Animal was active and alert. Faeces normal.	<p>25 c. c. Glucose saline 10% I/V. Cleaned the eyes with boric lotion. Diet : Milk with barley water.</p>
Examination of urine.	
<p>Albumin 0.025% Bile pigments - traces. Reaction - acid. Blood cells - present. Sp. gravity - 1020.</p>	
3-2-57-T. 106°F. Pulse 94 soft. M. M. Pale. The animal was weak. Slight discharge was present in the left eye. Motions found normal. Microscopical examination of urine revealed only blood cells. Passed little amount of urine.	<p>Cleaned the wound with acriflavin lotion and dressed with Benzoin. Given Cal. Sandoz 10% with Vit. C. 10 cc. I/V (5) Diet : Milk and barley water with glucose.</p>
4-2-57-T. 101. 2°F. Pulse 100. Feeding normal. Motions found to be normal. Urine was clear and revealed 0.2% of albumin and traces of bile pigment: Dog is active.	<p>Given glucose saline 20 cc. 10% - I/V. Applied benzoin seal to the wound. Diet : Milk and barley water.</p>
5-2-57 to 7-2-57—Animal was active and normal in habits.	<p>On 5th, 6th and 7th. Calcium Sandoz; Glucose saline; Calcium Sandoz given respectively. Sutures were removed on 7-2-57. Diet; Milk with glucose.</p>

RING IN THE STOMACH

(A CASE REPORT)

K. RADHAKRISHNA REDDY, FINAL YEAR, B.V.Sc.



An Alsatian pup was brought to the College Hospital on the morning of 17-1-57 by a lady with the history that the pup had swallowed a diamond ring. The owner was afraid that the diamond might cause the death of the pup.

On examination the pup was found to be active without any ill effects. The animal was screened and the shadow of the ring was found in the stomach. An X-Ray picture was then taken which confirmed the finding.

Immediately the pup was given a stiff dose of liquid paraffin, and the owner was advised to keep a watch for the ring in the faeces and to bring the pup the next day morning to the hospital for further examination if found necessary.

The owner brought the pup on the morning of 18-1-57 and reported that the animal did not pass the ring in the faeces.

Once again the animal was screened when the shadow of the ring was seen about 6" from the terminal part of the rectum.

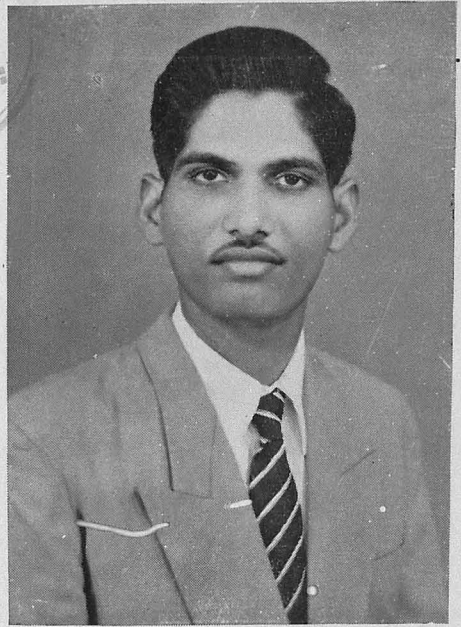
A second dose of liquid paraffin was administered and the animal was kept under observation. The ring was passed an hour later to the astonishment of the owner. The pup was found perfectly well and was discharged.

Acknowledgement: I heartily thank Sri C. K. Velayudhan Nayar, Professor of Pharmacology and Sri M. Ranganathan, Assistant Lecturer in Medicine for their guidance in the preparation of this report and the Principal, Madras Veterinary College for the permission accorded for the use of data from the case records.

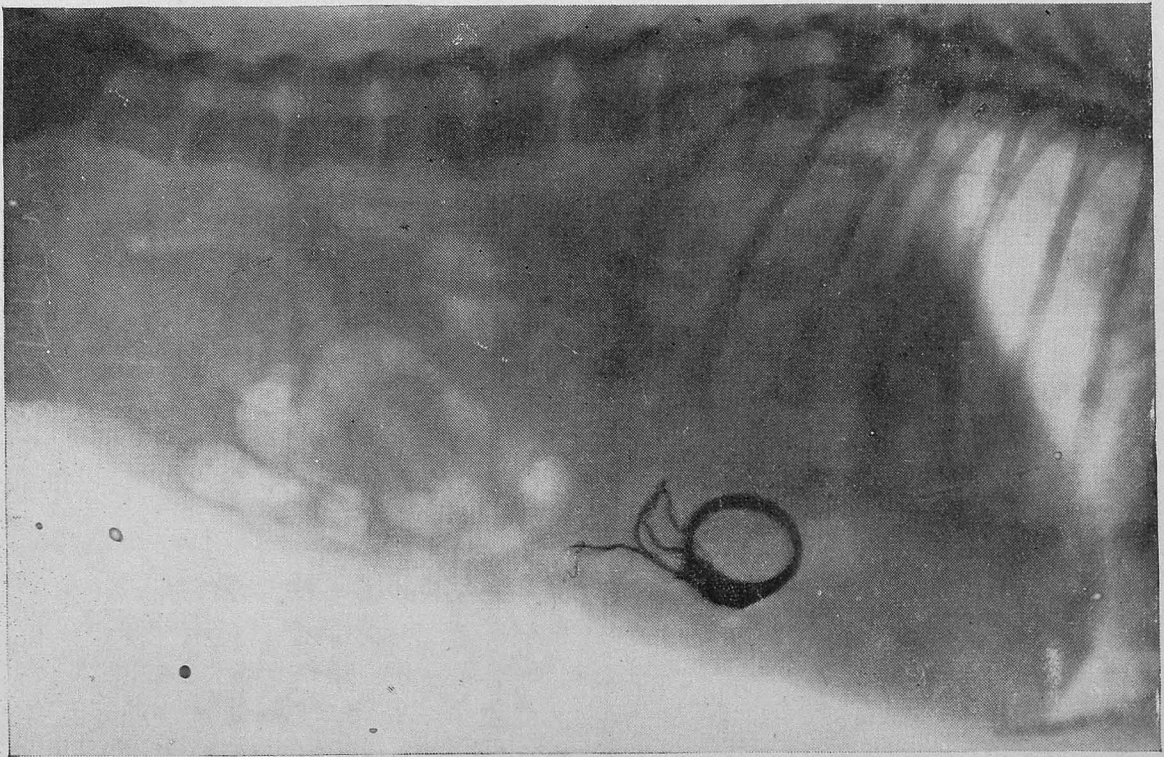
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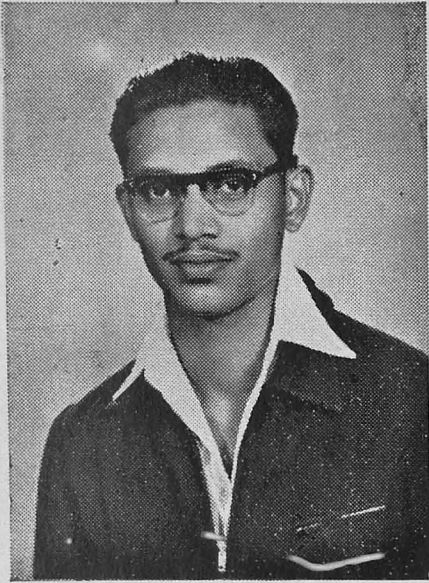
P. U. Narayana
Hockey Coach and Physical Director



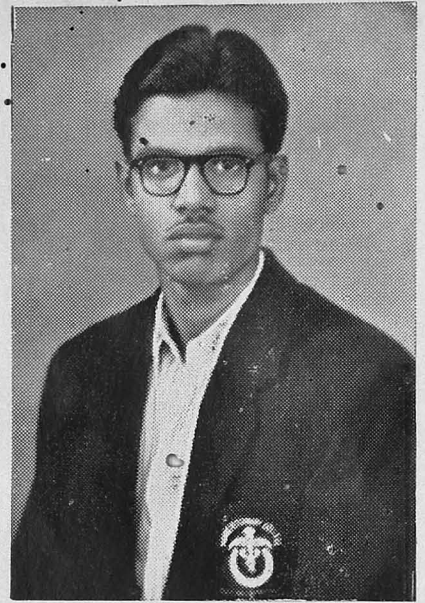
Dr. A. Ramamohan Rao, B.V.Sc.
Our Gold Medalist 56—57
1st Student to receive 4 medals at a time



RING IN THE STOMACH



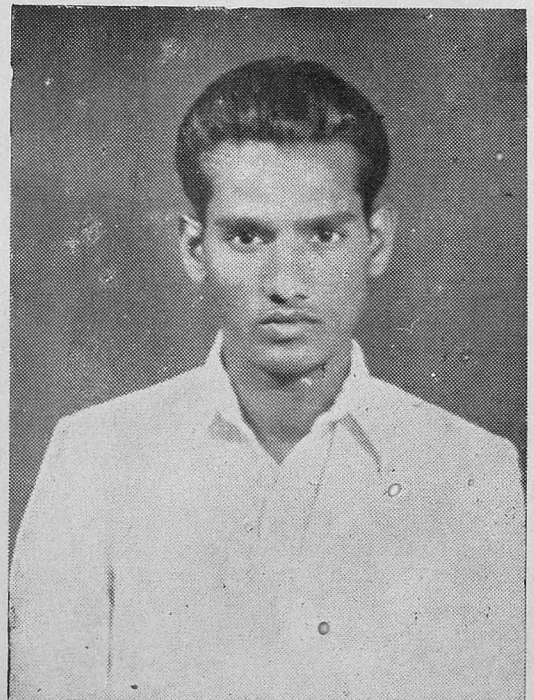
V. P. Sreedharan,
College Athletic Champion 56-57
and
The University Foot Baller



Thomas Amaldas
College Athletic Champion
56—57



Samuel Kamalesan
The Light Heavy Weight
Inter-Collegiate Champion 56—57



Md. Ghousullah Inter-University Boxer



The Bursa of the Male Strongyle as a Diagnostic Character

By

M. V. SANKARANARAYANAN,
DEVENDRA NATH DAS., and S. SUNDARAM,
(Post-Graduate Students in Veterinary Parasitology)

AT

MADRAS VETERINARY COLLEGE.



It is the experience of many a worker that identification of strongyles has been extremely difficult and various morphological features have to be examined before the genus or species could be determined with a fair degree of certainty. It happens that among the strongyle worms males have a cuticular expansion surrounding the posterior extremity, called the 'bursa,' serving as a prehensile organ during copulation. The bursa of the *Strongyloidea* is divided into a dorsal and two lateral lobes. (Fig. No. 1). It is supported by a series of rays which represent the stalks of the modified caudal papillae. The bursal rays have a definite number and arrangement although modifications may be met with occasionally. Usually supporting the dorsal lobe is a median, unpaired dorsal ray which may be subdivided distally. This ray gives rise to a pair of externo dorsal rays. In each lateral lobe there are 3 rays; the ventral ray, the lateral ray and the externo-dorsal ray supporting its anterior, median, and posterior margins respectively. The ventral ray is divided into ventro-ventral and latero ventral rays. The lateral ray is divided into antero, medio, and postero or externo-lateral rays.

The bursa may be symmetrical as in the genus *Strongylus* or it may be asymmetrical as in *Haemonchus* and *Bunostomum*. In Trichostrongylidae the lateral lobes are well developed, the dorsal lobe is either vestigial or absent. In Metastrongylidae the dorsal lobe is very small. In Syngaminae the bursa is

very short. In the genus *Nematodirus* the dorsal lobe is divided into two small lobules.

The arrangements of the rays of the bursa differ from species to species so that the bursa is capable of serving as a distinctive character for the species. In the following account an attempt is made to provide a synopsis of a few strongyle nematodes of Veterinary importance occurring in India indicating the habitat, the host, the locality and a brief account of bursa in each species. Illustrations have been copied and included to represent each genus. It is the hope of the authors that this article will be of some material value to the field worker who wishes to recognise these strongyles he has encountered from the livestock of his place. The information about the locality of the incidence of the helminth have been solely taken from the literature referred to at the end: 1, 7 and 8.

Abbreviations used:

- V. R. Ventral Ray.
- D. R. Dorsal Ray.
- L. R. Lateral Ray.
- V. V. Ventro-ventral ray, } Ventral system.
- L. V. Latero-ventral ray. }
- S. I. Small intestine.
- L. I. Large intestine.
- A. L. Antero lateral ray.
- M. L. Mediolateral ray.
- E. L. Or P. L. Externolateral or Postero-lateral ray.
- E. D. Externodorsal ray.
- D. Dorsal ray.

Genus & Species.	Location.	Host.	Locality.	Description of the Bursa.
Order : Strongyloidea :				
Family : Strongylidae.				
Sub-family : Strongylinae.				
Genus : Strongylus.				
				Ventral ray cleft, E. L. and laterals arise from a common trunk, E. D. arises from a common trunk with the Dorsal, Dorsal cleft at its origin, each branch ending in 3 digitations
1. <i>S. equinus.</i>	Caecum & colon.	Horse & mule.	Punjab U. P. Assam Madras.	Ventral ray swollen at the base.
2. <i>S. edentatus</i>	do.	Horse Ass.	Punjab U. P. M. P. Bombay Madras.	Medial lobe short; Dorsals narrow; E. D. originating at the bifurcation of dorsals; ventrals not swollen at bases.
3. <i>S. vulgaris</i>	do.	Horse Mule	U. P. Bombay M. P. Punjab Madras.	Median lobe indistinct, bluntly triangular. Dorsal very broad.
Genus Decrusia				
4. <i>D. additicta</i>		L.I. Elephant	Madras Orissa Malabar	Dorsal is undivided except at its extreme tip. V.Rs. long and stout; E.L. short; E.D. also short.
Genus Equinurbia				
				V.R. cleft, L.Rs. arise from a common trunk; E.D. arises separately from Dorsal and immediately breaks up into 3 branches of which the first is the longest; D.R. is split almost half its length with 2 lateral branches arising from the common trunk immediately before it bifurcates.
5. <i>E. Sipunculi formis.</i>		Intestine do.	Madras	D.L. longer than laterals; P.L. has a dorsal boss; D.R. shows 3 subdivisions on each side marked by irregular prominences (Bursa supported by a total of 11 rays).

Genus & Species	Location.	Host	Locality.	Description of the Bursa.
Genus Choniangium.				Bursa has an accessory ray projecting from the dorsal aspect of the main stem of the lateral ray.
6. <i>C. epistomum.</i>		Caecum Elephant	Bengal Orissa Madras	Bursa longer dorsally than ventrally; V.Rs. are opposed; the points of 3 branches of L.R. are divergent; accessory L.R. has a granular appearance; D.R. divides into 3 branches, each of which is bifurcate.
7. <i>C. mnguostomum.</i>		Intestine do.	Madras	D.L. fairly long; accessory L.R. not granular.
Genus Oesophagodontus				
8. <i>O. robustus.</i>	L.I.	Horse Mule	Punjab	Bursa with large lateral lobes; V.R. cleft; E.L. and L.R. arise from a common trunk; P.L. giving off a short thick accessory branch; D.R. arising in 2 lateral groups each consisting of from rays representing an E.D. and 3 approximately equal D.R.
Genus Triodontophorus				V.R. cleft; E.L. and L.R. arise from a common trunk; E.D. arising from a common trunk with the dorsal; Dorsal cleft almost to its base each limb giving off 2 lateral branches.
9. <i>F. brevicauda.</i>	Colon	Horse	Punjab Madras	Bursa with median lobe long.
10. <i>T. minor.</i>	do.	do.	Punjab Madras	Bursa with long D.L.
11. <i>T. serratus.</i>	do.	do.	do.	Bursa with very short M.L.
Genus Globocephalus.				V.R. cleft; E.L. and L.R. arise from a common trunk; E.D. arising from a common trunk with the dorsal; Dorsal bifurcate each branch tridigitate.
12. <i>G. urosbulatus.</i>	do.	do.	do.	do.
Genus Trichonema.				V.R. cleft; E.L. and L.R. arising from a common trunk; E.D. arising separately from the dorsal; Dorsal cleft to the base, each branch giving off two or rarely 3 branches.

Genus & Species	Location.	Host.	Locality	Description of the Bursa.
13. <i>T. longibursatum.</i>		do. Horse Caecum	Punjab M.P. Madras	Bursa with extraordinarily long. M.L. Distal part of E.D. forms an angle with the proximal part and runs parallel to the margin of bursa.
Genus Poteriosomum				E.D. arises from a common trunk with the dorsal; Main trunk of the dorsal cleft $\frac{1}{2}$ its length; the two lateral branches arising from the undivided portion close to the point of origin of E D.
14. <i>P. imparidentatum.</i>		Colon Pony	Madras Punjab U.P.	Bursa short and broad; M.L. not separated from lateral lobes. Margin denticulated.
Genus Gyalocephalus.				
15. <i>G. capitatus.</i>		Caecum Pony Colon Mule	Madras	Ventral, externolateral and lateral rays arise from a common trunk, externo dorsal arises separately from the dorsal; dorsal split to base each with 2 lateral branches.
Genus Bourgelatia				
16. <i>B. diducta.</i>		Caecum Pig Colon	Bengal Madras	Lateral lobes of Bursa divided giving the appearance of five lobed bursa.
Genus Quilonia				D.L. tends to be longer than L.L.; D.R. bifurcate each branch having 3 subdivisions.
17. <i>Q. rennei.</i>		Caecum Elephant	Madras Kerala	D.R. comparatively short; bifurcates in its posterior third; there is long common stem before trifurcation, the lateral sub-branch does not reach the edge of the bursa; the median and internal sub-branches are fused until practically at their tips.
18. <i>Q. travaucra.</i>		Caecum Elephant	Orissa Madras	Bursal rays stouter and D. R. also longer; D. L. not marked off from the L. L.; the three subbranches of D. R. come off practically at the same level and are equal in length.

Genus & Species	Location.	Host.	Locality,	Description of the Bursa.	
19. <i>Q. apiensis</i>		Intestine	do.	Madras	D. L. longer than L. L; Bifid V. R. lies close to L. R; E. D. arises from the stem of the D. R; D. R. appears rather broad and short. It bifurcates at its lower 1/3. Each branch trifurcates at the same level, internal sub-branch being the longest.
Genus: Amira.					
20. <i>A. pileata.</i>		Caecum	Elephant	Bengal Kerala Orissa Madras	Bursa greatly elongated. The free edges of lateral lobes folded inwards.
21. <i>A. Sameera.</i>		Intestine	Elephant	Madras	Bursa has a wrinkled appearance. Dorsal distinctly separate from lateral. Ventral ray bifid in its terminal half. Lateral rays are bent inwards. Externo dorsal ray long and ends near the edge of bursa. It is massive and divided at the level of origin of the E.D. ray. Each gives a thick short lateral branch which divides into two; do not reach the edge of bursa.
Genus - Murshidia.					
22. <i>M. indica.</i>		Large intestine stomach	Elephant	Madras	Bursa with well developed dorsal lobe. Ventral and lateral rays arise from a common trunk. The medio lateral and posterolateral separated in their distal portions. E. D. arises from the base of the Dorsal ray bifurcates half with a single or double lateral branch. Projections may be present on the posterolateral or externo dorsal ray.
					The bursa is distinctly divided into a dorsal median and two lateral lobes Ventral, lateral and E. D. ray lies close together. Dorsal D.R. branches are widely separated. E. L. ray is thicker at the base. Posterolateral ray has a dorsal branch which is stumpy.

Genus & Species	Location.	Host.	Locality.	Description of the Bursa.
23. <i>M. Murshidia.</i>		Large intestine Caecum	do. Madras	E. D. and dorsal rays are rugged in outline.
24. <i>M. falci fera.</i>		Large intestine Caecum	Elephant Madras	Lateral rays not bulbous at the base. The E. D. ray has a projection.
Genus : Oesophagostomum :				
25. <i>O. Columbianum.</i>		Large intestine	Cattle, sheep, goat	Ventral ray cleft. E. L. and L.Rs arise from a common trunk with D. R.; D. R. bifurcates for about half its length, each branch giving off a short lateral twig. To go opposite No. 25 Throughout India. E. D. separated from M.L. by a wide cleft.
26. <i>O. dentatum.</i>		do.	Pig	Bengal Bursa with edge finely serrated.
27. <i>O. radiatum.</i>		do.	Cattle	India P. L. having a protruberance at its root. E. L. closely approximating M. L.
28. <i>O. venulosum.</i>		do. stomach	Sheep Goat	U. P. Madras E. L. separated from M. L. by a wide cleft.
Genus : Chabertia.				
29. <i>C. ovina.</i>		L. I.	Cattle sheep	U. P. Punjab Bursal formula as in Oesophagostomum.
Genus : Syngamus.				
30. <i>S. tracheae</i>		Trachea	Fowl	Madras Terminal branches of D. R. tridigitate.
31. <i>S. laryngeus</i>		Larynx Pharynx	Bull Buffalo	U. P. Do
32. <i>S. indicus.</i>		Larynx	Elephant	Andamans Bifurcate branch of D. R. end in irregular fringed extremities.
Genus : Stephanurus.				
33. <i>S. dentatus</i>		Kidney Liver	Pig	India Bursa short and stout and sub-terminal.

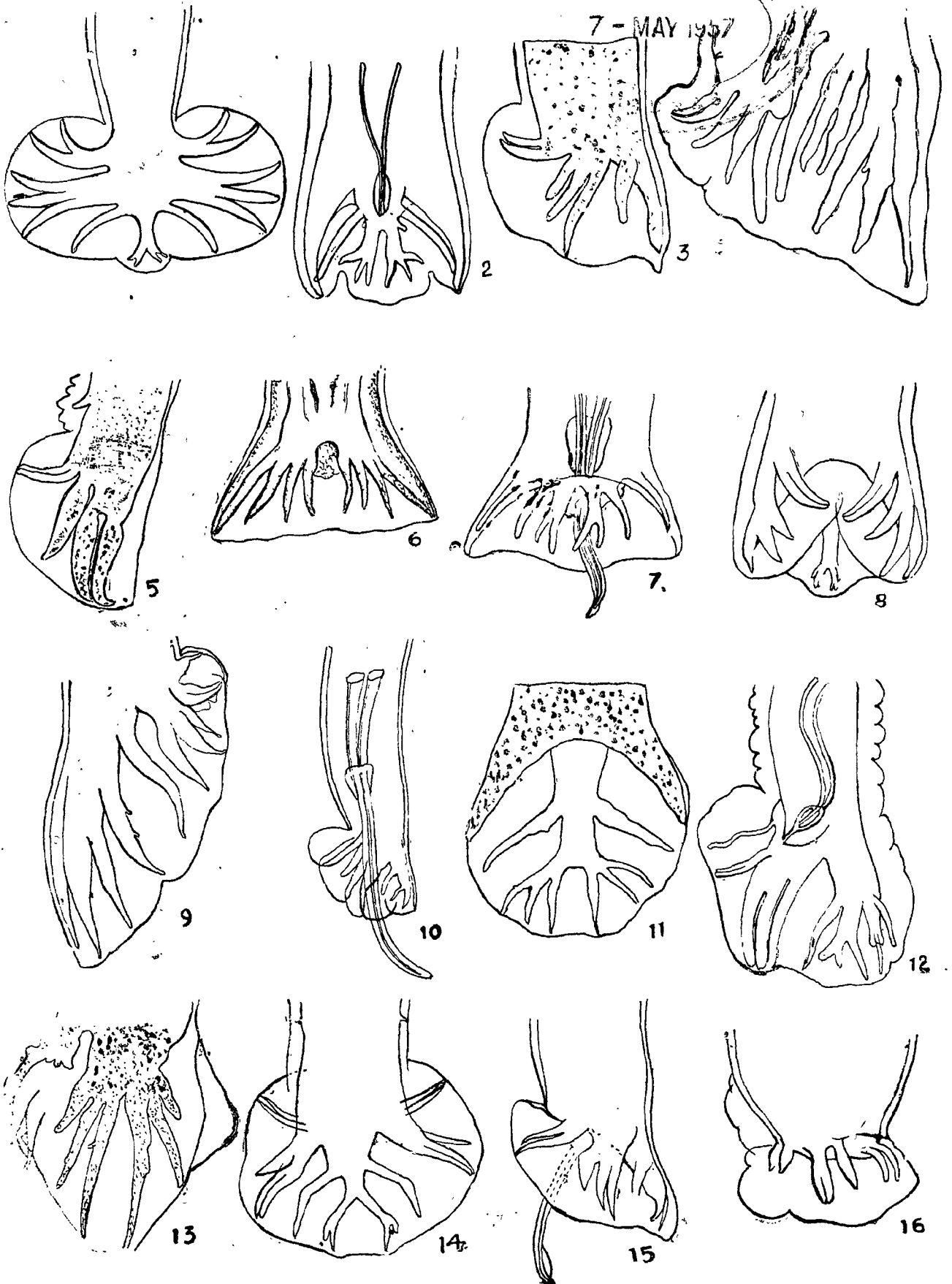
Genus & Species	Location.	Host.	Locality.	Description of the Bursa.
Genus : Ancylostoma.				V. R. Cleft; E. D. and L. R. arise from a common trunk; M. L. and P. L. separate; E. D. arises from a common trunk with dorsal; D. R. bifurcate and tridigitate.
34. <i>A. braziliense</i>	Intestine	Dog Cat.	Madras Bengal U. P.	Bursa with V. R. short; E. L. widely separated from other two laterals; opposite the root of E. D. the dorsal has pronounced ventral thickening.
35. <i>A. caninum.</i>	Intestine	Dog Cat	India	Bursa with lateral lobes long and deep supported by long and slender rays; 3 laterals widely divergent with thin points equi distinct and with deep cleft between M. L. and E. L.
Genus : Agriostomun.				
36. <i>A. vryburgi.</i>	Duodenum	Cattle	Assam Madras	M. L. and P. L. close together; Bifurcate branches of D. R. bidigitate.
Genus Bunostomam.				D. L. of caudal bursa assymmetrical; D. R. and E. D. are assymmetrical.
37. <i>B. phlebotomum.</i>	Duodenum	Cattle Sheep Goat	U. P. Madras	D. R. runs towards the left, small D. L.
38. <i>B. trigonocephalum.</i>	Intestine	do.	do. Assam Bengal Punjab	D. R. runs towards the right; No. D. L.
39. <i>B. foliatum.</i>	Gastric tumours, intestine	Elephant	Bengal	Bursa bilobed, foliate, Rays few in no. and widely separate.
Genus Grammocephalus :				V. R. cleft to its base; E. L. and laterals arise from a common trunk; M. L. and P. L. lie close together; E. D. arises from a common trunk with the dorsal; Dorsal doubled each limb being bidigitate.
40. <i>G. varedatus</i>	Liver, Bile duct	Elephant	Madras	Bursal rays short; Branches of D. R. exceedingly short.

Genus & Species	Location	Host.	Locality	Description of the Bursa.
Genus : Bathmostomum.		Elephant	Madras	D. R. beyond the point of origin of the E. D. which consequently arises from the branches of D. R.
41. <i>D. sangeri.</i>	Caecum Intestine	do.	do.	Bursal rays are fairly stout; Lateral and ventral rays tapering steadily.
Genus : Gaigeria.				D. D. symmetrical; D. L. larger than lateral lobes.
42. <i>G. pachyscelis.</i>	Abomasum	Cattle Sheep Goat	Punjab Madras	do.
Genus : Uncinaria.				D. L. symmetrical; D. L. considerably smaller than lateral lobes
43. <i>U. stenocephala.</i>	Intestine	Dog	Punjab Madras	
Family, Trichostrongylidae.				Well developed lateral lobes; Dorsal lobe very small.
Genus. Trichostrongylus.				D. L. symmetrical; Accessory membrane absent; V. V. smaller than V. L; V. V. and L. V. widely separated; E. L. M. L. and P. L. arise separately; E. D. arises from the base of the dorsal; Dorsal bifurcate near its extremity: Each branch being bidigitate.
44. <i>T. axei.</i>	Abomasum	Cattle, Sheep	Madras	do.
45. <i>T. colubriformis.</i>	do.	Sheep	Punjab Madras	E. L. thick
Genus : Nematodirus.			Assam Punjab	V. V. and V. L rays parallel and equal and close to one another.
46. <i>N. filicollis.</i>	Intestine Abomasum	Sheep	Punjab	Large elongate cuticular bosses 2. large lateral lobes. D. L. short, deeply emarginate thus reduced to two small lobules.
47. <i>N. mauritanicus.</i>	Intestine	Camel	Punjab	D. L. set off from lateral lobes by deep indentation and united with each other by a membrane showing only a shallow median indentation.

Genus & Species	Location	Host	Locality,	Description of the Bursa.
48. <i>N. spathiger.</i>		Intestine Camel	India	Bursa with distinct D. L. divided into two lobules. Finer smaller cuticular bosses than 46.
Genus : Mecistocirrus.				V. V. and V. L. rays divergent V. V. much smaller than V. L. D. L. symmetrical.
49. <i>M. digitatus.</i>		Stomach Pig Cattle, Buffalo	U. P. Assam Madras	
Genus : Haemonchus.				D. L. asymmetrical. V. V. and V. L. fused proximally and separated distally.
50. <i>H. contortus</i>	abomasum	Sheep Goat & Cattle	Punjab U. P. Hyderabad Bombay Madras Upper India	Stem of D. R. of bursa less than twice as long as its branches.
51. <i>H. longistipes.</i>	do.	camel	India	Stem of D. R. twice as long as its branches.
Genus : Ostertagia.				Accessory membrane of C. B. present.
52. <i>O. circumcincta.</i>		do. Goat	do.	Each of the main branches of the Dorsal ray of the bursa has two short accessory branches, one on the inner side near the tip and the other on the outer side higher up.
53. <i>O. ostertagi.</i>	Free or in nodules in the wall of abomasum	Cattle	U. P.	Main branches of D. R. bifid at tip without secondary branches.
54. <i>O. mentulata.</i>	abomasum Duodenum	Camel	India	do.
Genus : Cooperia.				D. L. symmetrical; Accessory membrane absent; V. V. smaller than V. L.
55. <i>C. curticei.</i>	Intestine abomasum	Sheep cattle	Punjab	Branches of D. R. lyre shaped.
56. <i>C. pectinata.</i>	Abomasum	Cattle	Madras	

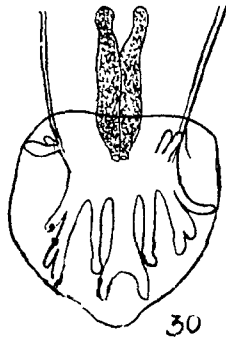
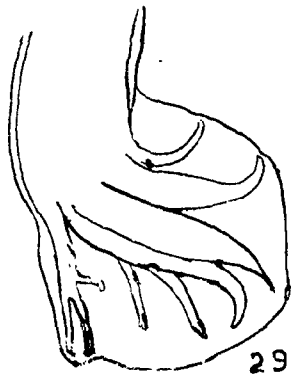
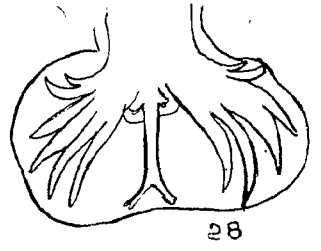
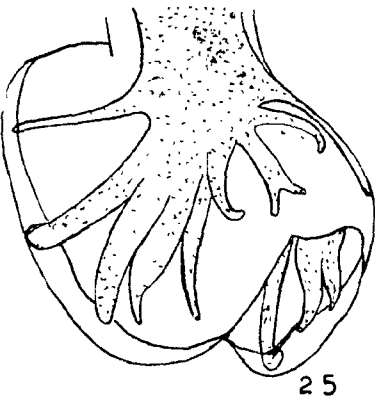
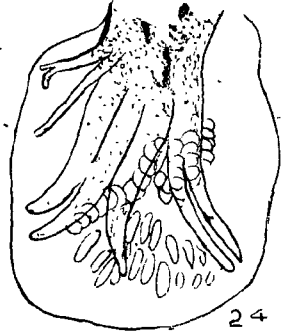
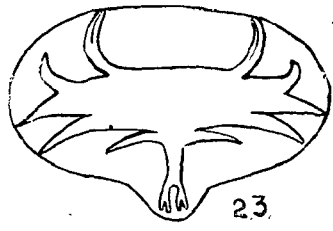
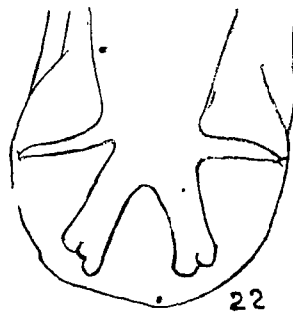
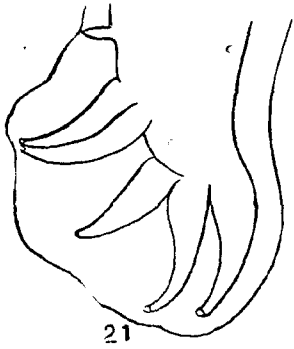
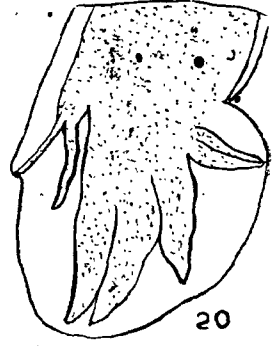
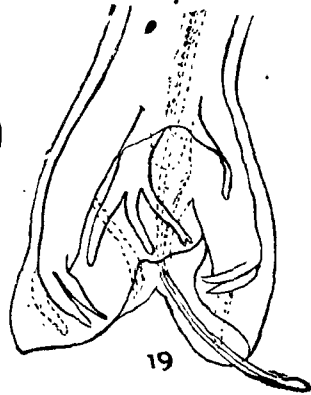
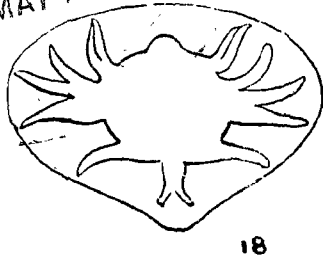
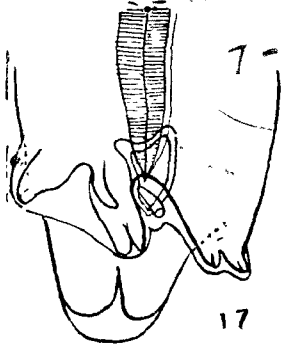
Genus & Species	Location	Host.	Locality.	Description of the Bursa.
Genus : Diotycaulus.				D.R. divided into two; Well developed, possessing two branches independent or fused at their distal extremity.
57. <i>D. arnfieldi.</i>		Lung Horse	Punjab U.P. Madras	Dorsal bifurcating about half-way.
58. <i>D. filaria.</i>		Bronchus Goat	U.P. Assam Madras	do.
59. <i>D. viviparus.</i>		do. Cattle Buffaloes	Punjab Hyderabad U.P. Madras	Bursa without lobes; Middle rays simple; Posterior tridentate.
Genus : Protostrongylus.				D.R. simple; V.R. cleft at its extremity; E.D. and other laterals arise from a common trunk; M.L. and P.L. fused for $\frac{1}{2}$ their length, E.D. arises separately from the dorsal. Dorsal a single thick trunk ending in a few short digitations.
60. <i>P. rufescens.</i>		Lungs Sheep Bronchi Goat	Punjab	Bursa small, with two indentations on each side.
Genus : Metastrongylus.				D.R. divided into two; rudimentary, possessing the form of two small simple appendices. Bursa with large L.L. and very small D.L.; V.V. and L.V. separated from each other; E.L. large, arises separately from other laterals; M.L. large; P.L. represented by a small branch arising from it; E.D. small, thin and arises separately from the dorsal.
61. <i>M. elongatus.</i>		Bronchi, Pig Lung	Madras	do.

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Our grateful thanks are due to Sri M. Anantaraman, Research Officer, Helminthology, Madras Veterinary College and Sri V. S. Alwar, Lecturer in Parasitology, Madras

Veterinary College, for their valuable help and guidance, and to Sri Jambulingam, College artist, for the drawings from the publications.

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KEY TO VARIOUS BURSA

- | | |
|--|--|
| 1. Typical bursa. | 17. <i>Stephanurus dentatus</i> . |
| 2. <i>Strongylus equinum</i> . | 18. <i>Ancylostomum</i> . |
| 3. <i>Decrusia additicta</i> . | 19. <i>Bunostomum phlebotomum</i> . |
| 4. <i>Equinurba sipunculiformis</i> | 20. <i>Grammocephalus</i> . |
| 5. <i>Choniangium epistomum</i> . | 21. <i>Bathmostomum sangeri</i> . |
| 6. <i>Oesophagodontus robustus</i> . | 22. <i>Gaigeria pachysceles</i> . |
| 7. <i>Tridontophorus serratus</i> . | 23. <i>Uncinaria stenocephala</i> . |
| 8. <i>Globocephalus</i> . | 24. <i>Trichostrongylus axei</i> . |
| 9. <i>Trichonema longibursatum</i> . | 25. <i>Nematodirus filicollis</i> . |
| 10. <i>Bourgelatia diducta</i> . | 26. <i>Mecistocirrus digitatus</i> . |
| 11. <i>Quilonia travancra</i> . | 27. <i>Haemonchus contortus</i> . |
| 12. <i>Amira</i> . | 28. <i>Ostertagia</i> . |
| 13. <i>Murshidia murshidia</i> . | 29. <i>Cooperia</i> . |
| 14. <i>Oesophagostomum columbianum</i> . | 30. <i>Dictyocaulus arnfieldi</i> . |
| 15. <i>Chabertia ovina</i> . | 31. <i>Protostrongylus rufescens</i> . |
| 16. <i>Syngamus indicus</i> . | 32. <i>Metastrongylus elongatus</i> . |

“ ACCIDENT ”

By

K. SAMBANDAM, 2ND YEAR, B. V. SC.



*I met a lady in the lab with mild
Full beautiful - Science's child ;
Her hair was glass, her foot was burner,
And her eyes were research with glamour
I saw strange things, and knowledge too
I cried - "Accident - Accident" - to you !*

Don't be under the impression that the above lady had brought the troubles to me to meet the accident. If you are under that mood please go through the essay and you will let the cat out of the bag - Accident.

You will see how many things had been discovered accidentally by the Scientists with child of fortune in hand.

Tasting a speck of saccharin let us get into the sweetness and see how it had been discovered as the heading runs.

Saccharin is neither a disaccharide nor a monosaccharide or a polysaccharide. But it is a sweetening agent. It is nearly 550 times sweeter than cane sugar.

One American chemist whose name happened to be Ira Ramsen and his pupil Fahlberg in 1879 were working in their chemistry laboratory. Time passed smoothly as the running of a jewelled watch.

After their up to the elbow they became tired and so they sat for tea. Luckily to the world they have touched the tea with their fingers accidentally. The tea was as sweet as anything and they were amazed. Without even taking tea, by that time tiredness took its heels, they traced the sweetness. At last their work revealed that it was nothing but Saccharin or otherwise called Alpha Sulphobenzamide.

Entering into bacterial world, some 280 years ago, Luvenhock, a shop keeper of Holland accidentally viewed drops of rain water through a microscope. He found many organisms what we call now as Bacteria. From that day onwards the development of Bacteriology, has been developed and true blue bacteriologists brought many things to light.

Pasteur who got credit by pasteurisation, was testing "Anthrax". In his laboratory there were a lot of old cultures. His assistants asked him whether the old cultures can be thrown to dogs. But Pasteur without keeping anything in his mind's eye accidentally and unknowingly injected the cultures into two hens which were kept in his lab. The hens became weak on that day but ever and anon they became alright. At one time he was badly in need of four hens for anthrax research work. But there were only two hens which were injected by the old cultures. So he purchased another two and did his research in anthrax with the four. By the next eye of day two fresh hens bite the dust but the old cultured injected hens survived. From that he found that "Diamond cuts Diamond". It is merely an accident.

Poking our nose in Aromatic chemistry it can also be made to sail in the same boat - accident.

Coal tar once a waste and veritable nuisance, supplies today the starting materials for many valuable drugs, perfumes, dyes, explosives, photogoods, etc. was found accidentally by W. H. Perkin in 1886, who can keep a feather on his cap by saying that he was only 18 year old boy and had not come to head as per the law of western side. He was attempting synthesis of quinine, gave the impetus to explore coaltar products for synthetic dyestuffs and a consequent development of aromatic chemistry followed.

Blotting the ink, the paper was found accidentally. Coming to the manufacture of paper, pulverised material, bamboo, is freed from lignin and some of the hemicelluloses by digesting with Na OH solution at 160-170°C, under reduced pressure for several hours. Thus the cellulose is got as pulp. It is milky white. Puffy mass can be obtained by thoroughly washing and bleaching with Ca O Cl₂. The white mass is run on to endless band of wire gauze with sufficient quantity of HoH.

This cellulose is forced between steam heated felt rollers. HOH is expelled and a sheet of blotting paper like material is got. It is sized with alum, rosin, and gelatin etc. to make it impervious to writing ink. The accidental omission of the size from paper gave the blotting paper which we use.

In concluding this, I invite you to wind up your mind with the essay and compare with the Dickens :

“Accidents will occur in the best regulated families ; and in families not regulated by that pervading influence which sanctifies while it enhances the - a - I would say, in short by the influence of woman, in lofty character of wife

David Copperfield.

I repute his voice with the ringing sound of the above essay and I leave it your judgement that how accident can happen accidentally.

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P H E N O T H I A Z I N E

By

SYED HAMEED HASAN, III YEAR



Thiodiphenylamide, as it is chemically called, is a dye first synthesized in 1885. Pure phenothiazine is a pale lemon coloured substance almost insoluble in water and stable when kept dry. The first biological use was demonstrated in 1934 when it was found to destroy the larvae of certain mosquitoes. In 1938 the results of its use as an anthelmintic were reported and soon after it was adopted as a therapeutic agent in helminthiasis.

It is more commonly used in herbivores than in carnivores. In the latter, it is less effective and more toxic. It is an efficient anthelmintic in the treatment of stomach worms of cattle and sheep; nodular worms of cattle sheep and swine, strongyles in horses, and caecal worms in birds.

Being soluble only to the extent of 1 part to 80,000 parts of water absorption is prevented to a considerable extent. It is given in large bulks and is taken by most animals without dislike when mixed in the feed. The animals need not be fasted before or after feeding.

The drug being insoluble in water is converted in the intestines of cattle, sheep and probably of all other animals into phenothiazine sulphoxide and is absorbed. This is converted into leucophenothiazine and leucothionol in the liver. (Clare N.T. 1947).

About one half of the drug is said to pass unchanged through the alimentary canal itself. In the urine it is excreted to the extent of about 30% in the form of leucophenothiazine and leucothionol.

The nature of its action is not fully understood. Lazarus and Rogers (1950) have showed

that helminths absorb the drug at least five times more than that absorbed by the tissues. Absorption is through the cuticle. Variation in susceptibility is peculiar. Resistant parasites absorb as much as non resistants. It is relatively in-affective against immature helminths. Phenothiazine sulphoxide is found to have action against *Haemonchus contortus* (Whitten 1948) and *Oesophagostomum columbianum*.

Toxicity to animals varies with the individuals and species. Some have died after receiving therapeutic doses and some have survived many times this amount. This variation is not explained. Goats and sheep are fairly resistant, cattle and swine are less resistant. Horses and human beings are said to be most susceptible to its toxic action.

Cachexia is an important condition in which Phenothiazine is contra-indicated. Animals that are weak, anaemic and emaciated should not be treated with the drug. In constipation the drug should not be given since the retention of the drug in the intestines facilitates its absorption.

Treated animals show red discolouration of urine and milk (if lactating). The discoloured urine may colour wool permanently. The milk from the treated animals is non-toxic to calves and to other animals. The pink colour is imparted by thionol and leucothionol.

Cattle. The use of phenothiazine is usually confined to the treatment of parasitic gastro enteritis due to *Haemonchus Contortus*, *Trichostrongylus axei*, *Oesophagostomum radiatum* and *Bunostomum phlebotomum*.

Dose is 10 gms/100 lbs. body weight with a maximum of 60 gms. and minimum of 10 gms.

Treatment should be repeated every 21 days in heavily infested areas.

Nodular worms and hook worms are resistant to the effects of the drug. Cowser & Berliner (1943) found that 20 gms / 100 lbs. live weight with a maximum of 80 gms. were necessary to expel the hook worms. Daily intake of 0.5 gms/100 lbs. live wt. reduces the egg production of *Haemonchus*, *strongyles* and *Oesophagostomum*. Other nematodes are not much affected. Mayhew (1950) found that 1.5 gms. for calves in daily ration decreased the development of infective larvae, though not the faecal egg count.

By giving 1:10 salt mixtures, Harwood and Guthrie (1945) were able to control helminthiasis of steers on open range.

Phenothiazine is excreted to the extent of 80% in the faeces and urine of cattle. Thus only a small percentage is excreted in the milk. The drug in the milk has considerable bactericidal action. The milk is pink to red in colour and remains normal for several days when exposed to warm air and if kept in a refrigerator it will remain good even up to a month. Boiling has no effect. Though the milk is non-toxic to human beings and animals it is inadvisable for consumption.

External application of phenothiazine is good to some extent for eradication of sucking lice.

Sheep & Goat. Phenothiazine is effective against the stomach worms, nodular worms, hook worms, *Trichostrongylus* and *Nematodirus* species of sheep and goat in the descending order of toxicity.

For prevention of the above infections, it is best as a prophylactic drug; one part of phenothiazine to 10-14 parts of salts being the best proportion. Salt mixture is given throughout the season to the animals. Significant weight gains with drop in faecal egg count have been reported by feeding the animals with salt mixture.

A single therapeutic dose of phenothiazine with the change in pasture for heavily parasi-

tized animals is good. Monthly administration is most effective. Approximate dose is 25 gms. for an adult weighing 60 lbs. and 12.5 gms for lambs weighing 25.50 lbs. Variations are desirable as per circumstances. Trichostrongylosis in sheep requires as high a dose as 35 gms adult.

Deaths due to toxicity are rare. Goats are more resistant than sheep. 160-490 gms, had no ill effect on sheep. Goats are seen tolerating even 1500 gms. Abortions are seen in the last 3 weeks of gestation and photosensitisation is also seen. Reports about goats are comparatively scarce.

Horses. Phenothiazine is effective up to 100% in all small and large strongyles, effectiveness varying with the size of the dose.

It is administered in bentonite suspension through a stomach tube or in the form of a bolus. It is readily taken when mixed with mineral mixture or when sprinkled over bran. Dose is 3 gms/100 lbs. body wt. For the control of strongyles 2 gms/day for each animal is quite effective.

Toxicity is much in horses. Death is common when administered in large doses to debilitated and anaemic animals. The toxic symptoms include dullness, weakness, anoroxia, haemolysis, oliguria and haemoglobinuria. The haemolysis which is not seen in other animals, shows that the course of metabolism of this drug is different in horses.

Swine. It has less value in swine than in ruminants. It removes above 90% of the nodular worms, 50% of the ascarids, and has no action against other intestinal parasites.

It is administered in the form of capsules, tablets or suspension; Dose is 1.5 gms/10 lbs. body wt. Very toxic to immature pigs and suffering from enteritis. Anorexia, apparent blindness, nervous disturbances with circling ataxia are the signs of toxicity.

Carnivores: In dogs, temporary decrease in a egg-production of ascarids and hook worms may be brought about. It is applied exter-

nally for demodectic mange, which has not responded to benzylebenzoate, hexachloride, etc.

Camels. It has been very useful in controlling the most commonly found nematode *Haemonchus longisittipes*. *Trichostrongylus* species are resistant. Dose is 20 gms/100 lbs. body wt. with a maximum of 60 gms.

Fowls. Phenothiazine is very effective (90%) against caecal worms *Heterakis gallinae* and less effective (50%) against ascarids (*Ascaridi galli*) of chicks and turkeys. Administration is in the form of tablets to the individual birds. Dosage is 0.5 gm. for chicks and 1 gm. for turkeys. Synergism is noticed between phenothiazine and nicotin. Pigmentation of feathers, leg-scales, corneal changes of eye are the toxic affects noticed.

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War destroys men, but luxury destroys mankind ; at once corrupt the body and the mind.

—CROWN.

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The Leather Trade and Animal Husbandry

By

F. D. WILSON, B.V.Sc., G.M.V.C.,
Department of Flaying and Meat Hygiene



The use of leather has been described as the relic of the Savage Age of Man. It is true that when the first man was born, he felt hungry and had to live by hunting. He then felt the fury of the elements, cold and rain and had to protect himself from them and he did so by using the hides and skins of animals, which he killed for his food. This was the beginning of the Leather Industry.

India a great country for cattle, contains a larger cattle population than any single country in the world. India has a total cattle population of 25.5 crores comprising of 13.6 crores cows and bulls, 4 crores of buffaloes, 4.65 crores goats, 3.77 crores sheep and 32 lakhs of other animals. Whether these are slaughtered or not, they must die and then, if nothing is done, the hides go waste. By tanning these hides and skins, humanity can be saved from a lot of misery and hardship. In India dollars are earned not by killing animals but by tanning the hides of cattle which die a natural death. Only 15% of hides obtained are from slaughtered ones, the rest 85% are from dead animals.

Hides and skins have been the objects of trade and barter from very early times and the industries of curing and leather making could claim to be the earliest among the industries set up by man and practised by him. The leather industry ranks probably fourth in importance as an earner of foreign exchange. During 1951-52 the total value of leather and leather manufactures exported was Rs. 35.34 crores. The industry therefore is one of the most important phases of Indian economic life. It not only gives employment to large

numbers of India's inhabitants, but is a factor in the economic well being of millions of India's depressed classes. Any action taken to improve or help the industry will therefore automatically though gradually help to better their lot.

Compared with the leather industries of Europe and America, India lags behind both in the volume of production and quality and variety of finished leather. It is only in comparatively recent times that the searching eye of science has been brought to bear upon its technology. This has led to improvements and modifications of its various qualities. Although some organised factories based on improved practices, followed in foreign countries, have been established here, the bulk of the production is still carried out on a cottage industry basis and the methods employed by the craftsman is empirical. It is obvious that if we are to retain our export market and build up the industry to suit modern requirements, these empirical practises have to be modified to bring them in line with modern scientific methods and to meet this need the Central Leather Research Institute was established in Madras.

Indian cattle comprising a quarter of the world's bovine population come from an inferior stock and many of them are decrepit, lame, unhealthy and ill-fed. They compete with human beings in the pressure on land for food. Though we profess to worship the cow we have not cared for her. This is because she is no longer a Kamadenu. As she has become a liability we have left her loose on the streets. The problem of let loose cattle by way

of loss to agricultural produce has assumed such grave proportions in Northern India that the Government have amended the Cattle Impounding Act so that deterrent punishment could be inflicted on the offending owners. Government also help the maintenance of Gosadans and Cattle Concentration Camps for the lodgement of old and useless cattle.

These however are only temporary expedients. The wise policy is to concentrate on the cow. The cow is comparable to an engine. Just as a good engine will convert all the fuel supplied to power a well bred bullock or cow converts most of the food consumed into work or milk or good hide or skin in smaller animals. A poor quality animal will always yield only a poor quality hide. Fortunately with patience cattle could be upgraded by the conclusive aid of pedigreed bulls. The Central and State Governments have therefore opened or are opening livestock farms for producing pedigree animals of various breeds. Breeding stocks are also issued for grading up the local breeds. Intensive work is undertaken in restricted compact areas under the Key Village Scheme and there are now many Key Village Centres to be found all over. Artificial insemination is used to pace up the progress and very many pedigree bulls are stationed in villages under different schemes. Though it may take time the stamping out of ill-bred and stunted useless cattle is well on its way. To better the lot of suckling calves, the calf subsidy scheme was introduced to bring home to the milkman the necessity for proper care of the large number of good quality calves.

Any livestock industry must have its own efficient health service. One might ask whether it would not be wise to have the ravages of epidemics to compensate for the alarming multiplication of uneconomic cattle. Unfortunately there are no means to direct pick out only the best. If superior stocks have to be built, the epidemic diseases should be efficiently controlled. The greatest killing disease of all in cattle is Rinderpest or Cattle Plague. The ravages were so great that agricultural operations were threatened with total paralysis. So

Queen Victoria found it expedient to appoint an Indian Cattle Plague Commission as early as 1869. As a result of its recommendations the Civil Veterinary Departments were constituted and an Institute for Veterinary Research was established at Mukteswar. The present Animal Husbandry Department in Madras has achieved more than the objective for which it was constituted. Then known as the Civil Veterinary Department it was just charged with the work relating to control of the disease. The residuary State of Madras has eradicated Rinderpest from its 56,000 miles of territory and 16 million cattle.

Of the virus diseases the one of greatest economic importance to the leather trade is Rinderpest. The disease does not lead to scars and localised grain defects in the leather but results in a very poor condition of the hide. Sole leather from diseased hides are thin with thin fibres and very little resistance to wear. In abrasive tests carried out on the Thuau machine figures of 9.85%, 11.6%, 11.35% and 10.4% were obtained as compared with upto 30% given by good sole leather, from a similar but healthy type of hide. Rinderpest is a febrile disease and hide from infected cattle show the characters that one would expect in an animal greatly emaciated as the result of acute fever.

All vaccines and sera for Rinderpest, Anthrax and allied diseases which rapidly deteriorate the condition and structure of the hide are prepared within India at the I.V.R.I. and of late at the Veterinary Biological Research Institutes of State Governments.

The I.V.R.I. has a special Research Officer for hides and skins and his researches on the warble flies, ticks, lice etc. and the best methods of control are being carried out in the field. It would not be out of place to mention that 600-700 warble fly holes have been recorded in a single hide and these occur in the costliest part of the hide. Dipping of cattle, sheep and goats for ticks, sarcoptic mange, etc. is being regularly undertaken in affected areas.

Ring-worm leaves bald patches on the hide. The patches show desquamation and crust formation leading to roughly circular damaged patches on the grain surface of hides. Animals recovered from ring-worm do not generally show permanent scars and treatment by the veterinarian has been of help in the hide industry.

The I.V.R.I. has also a Nutrition section to deal with researches on feeding and footstuffs available in the different parts of India.

The results of all these depend on the quality of the worker and to train them up more Veterinary Colleges have been instituted in India. While during pre-independence there were only 4 colleges there are at present 13 colleges in India. The M.V.C. continues to lead in the sphere of Vety. Education and in February 1953 a Flaying School was commenced in this college to train both amateurs and butchers in the art of scientific flaying, as the loss in the undivided Madras State was 25 Lakhs per annum as a result of faulty flaying. Flaying auxillary centres were also opened in the districts and butchers trained.

The flaying staff have not been satisfied with imparting training alone. They have been trying to improvise knives for flaying and some of these knives are being used by the butchers at the slaughter house.

The Indian Leather Industry is lagging behind to the detriment of India's economy and defence and it is essential that it should be developed and brought in line with the leather industries of the West. India annually produces hides and skins which at present are valued at Rs. 25 Crores. If all these available hides and skins were tanned and converted into finished leathers, it is estimated that a total annual production of various kinds of leather worth about Rs. 80 Crores would be possible. This is a target of industrial production which seriously deserves aiming at. Attempts should be made to produce leathers of the best possible quality because a great bulk of Indian leather has to be exported to foreign markets where its competing strength should be increased by better quality. Besides, leathers of the very best quality are required for army boots, saddles and other military accountments. So both for India's economy and defence her leather production must be increased in volume, variety and the quality produced must be of a high standard. Leather technology is like a clock and unless every part of it is well synchronised, the clock will not function properly e.g. a dirty or rusty knife during flaying or a knife used injudiciously may cause irreparable damage and loss to the industry. The Animal Husbandry Department should therefore strive to produce a large, strong, healthy and well flayed hide.

The measure of man's life is the well spending of it, and not the length.

—PLUTARCH.

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—Hosur Muni Reddy, I B. V. Sc.

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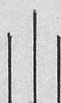
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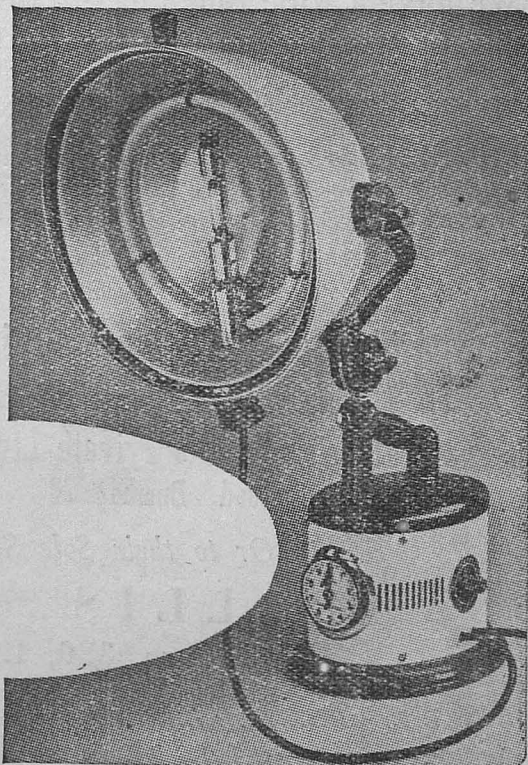
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NASAL SCHISTOSOMIASIS

By

K. GANGA RAJU, FINAL YEAR, B.V.Sc.



1. Introduction : Nasal Schistosomiasis is a chronic disease mainly of bovines characterised by granulomatous growths in the nasal mucus membrane and snoring sound during respiration. This is very wide spread throughout India and occurs as an enzootic disease in some areas. This condition has not been described in other countries except Ceylon, Pakistan and U. S. A. Though the disease by itself is not fatal the economic loss by the reduction in working capacity is considerably great.

Animals affected : The condition is very common in cattle and buffaloes come next in incidence, though it has also been reported in sheep, goats and horses. Among cattle it is commoner in adult animals than in young ones. The reason for this appears to be that the young calves have no chance of drinking water from a tank or pool which is usually the source of infection. Young calves may however be affected if they drink water from infected ponds.

Etiology : The etiology of the disease has baffled Veterinary workers in India for some time in the past. Krishnamurthi Iyer (1922) was the first to declare that the disease is a form of Actinomyces since he regarded the rosette like bodies found in histological sections of the lesion as characteristic of "Ray fungus" Cooper (1923 and 1931) recovered a pure culture of a streptothrix organism from the

lesions. Again Krishnamurthi Iyer (1927) suggested the etiology of this disease to be a Rhinosporidium. In 1932 three workers (viz.) Bhalerao, Datta and Malkani working independently recorded schistosoma worms in the nasal veins of cattle. Deta (1932) described this disease as a clinical manifestation of Schistosomiasis and further observed that there exists another separate and distinct affection of nose of cattle and horses (viz) Rhinosporidiosis as already described by Krishnamurthi Iyer (1927). The latter lesions are more fragile and pedunculated unlike the former which are elevated masses and intimately connected to the subjacent tissue by broad base. The controversy about the identity of *S. spindalis* and the schistosoma of nasal granuloma ended when M. A. N. Rao (1934) described the nasal schistosoma and proved it to be an entirely different species which he named as *S. nasalis*.

S. nasalis : Is a trematode worm belonging to the family Schistosomitidae and genus *Schistosoma*. The sexes are separate with marked sexual dimorphism. Males are shorter and thicker and females longer and filiform. These worms inhabit the nasal veins. The males possess 2-4 tests and the cuticle is coarsely tuberculated from ventral sucker to the posterior end.

Life history of S. nasalis : The ova containing fully developed miracidia come out

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along with the nasal discharge of diseased animals. The miracidia hatch out from the ova and, swims about vigorously in water with the aid of cilia present on its cuticle. The shape of it is more or less like that of an almond with its shoulders slightly broadened at anterior extremity and flattened dorso-ventrally. The miracidium can live in water for about 24-36 hours and should come across the proper intermediate hosts before this period, if the life cycle is to continue.

Line as luteola, L. acuminata and Indoplanorbis exustus : Are the snails that have been found to be intermediate hosts for this worm. The miracidium then enters into the snail where it develops into a sporocyst which then gives rise to cercaria. The cercaria are discharged from the snail. The cercaria (*Cercaria indica* Sewell, 1922) is furcocercus and pear shaped; on its wider end the forked tail is inserted. It is a feeble swimmer. The body surface is covered with small thin spines pointing backwards. The forked tail is also covered by spines which are coarser comparatively and are curved slightly at the ends. The whole development in the snail takes place in 40 days.

Infection : The cercaria penetrates the skin, oral or nasal mucosa of cattle when they drink water or while bathing in our infected pond.

Symptoms : The incubation period is 3 months. The adult flukes are less pathogenic and it is the ova of the worms which are mainly responsible for the production of the characteristic growths.

Redness of the nasal mucosa, sneezing and coryzo mark on set of the disease. Afterwards the mucous discharge from the nostrils is increased, and simultaneously the mucus membrane becomes oedematous, narrowing the nasal calibre and thus giving rise to a peculiar blowing sound during respiration. Then the characteristic lesions (i.e.) the pseudotubercles appear on the oedematous mucus membrane as raised patches studded over with tiny abscesses which are shotty to touch. The

lesions appear first at alar margin of the nose and gradually extend posteriorly to nearly middle of the nasal cavity. As the disease advances the growths are more in number and bigger in size, due to the confluence of these tiny growths a cauliflower like mass is formed which is vascular and composed of granulation tissue. At this time there is marked dyspnoea and characteristic snoring sound during respiration which interferes with feeding and rumination and the animal may go down in condition. The epithelial covering of the actinobody is ulcerated due to the pressure exerted by the ova attempting to work their way out. At this stage the nasal discharge becomes thicker and appears more or less mucopurulent and later becomes rusty and show streaks of blood. After rupture these growths disintegrate and are sneezed out exposing raw ulcers or varying sizes. During this time the animal is temporarily relieved of difficulty in breathing and snoring sound is not present. Again the growths appear which are more fibrous and non-vascular.

In calves irregular areas of congestion and pimply eruptions are most commonly seen. The snoring noise which is observed in adult cattle is not much present in young animals owing to probably the absence of cauliflower like growths.

The clinical symptoms of sneezing, snoring and profuse nasal discharge commonly seen in adult cattle are generally absent in buffaloes. Slight congestion and few pimply eruptions only are seen in these animals. This sort of resistance in buffaloes may be as stated by Rao (1935) due to the fact that buffaloes get a partial immunity to *S. nasalis* owing to the infection with *S. Spindalis* acquired on account of their aquatic habits.

Diagnosis : Is made by clinical symptoms. Definite diagnosis can be made by examining the nasal washings for ova of *S. nasalis*.

The mucopurulent discharge or the granulatous growths can be scraped out with the help of a curette and washed with normal saline solution. To this material a small

quantity of 10% caustic potash or soda is added to dissolve the mucus and centrifuged and the sediment is examined for ova. The ovum is an elongated spindle, the middle third of the body of it is concavo-convex and is prolonged into a horn on either side one of them having its extremity bluntly rounded and the other terminating in a spine (Palanquin shape). In the centre it has got a well developed miracidium can be seen.

Differential diagnosis: *Schistosoma nasalis* growths can be differentiated from Rhinosporidiosis which is caused by a fungus, by the nature of the growths. In Rhinosporidiosis the nasal growths are usually unilateral, more fragile, spongy and pedunculated but in *S. nasalis* infection the growths are sessile, solid, with broad bases. Microscopic examination of Rhinosporidial growths reveal the presence of sporangia.

Treatment: The earliest recorded account of the treatment of this disease is by Jaya Singh Raj (1908) who adopted surgical methods, for which he invented two types of scoops.

Theagaraja and Subramanyam (1919) attempted to treat this disease by rubbing a mixture of powdered copper sulphate and alum to the lesions in the nose without success.

Parthasarathi Naidu (1921) in Madras was the first to adopt a successful method of treatment by injecting intravenously solutions of tartar emetic and he did this at a time when nothing was known about the etiology of this disease. Rao and Mudaliar (1936) computed suitable dose of Antimonium tartratum for treatment of Nasal schistosomiasis. They recommended 1.5 grains per 100 lbs. body weight for 6 injections or 2.5 grains on alternate days given intravenously. Tartar emetic is very effective and cheap drug for nasal

schistosomiasis but the occasional reactions it produces and the length of the treatment warrant further researches to evolve a still safer but equally efficacious drug.

Other preparations of antimony that may be employed are:

(a) **Antimoson:** (Bayer) Dose 20-40 c.c. according to the size of the animal (Heifer to Bull). This can be given either by intravenous or intramuscular or subcutaneous routes. Total 5 injections each one given in 3 days interval.

(b) **Anthiomaline:** (May & Baker) This can be given by subcutaneous or intravenous routes. 6 injections every alternate day. Dose - 20 c.c.

(c) **Fouadin:** (Bayer) First 3 injections 5 c.c. each in alternate days, next 3 injections 6.5 c.c. daily and last 3 injections 8 c.c. daily. Total 9 injections all given intravenously.

Prophyloxix: As in other Trematode infections the best method of controlling the disease is by destruction of the intermediate hosts, (viz.) the snails. It is extremely unfortunate however that no effective steps have so far been taken on a provincial scale towards this end. Nor is a statistical estimate regarding the exact monetary loss due to this disease available, though it may not be an exaggeration to say that the loss due to the reduced working capacity and debility produced may be equal to that due to contagious diseases of bacterial origin. Much work has been done in South Africa where snail control measures are taken on a large scale in the control of human schistosomiasis. The methods for control of snails are:

1. Mechanical
2. Chemical, and
3. Biological.

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1. **Mechanical Methods:** These include removal of snails by hand and clearing the the vegetations which are necessary for snail growth as the snails may feed and crawl on some of them and fasten their egg-cocoons to them. Removal of weeds may be done mechanically and by addition of toxic substances.

2. **Chemicals:** Destruction of snails could also be done using chemicals like Copper Sulphate in dilutions of 1 to 5 parts per million.

Other chemicals that may be used are Copper Carbonate, Calcium Cyanamide, Quick lime, Copper Phosphate, Common salt, etc.

3. Biological control :

(a) **By insects:** Some insects known to attack snails for food. Of these firefly larvae or Glow works, are notorious. A species of this insect has been successfully employed in Hawaii Islands to control snails.

(b) **By Fishes:** The habits of some aquatic fishes like *Ospromenus gourami* was useful in controlling snails. It is gluttonous when feeding and swallows large amounts of vegetation, young snails and egg-cocoons.

(c) **By Duck rearing:** Ducks when reared and allowed to go to infested ponds and tanks reduce snails population effectively by preying on snails. So villagers should be advised to rear ducks.

(d) **By Vegetables:** The leaves, roots and fruits of some plants are toxic to the snails. Plants whose fruits contain some snail destroying substances are *Balanites aegyptiaca*, *Sayindus emarginatus*, *Acacia Concinna* and *Caesulpina Coriaria*. These poisonous fruits are allowed to soke in snail infested waters in large numbers

either whole or crushed or powdered, but it would not be economical to accomplish this through human agency considering the cost of the fruits and wages for men. A practical method of control is the planting of these trees by villagers themselves on the banks of ponds and along the edges of canals or ditches so that the fruits will be continually falling into the waters and check the snail population.

Side by side with snail control measures treating the affected animals in endemic areas should be undertaken.

Acknowledgement: My hearty thanks are due to Dr. V. S. Alwar, GMVC, BVSc., M.Sc., and Dr. C. R. Krishnamurthy, BVSc., Lecturer and Assistant Lecturer in Parasitology for their help in preparing this article.

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A man's best friend are his ten fingers.

—ROBERT COLLYER.

HAY MAKING

By

R. VENKATAKRISHNAN, B.V.Sc.,

(Department of Animal Nutrition)



Introduction : Hay making is a scientific art practised from the dawn of civilization as one of the methods of preserving green forage during the periods of luxuriant growth and to economise the cost of feeding by substituting it in the leaner months of the year, when scanty pasturage is available for grazing animals. This importance of making hay has been heavily felt at no time than at present when the battle for existence of the increased human population and its imperite necessity to grow more human food has encroached upon the availability of grazing lands for animals, the existence of which is also essential to meet the demands of human food requirement.

Definition : Scientifically speaking, hay making is cutting green forage just before maturity and drying it so that the moisture content is reduced to about 20% to enable proper preservation without undue deterioration.

Characters for the green forage to be cut for making hay : The forage for hay making should be leafy, greenish, succulent with soft and pliable stems and should not be at too late a stage of maturity. The land should be as far as possible devoid of unpalatable or harmful weeds.

Season and climate : The operation should be taken up in a non-rainy season when dry and sunny climate with moderate wind is assured. This assures quick drying with minimum loss of nutrients.

Time to cut : Cutting the green forage for hay making should be started in the morning hours after the dew is off.

Combing : In the case of spear grass (*Andropogon contortus*) the awns have to be removed before mowing. This is done by a combing machine.

The blades of the comb collect the awns when drawn from the direction opposite to which the grass is inclined. When a sufficient quantity has collected in between the blades of the comb, it is brushed out and removed from the field. The presence of awns in the hay may injure the buccal mucosa of the livestock feeding on it.

Mowing : The mowing machine is drawn against the grass in rows, the mowing blade being kept at right angle to the standing forage. Shortening of the mowing period and reduction in the cost of operation are assured when the mowing machine is used. Care should be taken to raise the blade when impediments such as ant-hills, stones etc. are met with as otherwise the blade will be damaged. The mowed hay is left in the field in swaths for initial drying.

Teddering : (Plate No. 1). Drying the cut forage is the crux of the whole process of making hay. Improper drying with undue or excessive handling causes high percentage of mechanical losses by way of shattering of leaves and breakage of stems. Improperly dried hay when stacked causes fermentation and rise of temperature inside the stack giving use to 'mowburnt' condition of hay. The rise of temperature inside the stack may even cause spontaneous fire outbreak in the stack. Proper and uniform drying with least mechanical loss is assured when tedder is used.

Racking and cocking: To prevent over drying and eventual bleaching, the swaths are collected by rakes and left in heaps called 'cocks' for 2 to 5 days, (Plate No. 2) depending upon the season and the dried

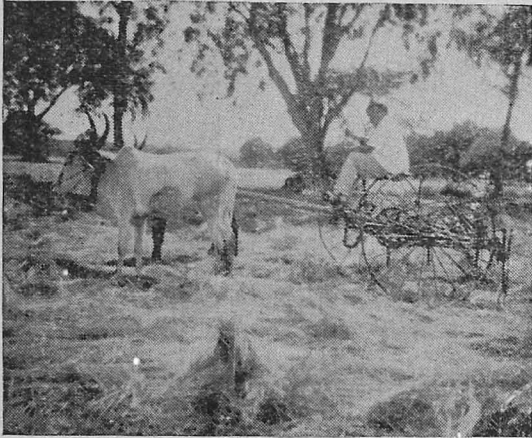


PLATE NO. 1 TEDDERING

nature of the forage cut. The heaps 'cocks' as they are called are pulled to a centrally elevated place in the field for erecting the hay stack.

Stacking: Upto a height of 8 to 10 feet the stack is built up by using hay forks into a square or circular or rectangular fashion. Above this height, hay elevator can be used with advantage of economy and quickness.

The top of the stack is finished with a slope sliding like a roof. The sides are made even by pulling out the ruffled hay. At the top thatched materials like korai grass or lemon grass are laid in position and tied down so that the top is secured tight from being blown out by heavy winds. The sliding thick roof cover prevents soaking of rain water and the elevated place in the field on which hay stack is built, helps easy drainage leaving the least time for rain water for stay and percolation.

Characters of good quality hay: It should be leafy with soft and pliable stems, retaining maximum amount of green colouration and devoid of foreign material. It should be free from objectionable and unpalatable odour due

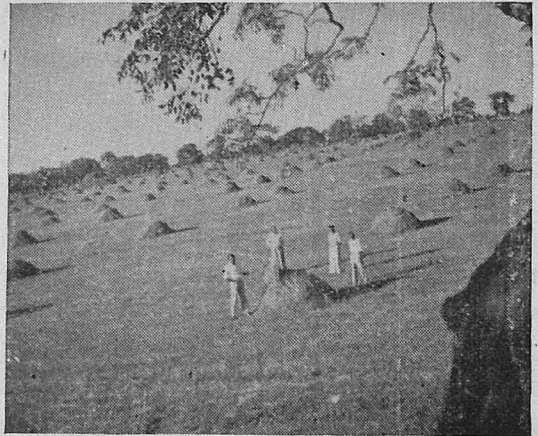


PLATE NO. 2 COCKING

to mould or mustiness. It should carry the aroma and fragrance of the original crop.

Conclusion: Hay forms one of the best methods of preserving fodder. Good quality hay when given along with other concentrate foods at the rate of 1.5% of the body weight for horses, at 2% of the body weight for sheep and at 2.5% of the body weight for cattle, brings about the sense of repletion and fullness of stomach for such animals by meeting the bulk requirements in feeding. Fine quality hay is the first roughage food for calves to nibble. Hay making indirectly helps in the increased yield of forage from a given land as the surplus fodder when cut and removed for hay making, fresh growth shoots up which enhances the number of cuttings.

Above all the feed cost is reduced, when fed, during the period of absence of abundant pasturage.

Awake, arise, or be for ever fallen.

—JOHN MILTON.

Recurrent Luxation of Patella and Its Cure

By

SITANATH MAHAPATRA, FINAL YEAR B. V. Sc.



Synonyms : 'Sub-luxation-patellae'

'Temporary upward luxation of Patella'

'Habitual luxation of Patella'

Recurrent luxation of patella is a very common complaint in working-animals in various parts of India. This ailment though not fatal is considered to be an unsoundness in working-animals. The lameness that develops is of a chronic and progressive nature causing great economic loss to the agriculturist.

Recurrent luxation of patella (R.L.P.) is seen in cattle most commonly in the bullock. Other animals affected are horses, cows, mules, buffaloes, and dogs. The condition is not a rarity in foals, calves and even breeding bulls. It is said that it is more commonly met with in bullocks put to work at young age-2 teeth. The universal nature of the distribution of the disease lends itself to promulgation of conflicting theories regarding its etiology which however seems to be rather indefinite and largely obscure.

Symptoms : A characteristic jerky lameness is the most important symptom of R.L.P. During locomotion the affected hind limb is kept extended back-ward and after a moment it is flexed forward with a sudden jerk. The lameness is most marked after a prolonged period of rest. It is persistent for the first few steps and wears out on exercise. In the very early stages of R.L.P. the lameness is not so marked and is likely to go unnoticed. In a well developed case the 'drag' lasts longer and recurs for a few more steps. In a long standing case the affected limb is kept extended

for a long time and for one or two steps the animal finds it difficult to flex the limb. The limb is brought forward slowly and the characteristic jerk is less prominent. In some cases a peculiar clicking sound is heard during progression. Animals suffering for a very long time may not be able to walk properly. The lameness may be seen in one or both the hind limbs. On palpation of the affected joint the animal does not evince pain; there is no sign of gonitis. But for the jerky lameness the animal is otherwise normal.

Mechanism of lameness is explained thus. During extension the patella is displaced upward and outward, and is held imprisoned over the upper extremity of the femoral trochlea, for a few seconds. This partial luxation arrests movement of the stifle, hocks and fetlock joints, (as their movements are synchronous) and the limb is kept extended so long as the patella is held up in this unusual site. When the patella descends, the limb is flexed and carried forward with a sudden jerk and the so called 'drag' of the limb is very characteristic.

What brings about this upward sub-luxation of patella is not so clear. Based on Merillat's opinion; "The habitual luxation of patella is a congenital weakness, relaxation, of the mechanism holding the patella to the femoral trochlea. The ligaments and the muscles are too lax to prevent the bone from slipping from the groove." This condition is often confused with stringhalt in horses. In stringhalt there is over flexion of the affected limbs, followed by sudden extension, whereas in R.L.P. there is prolonged extension preceded by jerky flexion.

Etiology of this disease is still an open question. The theories advanced by various workers are mostly hypothetical and speculative. The following factors are supposed to contribute towards the etiology of the disease.

1. Breaking in the animal at too early an age, i.e. at 2 teeth.
2. Nervous irritation of the muscles of the thigh.
3. Congenital weakness in the calves and foals.
4. Influence of environment and individual susceptibility.
5. Heredity.
6. Nutritional deficiency.
7. Tethering the calves by the hind limbs.
8. Traumatic injury.

Treatment: For a very long time no satisfactory cure for this condition was known. Improvement in general condition of the animal does not correct the habitual luxation. Blistering and firing had no effect on this malady. After 1925 various methods of effective treatment were introduced, out of which some have given very good results.

- They are :
1. Patellar desmotomy.
 2. Injection of lugol's iodine into the femoropatellar space.
 3. Inter muscular perineural injection of Sod. Salicylas in the poorman's groove.

Patellar desmotomy: (Patellar Syndesmotomy) Patellar desmotomy is the surgical division of the internal straight ligament of the patella. This operation is practiced in the continent, U.S.A. (since and 1920) some parts of India with good results. For the R.L.P., it is a radical cure.

Control: The animal is restrained in the lateral recumbent position with the affected limb lower most. The lower limb is tied to a

pole laid on the ground. The upper limb is secured together with the forelimbs. The affected limb is kept flexed in this position.

Now the internal straight ligament is located on the medical aspect of the stifle joint by tracing inwards from the middle straight ligament. The ligament is a conspicuous band running obliquely from the infero-internal border of the patella to get attached to the internal tuberosity of the tibia. The middle straight ligament of the patella runs vertically in between the two lips of the femoral trochlea and gets inserted to the anterior tuberosity of the tibia. The middle ligament should first be felt in the anterior aspect of the stifle and proceeding inwards one gets at the inner straight ligament which can be ascertained by applying firm pressure with the thumb. The length of the ligament is divided into three parts. The site for the operation is on the lower third of the ligament where it is free from the capsular ligament and where a pad of fat is interposed (between the ligament and joint capsule) usually.

The operation is performed usually under local anaesthesia (2% Novocain). The site of operation is shaved and properly sterilised. The stifle joint is kept flexed to increase the obliquity of the internal straight ligament, before the incision is made.

A bold incision of 2" long is made through the skin along the long axis of the ligament, extending from the upper limb of the middle of the ligament downward to a little below its insertion to the tibia. The tissues of the tendons are cleared. The ligament is separated from the related aponeurotic tissue and is raised by a tenaculum. Structures that are met with during operation are: (1) skin (2) subcutaneous connective tissue (3) fascia lata (4) Aponeurosis of gracialis and sartorius (5) the ligament.

The tendon is severed by a scalpel or scissors at the distal end. Sterile sulphanilamide powder is dusted into the wound. Acriflavin-glycerine can be applied instead. The wound is closed by a series of retention cum

apposition sutures. This method of suturing brings the lips of the wound into intimate contact and assists healing by first intention and leaves only a line scar. The wound is sealed by benzoin or collodium flexile seal.

The operation can be performed similarly on the other limb when both are affected.

Some times the apponeurosis and fascia have strong bands which remain tense after the ligament is cut. These also will have to be lifted and divided. (12-1954).

A slight swelling develops at the site an hour after operation. Fomentation, two times a day for first two days, brings about reduction of the swelling. The wound usually heals by first intention. Sutures are removed after a week. When drainage is required the lower sutures can be removed. The animal should not be put to work for a fortnight.

Injection of Lugol's Iodine: This line of treatment was first introduced by K. S. P. Rao (1925) at a time when no effective cure was known for this condition. The result was very promising and R L.P. was no longer incurable. The idea of injecting Lugol's Iodine inside the joint is to set up an acute inflammation, thereby bringing about fibrosis of the existing relaxed structures. This results in shortening of the ligament and prevents the patella from occupying an unusual position.

Control: As in the previous case.

Site: Femoro-patellar groove. About 3 inches posterior to the stifle, externally. The needle is inserted at this point where there is femoro-patellar groove.

5-7 c.c. of Lugol's Iodine is injected over the capsular ligament of the femoro-patellar articulation. There is no need for introducing the fluid into the joint cavity. Some practitioners give two injections of 5-7 c.c. each, one at the proximal and the other at the distal points of the groove. This depends upon the severity of the case.

V C-9

A severe acute swelling develops at the site of injection and it puts the animal out of work for a period varying from 1-4 weeks or over, according to the age of the animal the younger the animal the shorter the duration (8.1944).

The animal in no case, should be put to work after the injection is given, as it increases the severity of reaction and delays recovery. When both the limbs are affected, each limb should be treated separately at an interval of about 4 weeks. Animal walks normally after the acute phase of the reaction is over.

Untoward happenings during the injection are few. The needle may break inside the joint or injure the joint surface, when the animal struggles. This can be avoided by properly securing the limb, as for the patellar desmatory.

In a few cases the lameness reappears, in which case a second injection is tried after the reaction of the first injection has completely subsided. This treatment is adopted in many parts of India with good results.

Inter Muscular Perineural Injection of Sod. Salicylas in the Poorman's Groove: This is an artifice of Dr. Roy Choudhuri (1931). The treatment is based on the belief that there is irritation of the sciatic nerve on account of an unknown factor. Treatment with Sod. Salicylas neutralis was tried and 5 cases in all stages of the disease were treated. (9-1931)

The injection is given in the poorman's groove, (between the two heads of Biceps femoris) about 3-4 inches away from the hip joint. A hypodermic needle 5 to 6 inches long is entirely thrust in a downward and backward direction at the above site and Sod. Salicylate solution is injected.

Course of treatment: 4 injections are given in a period of 6 days. First injection consists of 15 grains of Sod. Salicylas in 15 c.c. of sterile distilled water and subsequent injections are repeated every alternate day. In the 3rd and 4th injections the dose is increased to 20 grains in 20 c.c. of sterile water. Three to

four injections effect a complete cure but in advanced cases more injections may be necessary. An improvement is seen after the first injection. It is also claimed that injection of Sod. Salicylas does not cause any pain or local swelling. The bullock is not put out of work and the beneficial results are noticeable in a short time. (9-1931)

The above line of treatment is comparatively more simple and if it proves satisfactory in a larger number of cases it will be more convenient for the practitioners and at the same time less-painful for the patients. Unfortunately the data in this respect is still inadequate.

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Talents are best nurtured in solitude ; character is best formed in the stormy billows of the world.

—GOETHE

Diagnostic aids to the detection of Oestrus in Cows and Buffaloes

By

K. S. NARASIMHAN, G.M.V.C., B.V.Sc.



The detection of oestrus or heat in cows by the observation of the external manifestations of heat symptoms has been known to the veterinarian and the Animal Husbandman alike from very early times. Certain insurmountable difficulties had to be faced in some of the deceptive cases which failed to exhibit one or more of the external symptoms associated with oestrus and this had set the minds of the Veterinarian thinking in terms of finding out better methods of detecting heat in cows. Great strides have been made in this field by research workers in the last half a century. Some of the old and more recent methods of diagnosis of heat will be enumerated below.

Clinical Examination: It has been said that the best way of finding out whether an animal is in heat or not is to put the cow to a bull. This is not always true of all cases. Sometimes the bull may mount over cows which are not in heat. Usually the cows show visible symptoms of heat and the husbandman encounters no difficulty in detecting the heat symptoms. But strangely enough the buffaloes present a tricky problem. In the countryside the ryots bring their buffaloes to the Artificial Insemination Centres for insemination with the history that their animals are restive and have been bellowing since the previous night. Such cases call for careful examination by the Veterinary Surgeon for heat symptoms. Unlike the cow the buffaloes do not apparently discharge copious mucus from the cervix which may be found hanging from the vulva in cows and sometimes they may be found sticking to the buttocks. In

such cases examination per rectum or vaginal examination with the help of a speculum is indispensable. Usually in buffaloes the discharge flows down on introducing the speculum.

The formation of the cervix shows great individual variation and generally speaking the larger the cervix, the wider the lumen. The cervix in the buffaloes is usually narrow and the os is not prominent, except in buffaloes which had a number of calvings. Sometimes due to the asymmetry of the cervical folds the os is pushed to a side and directed upwards. In some buffaloes during early heat the os may only be slightly opened and this condition stands as a stumbling block to the successful insemination during early heat. Especially is this so in virgin heifers and cows which have a flexous cervical canal. In such cases a second insemination 24 hours after the first is obligatory if the chances of conception are to be maximised. It has been found by practice that the speculum method of insemination in buffaloes offers a formidable problem in the sense that the insemination catheter does not easily pass into the lumen of the cervix, probably due to the narrow lumen of the cervical canal which is of a spiral nature. The introduction of the catheter is greatly facilitated by the rectal method of insemination in which the cervix is grasped with one hand by way of the rectum and the nozzle of the catheter is guided with the other through the vagina into the cervix.

During day time it is a simple matter to pick out cows properly but a certain number

of them may start their heat periods after dark. A majority of the cows in which the heat period sets in after midnight will still be on heat at dawn the following morning and will be detected in the usual way. Those starting between night fall and midday may however be off heat by the morning and will be missed unless special steps are taken to detect them. A vasectomised or "teaser" bull is the solution to this problem and is a very reliable method for detecting a cow on heat when the herd is large. A cow coming on heat is easily recognised by the bull following her about and from time to time particularly towards the commencement of oestrus attempting to mount her but unless she is actually on heat she will not stand for service. Similarly a bull will follow a cow that is going off heat.

"The end of heat is a gradual transition from receptiveness to one of non-receptiveness". A cow at the beginning of heat very often becomes restless, she twitches her tail frequently and raises it, together with the tail head, lowering her hips and the small of her back. Swollen condition of the vulval lips, the folds disappearing, congested wet appearance of the mucus membrane, the opened cervix appearing rosy and congested due to increased blood supply, bellowing of the animal with a tendency to mount on other cows and tendency to micturate frequently are the concomitant symptoms that may have to be looked for. Information may be obtained on the presence of tone of the uterus and the horns and the presence of a mature follicle on one of the ovaries by rectal palpation. Some animals which show silent heat do not bellow and the other heat symptoms may not be so conspicuous as to catch the attention of a casual observer and this is explained by the deficiency of oestrin hormone secreted by the developing Graffian follicle.

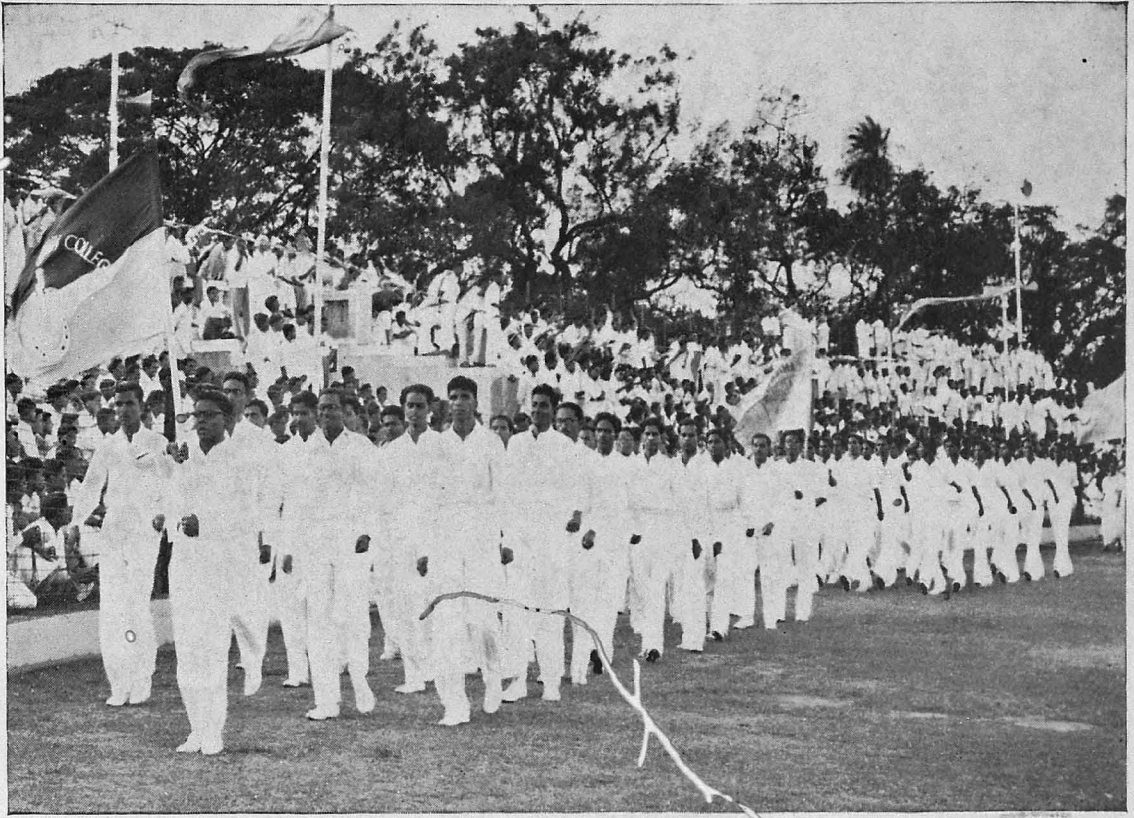
Tests based on Rheological properties: It is an accomplished fact that changes occur in the physical properties of the cervical secretions during the oestrus cycle and pregnancy in the cow and this has long been recognised by the Veterinarian and physiologists. The classifica-

tion of oestrus into early, mid and late heat is in some degree an arbitrary one. At oestrus the secretion is translucent "glassy" fairly fluid and is present in large quantities. It has the property of forming long strings or threads, these strings of mucus may frequently be seen hanging from the vulva about the time of oestrus as contrasted with the absence of such signs in most of the buffaloes in which the discharge flows down only on introducing the speculum. In mid cycle the quantity of secretion is greatly reduced, it is more viscous, whitish in colour and slightly adhesive to the touch. The discharge in the mid heat could be squeezed out by milking the uterus and the cervix per rectum, a process, which is not ordinarily feasible in buffaloes and in such cases the use of speculum would be of great help. During pregnancy the secretion becomes very viscid, opaque and is generally said to be peculiarly adhesive when palpated with the finger tip. The mid and late heats are characterized by the congested, wet appearance of the cervix and the patent condition of the os, the discharge becoming very scanty during late heat.

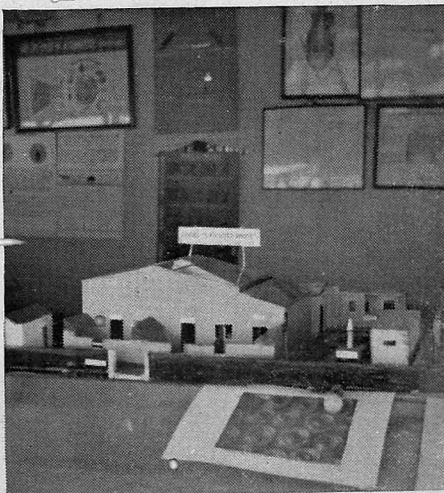
The value of Rheological properties of the cervical secretions in the diagnosis of oestrus in the cows came to be increasingly realized with the advent of Artificial Insemination. The timing of Insemination influences the conception rate. Best results are obtainable when inseminations are carried out during mid and late heat. In early heat inseminations a second insemination 24 hours after the first is indicated.

The changes of viscosity and flow elasticity which occur in the cervical secretions during the oestrus cycle have been studied by Blair, Folley, Copen and Malpress (1941). Viscosity values reached a minimum about the time of oestrus while flow elasticity values were then maximal. The marked increase in the flow elasticity of secretion has proved of great value in the detection of oestrus in cows. To enable the flow elasticity to be easily, rapidly and accurately measured, the above mentioned

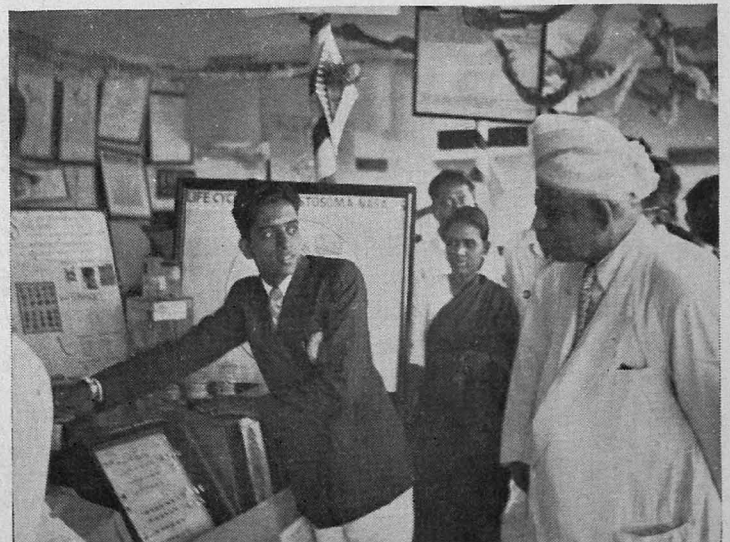
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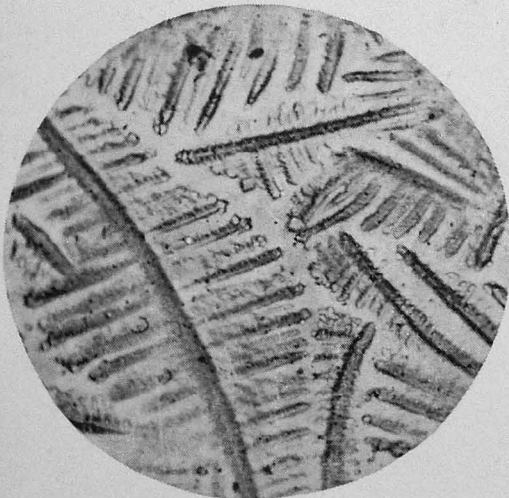


Meat Inspection Section at the University Centenary Exhibition

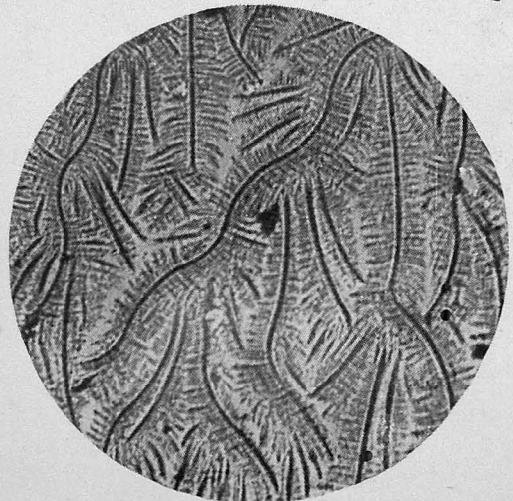


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Cervical Mucus from a Shebuffaloe
Stained Gram's (Thick Smear Low Power)



Cervical Mucus from a Cow Unstained
Thick Smear Low Power

workers devised a simple instrument known as the 'oestroscope'

In the cows the symptoms of heat are frequently not obvious, although the ovarian cycle is normal and valuable time may be wasted before the cow is served or inseminated. Hitherto the only reliable means of detecting oestrus has been to put the cow to the bull, a practice which may not always be practicable or even possible in small herds and Artificial Insemination Institutions. The practical application of the oestroscope in such conditions needs no emphasis. 'Investigations, based mainly on studies of the flow curves of secretions tested in a Blair emptying-tube viscometer revealed that plasticity predominated in pregnancy and elasticity in non-pregnancy.'

Microscopical examination of cervical smears: This method of diagnosis is a recent innovation. During the last few years a number of different workers have observed and described some interesting phenomena which take place when cervical mucus is streaked on to a glass slide and dried. After a few minutes characteristic fern like formations are seen to have developed. This phenomenon has been compared with oestrogen activity since in women it has been found that the development of these fern like formations is most pronounced at the time of ovulation. In women who have passed the climacteric such a smear of cervical mucus will show mucus and cell elements of various kinds but no fern like formation. As can be seen from the microphotographs of unstained and stained mucus smears (See Photographs opposite page) at oestrus there is an abundance of fern formation.

After ovulation the development of fern formations diminishes as the production of progesterone by the corpus luteum increases again. During pregnancy the picture is one of cellular elements of various kinds and dried mucus. This method has by and large thrown more light in recent times on the possibility of diagnosis of early pregnancy in cows.

SUMMARY

In this paper an account is given of the different techniques adopted in the diagnosis of heat in cows and buffaloes by clinical method. Special stress is laid on the advocacy of the rectal method of insemination in buffaloes in lieu of the speculum method which gives rise to practical difficulties. The study of the physical properties of the cervical secretions as an useful adjunct to the clinical diagnosis of heat as well as pregnancy merits consideration. An account is also given on how the cervical mucus behaves in cows during the follicle and Lutein phases of sexual cycle and the application of this technique as one of the methods of diagnosis of oestrus in cows.

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All great men are in some degree inspired.

— CICERO.

Endogenous Heating by Short Wave Diathermy

By

E. I. RAJENDRAN, G.M.V.C., B.V.Sc.

(Department of Surgery)



Diathermy is the name given to the generation of heat within the body tissues when the body is in the circuit of a high frequency current. For therapeutic purposes either a long wave current oscillating with a frequency of 5,00,000 to 15,00,000 cycles per second or a short wave current with an oscillation of 100,00,000 to 200,00,000 cycles per second are employed. This type of oscillating current is known as diathermic current. When the diathermic current is passed through the tissues heat is produced in the tissues and the heat so produced is known as endogenous heat. This principle is advantageously used in the treatment of various diseases where the application of heat is indicated. It differs from the conventional application of heat like fomentations, poultices etc. by directly heating the deeper tissues instead of by conduction from any outside source. The electricity in the form of diathermic current is supplied by special electrical appliances which are able to supply any required strength of electrical energy.

In modern treatment short wave therapy is preferred. In this the electrodes need not be applied direct to the patient; hence the patient is not subjected to discomfort or pain in cases where the part to be treated is painful or tender.

The heat produced in a particular tissue is proportional to its resistance to the passage of the diathermic current. The resistance of 0.5% salt solution at 18°C is taken as the unit. The adipose tissue presents the highest resistance of 19.4 as compared to 1.2 to 1.5 of blood. Bony tissue has a high resistance and gets heated to a higher degree than the soft tissues. This

phenomenon extends the application of diathermy in the treatment of a number of refractory bone diseases.

Diathermic current can be applied to the patient by electrodes protected with felt pads. The current is supplied from a diathermic plant. The pads are fixed in a parallel direction with the organ or the part of the body to be heated enclosed in between them. The diathermic current completes the circuit through the tissues enclosed in between the pads and in doing so the tissues get heated in proportion to their resistance. The heat can be maintained as long as it is required. In the treatment of long standing diseases this process has to be repeated daily until cure is effected. The heat produced in this way inside the tissues is chiefly lost by convection and to some extent by radiation. Some of the heat which is generated locally is removed by circulation but the body does not lose it because it is conveyed to other parts. In this way the whole body tends to become warm.

For application of local heat diathermic current is able to heat to a depth far greater than can be reached when the heat is derived from external sources. Heat derived from a poultice or hot water bag enters the body by the slow process of conduction and its penetration is hampered or prevented because of the blood flow in the cutaneous capillaries which remove the heat by convection. Even infra red rays from any external source has feeble penetrative power. Another advantage in diathermy is that a continuous supply of heat can be provided and maintained for any length of time. This is not possible in external

heating. The body as a whole can be heated indirectly by convection through blood circulation by fixing the electrodes on a wider area. On the other hand when general heating is attempted by external means like infra red radiation it causes much discomfort and exhaustion to the patient.

A number of diseases can be treated or their symptoms relieved by heat. Some respond to surface heating and others only to diathermy. The general principle is to heat the local tissue and promote the local circulation. The increased circulation helps to overcome infection if present and accelerate the process of repair of the damaged tissues. Patients who are subjects of deficient physiological activity and have a subnormal temperature derive much benefit from diathermy. Inflammation of the deeper organs or tissues respond well to diathermy. In the treatment of arthritis diathermy has a special place as compared to other therapeutic measures. In diseases of the respiratory system like broncho—pneumonia diathermy is of immense value. Pain is relieved and resolution is hastened in cases of painful skin affections like carbuncles and furuncles. Considerable success is claimed in the treatment of eye diseases like post-operative intra ocular infection and in acute or subacute glaucoma.

° Diathermy is contra indicated over regions

from where haemorrhage has recently occurred as it may restart the bleeding. Formerly it was believed that endogenous heating is contra indicated for acute affections but actually it is highly useful in treating some of the acute disease conditions like pneumonia and many varieties of sepsis. While the patient is under treatment care should be taken to avoid over heating. If the current is applied to sensitive areas, over heating can be noticed by the resenting movements of the animal. On the other hand if a benumbed area is included in the circuit no visible signs will be noticed even though a burn occurs in the tissues due to overheating. To avoid such burns careful watch should be kept over the amount of heat produced in the tissues. Burns can be avoided by regulating the flow of current and following ordinary precautions suggested or prescribed in the use of electrical appliances. As there is a risk of syncope due to sudden vasodilatation when a large area is subjected to diathermic current or when general heating is resorted to, the operator should keep a watch over the pulse and blood pressure of the patient.

To conclude endogenous heating with the help of short wave diathermic current is not only useful in treating acute and chronic diseases but also can be used extensively for the quick healing of deep seated operation wounds in veterinary practice.

Our character is but the stamp on our souls of free choices of good and evil we have made through life.

—GEI - KIE.

DIAGNOSIS OF PREGNANCY IN THE COW

By

R. SANKARARAMAN, FINAL YEAR, B.V.Sc.



Introduction :

A study of the clinical methods of pregnancy diagnosis in the domestic animals reveals that reliable tests would be of great supplementary value. Where such tests have already been developed, diverse opinions have been expressed on their relationship to the clinical methods. The views whether the tests are unnecessary and the tests have rendered the clinical method obsolete are equally wrong and that best results are obtained when the methods of the clinician and the laboratory are judiciously combined.

Diagnosis of Pregnancy :

This has been classified for convenience under the following headings.

1. Tests based on clinical methods.
2. Tests based on hormonal investigations of body fluids.
3. Tests based on enzymic investigations of body fluids.
4. Tests based on other biochemical investigations of body fluids.
5. Tests based on physiological phenomena.
6. Tests based on immunological phenomena.
7. Tests based on physical investigations of body fluids.

I. Tests based on clinical Methods : Clinical diagnosis of pregnancy is studied under various headings, but it must be kept in mind that the final diagnosis is based on a consideration of the total findings. An accurate diagnosis is possible from the end of the

second and beginning of the third month of pregnancy.

a. Rectal Examination : Pregnancy in the cow is mostly relied on Rectal examination particularly in the early and midgestational periods and it involves the palpation through the wall of the rectum of the genitalia and the uterine arteries. Gerlach (1862) in his book on forensic Veterinary Medicine, discusses the diagnosis of pregnancy in the cow, but makes no reference to rectal examination although vaginal examination is mentioned. Fleming (1896) in his book of Veterinary Obstetrics states that rectal examination for the diagnosis of pregnancy is a safe method and the risks have been greatly exaggerated.

b. Palpation of the uterus : On palpation of the uterus, the pregnant horn of the uterus is greatly enlarged and it is accompanied by changes in the thickness of the uterine wall. Various techniques have been described by different workers regarding diagnosis of very early pregnancy by rectal palpation of the genitalia. Pissel advocates the technic in which the horn of the uterus on the side corresponding to Corpus luteum is grasped between the thumb and finger and then, by drawing the thumb and finger backward, it is possible to detect small quantities of fluid in the horn and the foetus about the size of a lentil may be felt as it is forced against the fingers. Rutter (1923) describes a method by which it is possible to detect the foetal membranes and their folds at the end of the 4th week of pregnancy by rubbing the walls of the uterine horn between thumb and finger. Eilmann (1924) described the so called "Aufrollen" method in which "the uterus is

folded up" so that the fluid wave and membranes can be readily palpated by the 40th day of pregnancy. It must be remembered that the risks involved in these techniques are very great in so far as they relate to the palpation of the foetus between the 7th and the 10th week and as such no attempt should be made to palpate the foetus during that period.

(c) **Palpation of the ovary:** During pregnancy ovaries are palpated to obtain information on the corpus luteum.

(d) **Palpation of the uterine arteries:** On palpating the middle uterine artery, there can be felt a characteristic rhythmical "thrill" of the artery wall which is synchronous with the maternal pulse. (The middle uterine arteries are distinguished from the obturator arteries by their comparative mobility. They lie in the broad ligaments whereas the position of the later is fixed).

(e) **Vaginal examination:** On vaginal examination during pregnancy, the walls of the vagina feel drier and the cervix becomes occluded with a plug of thick, tenacious mucus.

(f) **Palpation of the foetus:** The palpation of the foetus and the foetal membranes become possible as pregnancy advances. During the period of 120-160 days the presented extremity which will be within easy reach lies in front of and below the pelvic brim between $5\frac{1}{2}$ and $7\frac{1}{2}$ months. The foetal head, and or flexed limbs are palpated just anterior to the pelvic brim. In some cases the foetus can be seen butting against the abdominal wall from $6\frac{1}{2}$ months onwards. From $7\frac{1}{2}$ months to end of gestation the foetus will be detected readily.

II. Tests based on Hormonal Investigations of Body Fluids:—

A. Biological Tests:

(i) **Tests using urine:** Attempts were made by several workers based on Asheim and Zondak test in woman, to detect the presence of gonodotrophin in pregnant cow's urine but all of them proved negative.

B. Allen-Doisy devised a test by which they found the presence of oestrogen in the urine of the pregnant cow in relatively smaller quantities than in the urine of pregnant woman. In the urine of cows from 21-112 days pregnant, there is no evidence of oestrogen being present, from 112-240 days oestrogen is sometimes present, and after 140 days the test is always positive.

C. Progesterones and progesterone are present in the urine during the second half of pregnancy. Further researches have to be undertaken to confirm this finding.

(ii) **Tests using blood:** Gonadotrophins is absent in the serum of pregnant cows. Traces of progesterones are present in the blood of a pregnant cow.

Chemical tests:

(a) **Test for Gonadotrophin:** Urine is taken in a test tube and diluted with water and acetone is added. When uranyl sodium bicarbonate is finally added a fine precipitate known as "Harn - Prolan" appears in pregnant Cow's urine.

(b) **Cuboni test for oestrogens:** This is not a reliable test for pregnancy as the urine of non-pregnant cows shows similarity of the colour and fluorescence obtained with samples of pregnancy urine.

III. Tests based on Enzymic investigations of body fluids:

(i) Protective enzymes:

Dialysis method: The abderhalden reaction was positive for about three weeks post-partum and could be used to establish whether a cow was newly calved or otherwise.

Optical methods: By using Zangemister's photometric technique, no changes in bovine serum-substrate mixtures indicative of pregnancy are found.

Direct Method: There is a "Hormone Method" of pregnancy diagnosis, based on the postulate that during pregnancy, there must be present in the blood of the cow an anti-

hormone to oestrogen or an enzyme which destroys oestrogen since the cow shows no signs of oestrus although oestrogens have been shown to be present in the blood.

(ii) An increase in the blood histaminase does not occur during pregnancy in the cow.

(iii) Pitotinase, Arginase, Catalase, Diastase or Amylase, Lipase, and Phosphatase were found in the blood on non-pregnant cows.

IV. Tests based on other biochemical investigations of body fluids and tissues :

Glycosuria tests: Have been applied to the diagnosis of pregnancy in cows but in modern researches of urine of cows it is found that such tests are not applicable to ruminants. Boddie (1933) in his diagnostic methods in veterinary medicine, claimed that reducing sugar is present in more than 50% of samples of urine from normal cows. It must also be noted that Fehlings and Benedicts' reagents are quite unreliable for testing for sugar in the urine of the cow owing to the presence of glycuronides in the urine.

Manoilow Test: To .3 ml. of fresh serum is added to 1 ml. of a 2% solution of durtin the mixture is shaken one drop of 0-2% alcoholic solution of Nile blue is added and the mixture allowed to stand for a few minutes. If the serum is from a pregnant cow the solution will change to yellow or rose-yellow. Manoilow considered that the test was based on the degree of alkalinity of the serum.

Alchol - Milk test: The alcohol - Coagulation test can be used as a means of diagnosing pregnancy in the cow.

Test: A small quantity of milk is drawn from the udder into a test tube an equal volume of absolute alcohol is added and the mixture is shaken and allowed to stand for $\frac{1}{2}$ to 3 hours. If the milk is from a pregnant cow coagulation will occur. It was observed that diagnosis could be made as early as the 21st day of pregnancy by this method.

V. Tests based on various physiological Phenomena :

Basal Body temperature: During the 2nd to the 5th week of pregnancy the basal body temperature appeared to be slightly higher than in the beginning of metoestrus, in the 6th to 19th week it fell to the level noted at the beginning of metoestrus. From 20th week onwards the basal body temperature rose slowly until the 25th week when the rise was more rapid, the maximum being reached during the last five weeks of pregnancy. In the cow therefore the maximum basal body temperature occurs at the end of gestation. The above theory was carried out by Vollmann and Vollman (1942). But further researches have yet to be carried out.

VI. Tests based on immunological Phenomena :

Skin tests: By intra-dermal injections of bovine maternal or foetal placenta extracts, the diagnosis of pregnancy in the cow is made positive. 0.5 ml. of the antigen was injected subcutaneously under the tail. In pregnant cows a reddening and swelling of the skin, 3 cm. in area was produced, the reaction appeared in about 6 hours and lasted 18 to 29 hours.

VII. Tests based on physical investigations of body fluids and tissues :

In the section dealing with the clinical examination for pregnancy, it has been noted that certain changes in the appearance and in the physical properties of the cervical and vaginal secretions occur during pregnancy, chemical and physical studies have been made on these secretions and these will now be reviewed.

Rheological Properties: During pregnancy the cervical secretion becomes viscid, peculiarly adhesive when palpated, with the finger tip. Investigations into the Rheological properties of the secretion during pregnancy revealed that plasticity predominated in pregnancy and elasticity in non-pregnancy.

Conclusion :

The diagnosis of pregnancy should be possible in the cow by the 6th week of pregnancy by clinical examination. As yet, no laboratory test, hormonal or otherwise, has been found of any value in the early diagnosis of pregnancy.

Acknowledgment :

My sincere thanks are due to Dr. M. G. Chellam, G.M.V.C., F.R.V.C.S. (Sweden), Regional Sterility Officer, Dr. M. N. Dhandapani, B.V.Sc., and Mr. K. S. Narasimhan, B.V.Sc., Assistants in Sterility Section, Madras Veterinary College for their valuable guidance in preparing this article.

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THE UNEXPECTED

By

A. SOMASUNDARAM, FINAL YEAR, B.V.Sc.



Was it a theft or elopment or murder? That was the question on everybody's lips. "Hotel Westend" was as active as a bee-hive, with telephone bells ringing, with phone messages going out and with lots of people coming in and going out. Some people knew something only while some pretended to know everything but prepared to wait for more definite news.

Suddenly the Hotel Manager asked for a taxi. Half a dozen people yelled out for the taxi. Four or five taxis rushed to the portico where only one was wanted. And all the people gathered there saw an exceptionally beautiful young lady enter the taxi full of emotion and heard her say "to Police Station".

The lady that left for the Police Station was Susila. Her story is one of such strange stories wherein fate intervenes, creates certain circumstances, drives her on and on in quest of something dear and near to her for the moment, and ultimately lands her in totally different environment forgotten by her.

Susila was the daughter of Dr. Kumar, an L. M. S. Officer. During World War II, he was posted to Burma so as to be just behind the warfront. He left for his duties and took with him his wife, a daughter named Susila, then aged about twelve, and a son named Ratan Kumar, aged fourteen.

A few months after they all reached Burma, there was a hurried withdrawal from that place. So many families were uprooted and

so many dislocated that confusion reigned supreme. Naturally during such time of disorder and confusion, evil elements in society came out and asserted themselves by looting, plundering, kidnapping etc. The beautiful little Susila was a victim, and the kidnapers demanded a large sum for her restoration. Before Dr. Kumar, could think of what was best to do, he himself had to resign to the inevitable and to leave Burma in an Army plane, leaving behind poor Susila.

Intelligent and beautiful as she was, Susila impressed the leader of the kidnapers so much that he spared her life and began to shower favours on her. We cannot say whether he had ulterior selfish motives or he just wished to trade on her after a couple of years, when her beauty would be properly ornamented with blossoming youth.

And in a short time, she became very friendly with all the neighbours around. She took an old lady, who had lost her only son in the war, into confidence and told her of her miserable plight and her fears of the leader of kidnapers. The old woman pitied the young girl's predicament and managed to leave for Singapore, the city of Luck and Millionaires, with Susila so that the kidnapper could never lay his dirty hands on young Susila. The old woman put Susila in a short term course in a Western School.

Very soon, in about a couple of years, her youth blossomed forth in all its tenderness and colours. Her rosy cheeks were the natural

It a woman attracts men, she has sex appeal; if she attracts women, style; if she attracts everybody, charm.

—BALTRAM GRACIAN

outcome of her very fair complexion. Her curly hair, the dimples that showed themselves whenever she smiled, her height with the proportionate weight etc., were just additional assets to her dignified and graceful manners.

No wonder, that she was therefore the talk in society. Wherever she went, she was greeted by a number of young men - each one of them inventing his own methods to win her affection for himself. Let it not be forgotten that such games of love-making is the pastime of the rich only. There may of course be some impostors also pretending to be rich. For them such pretension is a natural course of their profession. And now coming back to the attempts of young men to win her affection, let us not overlook that men considered old enough to retire from such games did not lag behind. They would not resist the temptation of trying their luck - knowing well they were taking a mere chance - in their own way by dancing attendance on her and trying to impress on her that each wrinkle on their face and each one of the grey hairs on their head represented a lakh of rupees in the bank.

The old woman, experienced as she must have been, warned, Susila with all good intentions to be careful of the pitfalls ahead. She warned the young girl not to be carried away by the idle promises of the rich old men as they would be afraid to implement the promises, because of their family connections and rules of their society. Further she advised her to pick a suitable young man of average riches free of encumbrances or as little of such obstacles as possible so that the course of their love may run smoothly and end up in marriage. While the young aspirants were fighting it out directly, the aged were busy in manipulating methods. One of the generals among the aged warriors finally hit the target by bringing such pressure on the old woman that she could not resist the apparently innocent but planned onslaught. Suddenly she was hit with the idea that she was not properly using the hen that could lay a golden egg for her.

She started adopting direct and remote control methods over the activities of young Susila. In fact she was creating the necessary atmosphere for the meeting of the old man with the young girl. Naturally Susila resented this. She wanted to save herself from this agonising suspense.

She had no time to pick and choose from the brigade of her young admirers. In haste she picked up an apparently dashing young man by name Sudhir said to have been connected with the high-ups in Film circles. She fell in love with him passionately little knowing, as all young woman do, that he was only an impostor who wormed himself into such really rich circles as all such impostors do. He too professed love to her. There were number of secret meetings and exchange of the usual promises etc.

Having learnt from her that she was from India, he also said he was planning to go to the ancient land for a longtime, and that, for her sake, he would not mind settling down in India permanently if necessary and joining the film field to make a living.

Susila thought within herself that here was a God-sent chance. They both planned a trip to India. Very soon all the formalities were overcome with the speed with which such impostors could do things.

They reached India and lodged themselves in an expensive hotel in Madras. They spent a day or two sight-seeing. The third day he went alone and returned. The fourth day also he left alone but did not return. She felt nervous and suspicious of his movements and to her surprise, she found her case containing valuables worth a couple of lakhs missing. Her suspicions were confirmed.

She reported the theft to the hotel manager who was surprised, and directed her to lodge a police complaint immediately. The entire hotel was agog with these reports. The Inspector, who had earlier learnt over the phone this story of the theft by the male member of this runaway unmarried lovers, was more inte-

rested to know, being after all a human being, if she was really as beautiful as the hotel manger had described and was in fact waiting for her. In a minute the tender beauty was before him in all innocence and he felt within himself how the imposter could prefer this prize possession to a couple of lakhs of rupees.

Her charm was a challenge to him to prove his mettle by apprehending the culprit. He quickly jotted down the most important facts to avoid waste of time and set the police machine into action, and returned to her to put some searching questions now to show out his master mind in crime detection. She did not try to destroy facts. At a certain stage, something appeared to strike his mind and he began to be more friendly and intimate. The sixth sense in him was correct. He realised that she was no other than his own sister Susila. He drove her to his home. The joy of Susila's father and mother knew no bounds over this happy reunion. Susila herself was stupified in the beginning but later on realised the hand of fate in all this.

In the meantime news reached Inspector Ratan Kumar that the imposter who decamp-

ed with the case of valuables and left by plane to Calcutta was arrested and was being brought back to Madras.

To avoid dirty talk in society, the story of theft was twisted so as to appear that the two were really a newly married couple, that the imposter Sudhir was of unsound mind at the time of decamping and that she grew nervous and that in her bid to get at her husband, as quickly as possible, she preferred a complaint.

To avoid prosecution, even Sudhir, admitted that he was used to such fits of mental break down now and then and that this was one such occasion. Thereupon the learned members that assembled there pronounced that he should be taken in once again but only as a "*Inti Alludu*" meaning a son-in law who by consent agrees to stay with his wife in his father-in-laws's house.

I do not know how many readers agree with me but my personal opinion is that the punishment pronounced was much more severe than what would have been the lot of the imposter otherwise.

FRAME THE ANIMAL

Answer: HIP PO POT AM US.

Hippopotamus.

Proverbs in Relation to Vet Terms

By

T. V. SUBBIAH, FINAL YEAR, B.V.Sc.

A Wolf in sheep's clothing
 A Bird in the hand is worth two in the bush
 A living Dog is better than a dead lion
 A rotten Sheep affects the whole flock
 Barking Dogs seldom bite
 Better ride an Ass that carries us than Horse that throws us
 Catch the Bear before you sell its skirt
 Count not the Chickens before they are hatched
 Do not speer a free Horse
 Birds of same feather flock together
 When the Cat is away the Mice will play
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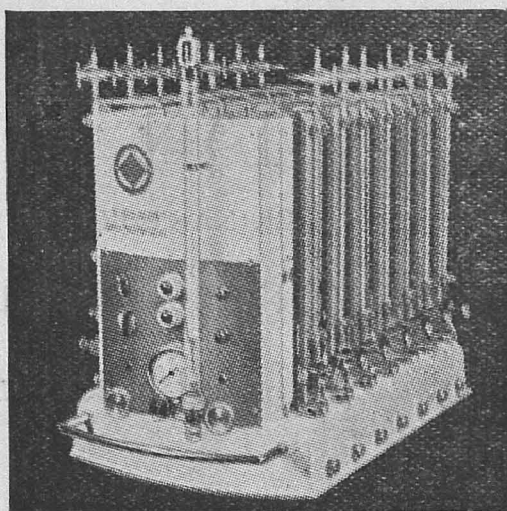
N. SANKARA SUBRAMANIAN,
II YEAR, B. V. Sc.



- I. A great man shows his greatness by the way he treats little men.
—Carlyle.
- II. Reading makes a full man, writing an exact man, speaking a ready man.
—Bacon.
- III. A snake strikes without an embrace. But a woman strikes at a man whilst her arms are about him.
—Peter Cheyney.
- IV. Women always have a passion for mathematics. They half their ages, double the cost of their clothes, triple their husbands salaries and usually add five years to the age of their best friend.
—Readers Digest.
- V. One says the silent man is the wise man and the other that a man without words is a man without thought.
—Edgar Wallace.
- VI. Still waters are the deepest, but the shallowest brooks brawl the most. An open mouth shows an empty head.
—C. H. Spurgeon.
- VII. Many look as if butter would not melt in their mouths, and yet can spit fire when it suits their purpose.
—C. H. Spurgeon.

- VIII. Hard work is the grand secret of success.
—*C. H. Spurgeon.*
- IX. Two cats and one mouse.
Two women in one house
Two dogs to one bone
Will not agree long.
—*C. H. Spurgeon*
- X. About Monument: Better kind words to the living, than fine speeches over the grave.
—*C. H. Spurgeon.*
- XI. Character is more than skin deep.
—*C. H. Spurgeon.*
- XII. Experience is still the best teacher. An added advantage is that you get individual instruction.
—*Readers Digest.*
- XIII. No meat eats so sweet as that for which we do not pay.
—*C. G. Spurgeon.*
- XIV. Brute force has never attained anything durable.
—*Napoleon.*
- XV. The rose called by any other name would smell as sweet.
—*Swami Vivekananda.*
- XVI. A Home should be a Bethel, not a Babel. The husband should be the house-band, binding all together like a corner stone, but not cruching everything like mile stone.
—*C. G. Spurgeon.*
-

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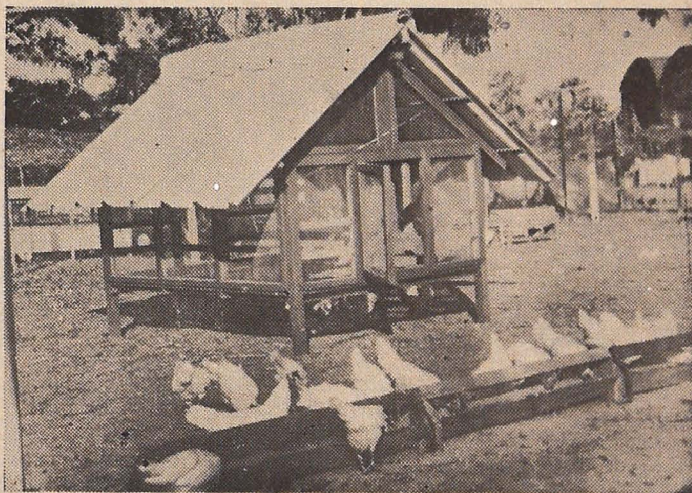
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Oestrogens and their Role in the Causation of Neoplastic Diseases

By

K. P. CHANDRASEKHARAN, G.M.V.C., B.V.Sc.

(Dept. of Pathology)



Among the many substances arising from normal physiological processes, oestrogens were probably the earliest to be associated with tumour formation and many other disorders in man. In recent years numerous experimental work done with oestrogens has helped to clarify the many clinical observations in regard to the causation of certain diseases and to ascertain the exact role played by these substances. However it is well to remember that under certain circumstances oestrogens are carcinostatic and that in recent years some of these substances especially stilboestral have been widely employed in the field of animal production for growth-fattening and for greater efficiency in feed utilization. This means oestrogens are substances with potentialities for both evil and good and that utmost care is necessary in their administration therapeutically or otherwise. It is essential therefore that any one attempting to employ them should have full knowledge of these implications. An attempt here is made to present some of the basic ideas concerning their sources in the animal body, the biologic effects and their role in neoplastic diseases. In respect of some of the diseases mentioned here, it must be understood however that the part they play in the etiology cannot be taken as fully established and that the suggestions made are merely speculative.

I. Natural and synthetic oestrogenic substance :

The important natural oestrogenic steroids are Oestradiol-17B (-) - oestrone, oestriol,

equilin, equilenin and 17 - dihydroequilenin and all of them may be considered to have been derived from the hypothetical tetracyclic saturated hydrocarbon oestrane. They produce the same qualitative effect, but the quantitative response as measured by oestrous response in ovariectomised animals vary. The oestrogenic activity of any substance is measured by the dose required to produce full oestrous response in 50% of a group of ovariectomised animals.

Synthetic oestrogens : Since the year 1930, many chemical compounds most of which are derivatives of *S*-diphenylethene, having biological activity of natural oestrogens were discovered. Among these mention may be made of 1 Keto - 1:2:3:4 - tetra hydrophenanthrene, 5:6 cyclopenteno - 1:2 - benzanthracene, 1:2 benzpyrene, diethyl stilnoestrol (or more simply as Stilboestrol), hexoestral and dienocestrol. The last three compounds have been widely used in clinical practice to replace the natural oestrogens and have the additional advantage in that they can be given orally.

Besides the above synthetic oestrogens many oestrogenic acids and lactones have been found to possess varying degrees of oestrogeno activity.

The chemical composition of these substances are highly complicated and those interested, consult the chapter on *Chemistry of oestrogens* by Shoppee in the Monograph on "Oestrogens and Neoplasia" by Burrows and Horning (1952).

2. Sources and distribution of oestrogens in the body :

Oestrogens are present in the tissue extracts from gonads, mammalian placenta, blood and urine of both sexes. Stallion's urine contains large amount. The output of urinary oestrogens in pregnancy is more from placenta than from ovaries.

During the normal reproductive life of the female, ovaries are the chief source of oestrogens and this output is regulated by pituitary-ovarian balance. The amount of oestrogens has been found to be greatly enhanced in tumour formation (e.g. Granulosa-cell tumour) of the ovary.

Males also produce oestrogens and their presence (oestradiol and oestrone) are peculiar to stallions urine. They are derived from the testis and in that organ the principle source is the sertoli cells. In dogs with tumour derived from these cells, oestrogenic effect such as mammary enlargement and sexual attraction to other dogs is of common occurrence; (Huggins and Moulder, 1945).

Adrenals under certain circumstances produce oestrogens. After gonadectomy, there is urinary output of oestrogens in both sexes and this is considered to be derived from adrenals. Besides, adrenal cortical tumours often secrete oestrogens in detectable quantities in the urine.

Pituitary might also be an occasional source of oestrogens, for certain workers have reported oestrogenic effect in mice by injection of pituitary extracts from cattle. (Broula & Sumonnet, 1927, Callow & Parkes, 1936).

Oestrogen from environment : Oestrogens in small amount have been detected in various dietary articles as milk, egg, honey, cheese, potatoes etc. In the flowering stage in plants the oestrogenic content is high. In certain type of clovers in Australia a high content of oestrogen has been detected and this has been ascribed to the cause of lowered fertility in sheep (Bennett et al, 1946, Bennetts 1947, Curnow et al, 1948).

Industrial hazard to workers engaged in manufacture of synthetic oestrogens has been recognised by authorities (Sracff & Smith, 1942, Fitzsimons, 1944.). In these cases oestrogens gain entrance to the body through skin or by inhalation.

3. Biological action of oestrogens:

The biological action of synthetic and natural oestrogens are nearly the same in character, though difference may be noticed in their speed and duration. The normal action is to activate and control the various processes involved in reproduction in the female. In the healthy female this output is rhythmical and sufficient time elapses between periods of abundant supply so that no ill-effects result from the oestrogenic activity. Under abnormal conditions the output of oestrogens may be excessive and persistent and this may initiate irreversible tissue changes including neoplastic conditions.

The use of some of the synthetic oestrogenic compounds in feeding experiments on cattle and sheep has shown that the chief physiological and bio-chemical effects are augmentation of protein anabolic processes possibly from increased adrenal central activity. Continued use results in adrenal and pituitary hypertrophy, decreased blood eosinophils, increased urinary output of 17-Ketosteroids, metaplasia of secondary sex organs and masculinization of body control in the females. (Carroll, 1955)

As regards the degree of neoplastic response induced by oestrogens Burrows (1952) has clearly pointed out that this requires the co-operation of many other factors. In the laboratory it has been noticed that oestrogens could induce mammary neoplasia easily in the male mice of strains. R. III, C₃H *dba* and uterine cancer in CBA and cross breeds of CBA and C57 strains. In these strains the particular type of neoplasia could be induced possibly in dose that provoke merely normal physiological response in other strains. Oestrogenic neoplasia, like those produced by carcinogens, manifest in stages-hyperplasia, benign neoplasia and malignant neoplasia. The first stage is reversible

but if oestrogen supply continues benign neoplasia result and this probably later be transformed into a malignant ones. Also, as in other types of malignant growth in oestrogenic cancer too a long time elapsed between the application of the agent and appearance of the final changes.

Yet another manner by which gonadal hormones influence tissue growth has been mentioned by Burrows (1952). He refers to the effect of androgens and oestrogens on prostate to illustrate this point. The capacity of androgens to cause the functional activity of the epithelium of prostate in castrated rats is enhanced by addition of small doses of oestrogens; on the other hand oestrogen added in excess to small doses of androgen, produces atrophy of glandular epithelium and proliferation in the stromal part. Hence whether these two gonadal hormones cooperative with or antagonise in producing tissue growth, depends greatly on their relative concentrations. Under natural conditions these interactions may not be so simple and may be conditioned by gonadotropin from pituitary. Bullough (1946) has shown that oestrogen caused widespread mitogenic activity in body cells, especially those of the gonade and accessory reproductive organs. Both the rate and number of mitosis are increased. The fibro-blasts throughout the body showed increased mitosis and in time laid down collagenous material. Thus in fact some investigators believe that tumour inducing property of oestrogens might perhaps be due to this mitogenic effect and not from any specific carcinogenic potency.

4. Oestrogens in the genesis of diseases:

(a) **Mammary tumours in men and dogs:** Conditions of gynaecomastica chronic mastopathy, innocent tumours and mammary cancer in man and animals could be traced to increased amount of oestrogens produced or due to failure to inactivate them in the liver. Hyperplasia in the male breast (gynaecomastica) commonly observed at puberty is due to excess oestrogens elaborated by maturing testis. In this connection it might be interesting to note

the occasional gynaecomastica reported under androgen administration in man and rats. The explanation in these cases could be found in the close structural resemblance between androgens and oestrogens and the production of the later from the former in the body.

That liver is the seat of inactivation of the oestrogens has been shown by many workers (Twombly and Taylor 1942 and others). Thus when there is disease condition of this organ as in cirrhosis, Infective Hepatitis etc, biologically active oestrogen appears in the circulation and urine. Also gynaecomastica has been recognised as a common condition accompanying chronic liver diseases.

Chronic cystic mastitis in mice following repeated injections of liquor folliculi from cows' ovaries was observed by Goormaghtigh and Anerlinch (1930) and later the oestrogen concerned here was found to be X oestradiol. Since then many workers have induced chronic mastopathy, innocent tumours and cancer in experimental animals. But there many other factors such as hereditary constitution, individual susceptibility, age of the animals, dosage and period during which the administration was given, have to be taken into consideration, while assessing the incidence of various states induced.

From this it follows that in many cases of benign tumours and cancer of the breast in the women and the bitch, the etiological agent at work might certainly be the excess oestrogen produced in the body itself. In the bitch concurrently are to be found irregularity in oestral cycle, prolongation of oestrus and presence of pseudo-pregnancy with lactation. Also endometrical hyperplasia cystic changes in the endometrical glands, purulent exudate, hypertrophy of the myometrium and occasionally leiomyoma of the uterus are seen. (Mulligan 1949). In many cases of mixed tumours and cancer in dogs (and woman) if adequate histological examination is made from different parts, varying changes as ductal and acinar hyperplasia, cystic dilatation, thickening of fibro-muscular wall of the duct and prolifera-

tive changes in the connective tissue element are to be found. Thus changes are never uniform and varies considerably in different parts of the growth; but indeed they are only the different histological patterns of the disease which is essentially the same and caused evidently by the persistent action of oestrogens on the mammary tissue.

With regard to the causation of cancer of the breast, long before anything was discovered about oestrogens eminent surgeons like Sir James Paget (1878) found the association of chronic mastopathy with cancer and it is now generally accepted that this condition predisposes to cancer. The upset of hormonal control with excess of circulating oestrogen is found to occur more frequently in women who have not borne any children or who having borne children have failed to suckle them. Thus Willis (1948) remarks, "thwarted reproduction and thwarted lactation predispose to cancer (of breast) normal reproduction and lactation are the prophylaxis."

The importance of ovary in the genesis of mammary cancer has long been recognised and for generations surgeons resorted to oophorectomy as a method of treatment. Complete cure had been reported from this procedure in occasional cases. But complete recovery always cannot be expected for total elimination of oestrogens, is necessary for this purpose. This is impossible of achievement because, oestrogens could under certain circumstances be produced in the animal body from many other sources, as seen already.

(b) **Tumours of the Uterus in men, dog and of oviduct in poultry:**

Endometrial hyperplasia, fibromata and cancer have often been associated with increased ovarian activity. In the bitch though tumour formation of the uterus is uncommon, purulent endometritis (pyometra) with hyperplastic changes of endometrium caused by increased production of oestrogens with irregularity in oestrus cycle is of frequent occurrence. In cows with nymphomania and per-

sistent heat caused by excessive production of oestrogens; Garm (1949) showed hyperplastic changes of varying intensity in the endometrium. In women with ovarian tumours (Granulosa cell type) endometrial hyperplasia, fibromyomata and even cancer, all evidently due to excessive oestrogen production from the ovarian tumour, could be seen in significantly larger numbers. However in women and possibly in animals too besides oestrogens, other factors, such as trauma at the time of labour, inflammation etc. may have to be considered in this condition. Experimental work done with animals especially rabbits and mice go to show that continued action of oestrogens on the uterus may result in changes similar to that noted in the woman.

Spontaneous tumours of the uterus excepting in rabbits and poultry (oviduct) are not frequently reported in animals. The bitch and the cow under oestrogenic action though may show endometrial hyperplasia and endometritis (with secondary infection with bacteria) do not suffer frequently from neoplasia.

In birds occurrence of leiomyomata in the ventral ligament of the oviduct and of the wall of the oviduct are of common occurrence. The incidents of this tumour is more in birds with high egg production and this naturally makes one suspect that increased ovarian activity may have something to do with its genesis. This suggestion of course in merely speculative and experimental proof appears to be lacking.

(c) **Leukosis in mice and leukotic tumours in fowls :**

Lymphoid leukaemia and malignant lymphoma (collectively called Leukosis) are common neoplasms in mammals and birds. Experimental work done with the form commonly seen in mice has shown that gonadal hormones, besides other factors, exerted some influence on its etiology. Relatively higher incidence was noticed in the females and Mc Endy et al (1944) found in their group of mice a low incidence of the disease following oophorectomy between 23rd and 56th days of life. On the other hand castration in early life

increased the liability of the disease in male mice (McEndy et al. 1944 and Murphy 1944). Also experiments done with strains of varying susceptibility, it was ascertained that administration of oestrogens greatly increased the liability of mice to leukosis. (Gardner et al 1944 and many others).

With regard to Avian Leukosis, though a virus has been incriminated, other factors such as hereditary constitution, hygienic conditions of the environment are involved in the final manifestation of the disease. High incidence in hens and great liability at an early maturity period points to the possible etiologic role of oestrogens in Avian Leukosis. Though much experimental work does not seem to have been done in this direction, findings of Marine & Rosin (1940) showed that lymphoid tumour were more common in caponised white leghorn fowls than in the non-caponised.

(d) Prostatic enlargement and tumours :

Hypertrophy and tumour formation of the prostate are of frequent occurrence in man and dog. Experimentally it has been shown that benign hypertrophy similar to that occurring in elderly persons and old dogs can be induced in experimental animals by prolonged injection of oestrogens (Burrows, 1949). There was metaplasia of the epithelium of ducts and proximal acini in the early stages, the changes later spreading towards the periphery and with widespread proliferation of the fibromuscular stroma. Basing on these changes it was believed that benign enlargement and possibly tumour formation of prostate might be due to increased amount of oestrogen acting on the gland. Further, Teium (1950) showed that in the etiology of benign enlargement of testes the relative amount of oestrogen and androgen present in the testes with advancing age played a conspicuous part. He found in older persons there is markedly relative increase in the number of lipoid oestrogen-producing sertoli cells and decrease in the number of producing Leydig cells. However it should be admitted that whether the enlargement is due to increase in oestrogen or decrease in androgen

is still a matter of controversy. However the consensus of opinion among workers appears to be that the benign enlargement is caused more by "a shift in relative amount of androgens and oestrogens rather than due to an excess of any particular hormone (Horning 1952).

(e) Testicular tumours :

Although the causation of testicular tumours are obscure, experimentally it has been possible to produce in certain strains of mice testicular tumours by prolonged administration of oestrogen. Testicular tumours are found to occur more in undescended testis wherein increased temperature acting on the testicles produces less androgen and possibly an increase of oestrogen. It is suggested that this increased oestrogen or probably an increase in ratio of oestrogen to androgen might be a factor in the genesis of testicular tumours in cryptorchid testes.

(f) Tumours of the adrenals and pituitary:

Experimental research on rodents and clinical observations have shown the intimate relationship existing between adrenal and pituitary tumours and the gonads.

Many spontaneous adrenal tumours elaborate large amounts of oestrogen or androgen, the former being associated with adrenal feminism and the latter with virilism. On the other hand, injections of oestrogens produce adrenal tumours in mice. Also gonadectomy at an early age has resulted in adrenal tumour in large percentage of mice. (Spiegel 1939, Gardner 1941 and many others). In these experiments were successful with certain inbred strain of mice. Thus for experimental production of adrenal tumours, gonadectomy at early age in suitable strains of mice is a better method than administration of oestrogen into intact mice. These experimental tumours produced excess of oestrogen which invariably caused the usual tissue changes in the accessory organs of reproduction.

Compared with the males, the pituitary gland of the female shows significant increases in weight at the time of puberty and there-

after. This has been attributed to the activity of oestrogens. Changes caused in the pituitary under oestrogenic action are hyperaemia, increased mitosis in chromophobe cells, enlargement and neoplasia. In some cases reversibility of these changes was reported after cessation of oestrogen administration. However, it should be borne in mind that these changes are modified by such factors as genetic make up of the rodent used, sex, dosage and length of administration. How far these factors operate in the genesis of spontaneous pituitary tumours in man and animals it is not possible to assess.

5. Treatment with oestrogens:

In view of the intimate relationship of oestrogens with certain type of tumours and some diseases of the genital tract, it would be clear that much caution should be exercised in the administration of these compounds. Obviously all that has been produced in rodents under extreme experimental conditions cannot be true of man and animals under natural conditions. As far as domestic animals are concerned it has been found that the dogs, sheep and possibly poultry are more prone to oestrogenic action than others. In the cow, though oestrogens have not been generally associated with neoplastic processes, they could initiate endometrial changes which may cooperate with bacterial agents to produce endometritis.

An important point to be considered in the use of these compounds in animal production is that such a treatment should leave no appreciable amount of these substances in the meat as to constitute a hazard to human health. From the experiments so far reported it is clear that with the commonly used compound for this purpose, viz, Stilboestrol, in doses usually employed in feeding, no such risks were involved. (Burroughs et al 1954, Turner, 1955, Preston, et al, 1955).

It must also be clear from the foregoing that oestrogenic changes are conditioned by such factors as individual susceptibility, genetic

make up, quantity of the oestrogen produced in the body and the length of time the compounds have acted on susceptible tissues. Probably in some cases, improper inactivation in the liver might also be an important factor. However, before treatment with oestrogen, it seems essential to find out whether the patient is already under the action of oestrogens produced by the individual's body itself. Thus Burrows (1952) points that oestrogenic treatment should always be given intermittently and that before treatment the effective output of oestrogen from the patient as judged by the condition of endometrium require assessment.

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J A U N D I C E

By

SUNDARSHAN SAHU, III B.V.Sc.



Jaundice or icterus is a clinical symptom, manifested in a number of diseased conditions, rather than a disease by itself and is characterised by hypetbilirubinaemia and deposition of bile pigments in the tissues of the body. It is manifested clinically by an yellow to orange, or even greenish discolouration of the visible mucous membranes, sclerus and the unpigmented parts of the skin.

Bile pigment or bilirubin, is always present in traces in blood varying from 0.1 to 0.8 mg. per 100 c. c. of blood, as well as in urine. In jaundice the quantity of bilirubin in blood is many times greater than the normal level. Clinically jaundice does not appear until the concentration of bilirubin in plasma rises to about 3 mg per 100 cc. When the concentration of bilirubin in the plasma is more than the normal level, but less than the clinical level, the condition is called "latent Jaundice".

The mechanism of formation and excretion of bile pigments

Virtow was the first person to disprove the opinion of monopolisation of liver in bile pigment formation and to demonstrate the extra-hepatic bile pigment formation. It is now generally accepted that production of bilirubin from haemoglobin is in greater extent by extra hepatic portion of reticulo-endothelial system. Animals have minor portions of reticulo-endothelial system in the liver and hence a marked and immediate hyperbilirubinaemia is seen in dogs when liver is completely removed. The organs concerned in the formation of bilirubin are bone-marrow, spleen and liver

The steps involved in the formation of bile pigments from haemoglobin are of fundamental importance in the study of jaundice since jaundice of any kind is merely an outward manifestation of abnormality in one or more phases in this transition.

Haemoglobin is composed of four molecules of ferrous complex of protoporphyrin and one molecule globulin. The first step in transition is the opening of propylpyrin ring at a particular point, with the formation of a new compound called "Verdo-haemoglobin" or "green haemoglobin", in which iron is attached less firmly than haemoglobin and hence verdo haemoglobin splits up into an iron containing portion and an iron and globulin free pigmentary portion. The former portion is linked with globin of plasma and is stored for further erythropoiesis; the latter portion is linked with plasma albumin and is called haemo-bilirubin.

The hepatic cells liberate the pigment from albumin and the compound thus formed is known as cholebilirubin, which is chemically Sodium-bilirubinate. Bilirubin, thus formed is excreted as such in the bile of dog but is partly converted into its oxidised product, biliverdin in the case of other species of animals. In the large intestine it is reduced into Stercobilinogen (urobilinogen) by the activity of the micro-organisms. Stercobilin, the oxidised stercobilinogen, is responsible for the normal colour of faeces. A small portion of the stercobilinogen, that is absorbed from the intestine, when the liver is healthy, is again excreted in the bile except a small trace that is excreted as urobilin.

Classification of Jaundice

(1) Old classification :

- I. Obstructive jaundice.
- II. Non-obstructive jaundice.

(2) Classification by Menee :

- A - Haematogenous.
- B - Hepatogenous.
- I - Obstructive.
- II - Toxic or infective.

There is no sharp line of demarcation between haematogenous and hepatogenous types as one eventually leads to the other and thus clinically this classification has little value.

(3) Rich's classification :

- I - Retention jaundice.
- II - Regurgitation jaundice.

In retention jaundice the defect in bilirubin-metabolism lies in the inability of the hepatic cells to remove an increased or sometimes normal amount of haemobilirubin from the blood stream, and hence hyperbilirubinaemia results. Owing to its albumin linkage haemobilirubin is not excreted in urine.

In regurgitation jaundice the functions of hepatic cells are normal but owing to particular pathogenic factors which may be either an increased intrabilirubinary pressure with actual disruption of the bile-capillaries or an increased permeability of these structures, there is a leakage or regurgitation of bile into the blood stream resulting in complete or partial reduction of bile-flow into intestine.

Aetiology

I Retention Jaundice :

A. Haemolytic anaemias due to abnormality in shape of R. B. Cs as in infectious anaemia in horse.

B. Excessive haemolysis-(a) snake bite (b) Intraperitoneal haemorrhage.

C. By certain haemolytic poisons-Potassium chlorate, Creoline, Naphthaline, Acetanilidum, Sulphanilamide etc.

D. Febrile conditions-due to (1) Piroplasmosis (cattle). *Babesia bigemina*, *B. Bovis* (not found in India) (Horse). *B. equi* (*N. equi*), *B. caballi* (Dog), *B. canis*, *B. gibsoni* (2) Anaplasmosis. (3) Influenza, distemper, azoturia, haemolytic streptococci infection. (4) Epizootic or enzootic interus in sheep (sheep cholera) by *C. haemolytic ovis*.

E. Chronic venous congestion.

F. Immature liver cells in new born-icterus neonatorum.

Regurgitation Jaundice :

A. **Hepatogenous**: May be due to (a) Chemical poisons-chloroform, ether, Carbon-tetrachloride, Tetrachloroethelene, Arsenic, Phosphorous, Sulphanilamide etc. (b) Idiopathic-yellow atrophy of liver. (c) Cirrhosis, hepatitis. (d) Infective diseases-leptospira ictero haemorrhagiae, infective hepatitis and catarrhal jaundice.

B. **Obstructive**: I. Extra hepatic. (2) Congenital-complete or partial occlusion of the lumen of the bile-duct. (b) Acquired-(i) within the lumen of the bile-duct-calculi, worms (liver fluke, ascarids *P. explanatum*) inspissated bile. (ii) In the wall of bile-duct-catarrhal inflammation of the wall-neoplasms, stricture. (iii) Pressure from without-Tumours in the liver, echinococcus cyst, enlarged lymph glands, Aneurysm in the neighbouring arteries, neoplasms etc.

II Intra hepatic: (i) Cirrhosis of liver. (ii) Carcinoma of liver (iii). Cholangitis.

Semiology

The chief clinical symptom in jaundice is the discolouration of the visible mucous membranes such as buccal, nasal, conjunctival, vaginal, sclerotic and nonpigmented parts of the skin. The colour varies from lemon to orange yellow to greenish-yellow colour.

The other principal symptoms are due to retention of bile-salts rather than bile-pigments. There is little secondary disturbance in retention jaundice but chloesterol is

increased and there may be deposition of cholesterol in the skin giving rise to small yellow nodules known as Xanthomata sometimes xanthopsia or yellow vision is also met with.

In regurgitation jaundice there is severe itching, bradycardia, haemorrhages due to injury to capillary endothelium by bile salts besides various nervous symptoms. Owing to the lack of bile salts fats are not digested and absorbed normally resulting in putrifactive changes and hence the faeces has putrid smell. In retention jaundice the faeces is more brown in colour than normal whereas in regurgitation jaundice due to lack of stercobilin it is pale or clay coloured.

Urine in regurgitation jaundice is dark brown or even greenish in colour owing to the presence of bilirubin. It produces a yellow froth on shaking. Milk and sweat also contain bile-pigment but it is not found in saliva and lachrymal secretion. In piroplasmosis jaundice is accompanied by haemoglobinuria.

Enzootic icterus in sheep commences with severe diarrhoea, sometimes bloody or mucoid, intense thirst and high temperature. Other symptoms are reduced appetite, loss of body weight, occasionally albuminuria. In severe cases there are symptoms of the so-called icterus gravis including nervous disturbances such as indifference, lethargy and muscular spasm.

Diagnosis

Jaundice is diagnosed easily by noting the discolouration of the visible mucous membranes and the colour of the dung but the actual course and nature of the condition is known well by subjecting urine as well as plasma to biochemical examination.

Plasma: Plasma is subjected to Vandenberg's reaction and the result is interpreted as follows:

I - Immediate direct reaction - Regurgitation (obstructive).

II - Delayed direct reaction - Retention (Haemolytic).

III - Biphasic reaction - Obstructive plus Haemolytic.

IV - Indirect reaction - Retention jaundice.

The bilirubin content as well as clotting time of the plasma are also observed and in positive case the bilirubin concentration will be many times greater than normal, and clotting time is increased.

Urine: It is tested by Huppert's test to detect bile-pigments, which are present only in regurgitation jaundice. Obstructive jaundice by gallstone may be revealed by a straight X-ray of the abdomen.

Treatment: The treatment must be aimed at cure of the disease responsible for the icteric condition. In retention jaundice treatment of the respective diseases removes icterus with the disease.

In cases of all gall-stones and neoplasmas, causing obstructive jaundice surgery will have to be resorted to.

Precautions in operation: Due to lack of bile-salts vitamin K absorption is impaired resulting in low concentration of prothrombin in the blood and hence in jaundice, clotting time is increased and it is difficult to stop the haemorrhage. To overcome this difficulty either synthetic preparations of vitamin K such as Kepilen are given by i/m injection twice daily for three days before and after operation or per os bilesalt with or without 'Kepilen' thrice daily for three days before and after the operation.

In hepatic disorders cholagogue purgatives as a calomel are given. The purgative is followed by an emetic. Drugs containing lipotropic factors like choline, methionine can be given.

Diet: Food stuffs containing high percentage of fat are contra indicated. Diets containing high percentage of protein, carbo-hydrate and vitamins especially, vitamin B complex, C, K

are advocated. For horses and cattle limited quantity of best hay and boiled linseed or soaked linseed with little green fodder is advised. For dogs, boiled sheep's paunches with barley and lime water or normal saline for drinking are advised. The animal should not be put to any work. Absolute rest is essential.

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Recent knowledge about Parafilariasis of Animals

By

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Literature on Parafilariasis in animals due to various species of *Parafilaria* is rather scanty. No systematic record is available regarding the incidence and distribution of this infection in our country. There are, however, a few cases on record of this condition in equine as well as bovine species occurring sporadically here and there. The intermediate hosts are not yet definitely known, but it is suspected that they may be some dipterous flies. Recently, work done at the Indian Veterinary Research Institute, Izatnagar, on the life-history of this parasite (I.C.A.R. Helminthiasis Scheme for 1950-54) was inconclusive, although larval forms attributable to *Parafilaria bovicola* were obtained from *Musca sp* caught while sucking the blood oozing out from nodules of an infected animal. The author desires to survey in this paper, the recent knowledge of this malady, after critically studying the available literature.

The members of the genus *Parafilaria* Yorke and Maplestone, 1926, are characterized by: mouth with two lateral, lip-like structures; cuticle transversely striated, except near the anterior extremity where it is covered with numerous transverse rows of circular or elliptical papillae; oesophagus not divided into two portions and very short.

In male, caudal end loosely coiled; tail short and bluntly rounded; short, caudal alae with large, pedunculated, twelve pairs of pre and post-anal papillae, four or five pairs of which near the cloacal aperture project into the alae. Spicules unequal and dissimilar;

the left, long slender and pointed; the right, short, stout and blunt; in some gubernaculum absent.

In female, posterior end bluntly rounded: anus and posterior end of intestine atrophied; vulva near the mouth; uteri run backwards (opisthodelph); oviparous, eggs containing embryos. The eggs hatch out soon after they are deposited, and the larvae are probably picked up by the dipterous insects and develop in them, adult worms in the subcutaneous and intermuscular connective tissue of equines and bovines.

The disease caused by them is a peculiar chronic form of skin diseases affecting chiefly equines and bovines. The disease starts with an appearance of small nodules about the size of a hazel-nut, measuring about 5-7 m.m. in thickness and usually 1 to 10 in number, situated most frequently on the neck, fore-leg and dorsal region of the animal. In about 2 or 3 weeks' time these nodules attain a diameter of nearly 40 m.m. and become haemorrhagic. A small aperture about 0.5 - 1.0 m.m. in diameter, appears at the summit of the nodule, through which the anterior end of the female worm protrudes for deposition of eggs. The eggs hatch out soon after they are deposited, and are picked up by dipterous insects in which they develop. It has been observed that the haemorrhage is more profuse in animals used for ploughing and pulling carts and in those that graze in the open on hot days. The disease is seasonal and its duration is variable, usually December to July. The

lesion is confined to the subcutaneous and intermuscular tissue, producing nodules, which appear suddenly, break open, bleed and then heal up. The condition is termed as "summer sore" or Haemorrhagic filariasis.

Srivastava (1939) observed in a bullock, suffering from cutaneous microfilariasis, that the animal had practically no hair on the greater part of its body. The skin revealed numerous scars of healed lesions all over the body, and pieces of skin had peeled off from several places. It was noteworthy that the skin was so tender that even the slightest abrasion was sufficient to peel off the skin leaving behind bright red bleeding surfaces. Histopathological examination of the affected skin showed numerous microfilariae, but, repeated examination of blood smears and the centrifuge deposits of blood proved negative for adults as well as larvae.

The microfilariae are unsheathed and measure about 0.255-0.28 m.m. in length and 0.004 m.m. in breadth. Microfilariae are characterized by their rounded anterior end and slightly curved and pointed posterior end. The number of microfilariae in the skin varies from time to time. In winter months, the number of microfilariae decreases rapidly and the skin presents an almost normal appearance, but again at the onset of summer, the microfilariae associated with clinical manifestation reappear.

As it will be evident from the foregoing account that the disease is a chronic one, it is not difficult to imagine that the working capacity of the affected animal is considerably reduced on account of the numerous wounds and constant irritation. From the apertures made by the adult, an exudate of blood and lymph, and irritation, and perhaps some inflammation result. The inflamed and swollen areas may allow the entry of bacteria and the condition may become worse. Affected animals become restless and distressed. In any event, animals thus distressed feed badly and lose condition and become weak. Apart from the effects on the animals themselves, the

damage done to the hides may be considerable. The holes made in the hides leaving behind the scars may render them unsuitable for use as leather. The knowledge so far accumulated about the epidemiology of Parafilariasis in various animals in India, as well as abroad, is summarized below.

II. The Disease in various animals

(i) Parafilariasis in equines

Parafilaria multipapillosa. (Syn. *Filaria multipapillosa*) was first recorded by Condamine and Drouilly, 1878. Later on Railliet (1885) renamed it *Filaria haemorrhagica*. Again, Stephens and Theobald (1916) suggested the name *Setaria haemorrhagica*. In the same year, Romanovitch put it as *Microfilaria haemorrhagica*. But Yorke and Maplestone, 1926 established the name of this species as *Parafilaria multipapillosa* relegating the other names as synonyms of it, and since then the species is recognized as *Parafilaria multipapillosa*.

In India, the disease is widely prevalent among equines but no work has yet been done to draw any conclusive evidence on its pathological aspects. Sen (1931) published an account of several equine microfilariae in a short review of the literature among which that of the genus *Parafilaria* is also mentioned. Loser (1937) recorded Parafilariasis of horses in the territories of the Lower Volga in Russia. The disease was associated with small subcutaneous haemorrhagic nodules containing microfilariae. He observed that the disease is prevalent in the summer months and developmental stages attributable to this filaria occur in small flies of the Steppes.

Lutter (1940) found that ten Hungarian horses were afflicted in the summer with a mild bloody sweat accompanied by skin nodules in the shoulder region. He found eggs and microfilariae of *P. multipapillosa* in every case in the blood from the nodules and blood clots, but not in venous blood. Life-history experiments with various flies, daphnids and copepods proved unsuccessful.

In Poland Zarnwski (1945) found certain skin eruptions in horses due to *Parafilaria multi-*

papillosa. In the same year, Singh (1945) published an account of cutaneous filariasis in Italy and Sicily.

Bauman (1946) observed in Greece that the female of *P. multipapillosa* pierces the skin of the host for the purpose of egg deposition. *Musca sp.* swam on the bleeding spots and act as the intermediate hosts. Microfilariae of this worm do not appear in the blood, as stated earlier; if embryos are found they are attributable to other filariae. In 1955, he published an account of the diagnosis of the infection, and discussed the possible transmission by flies and reported a case from the Austrian Tyrol.

(ii) Parafilariasis in cattle :

Oguni (1927) succeeded in demonstrating a type of micro filariae in an elephantiasis-like disease in Japanese cattle, which was formerly believed to be merely a kind of scabies or a similar condition. The onset of disease generally occurs in large numbers in summer months and are rare in winter. It has been observed that the animals between 3 and 7 years of age suffer most. The lesions are usually found on the skin of the head, neck and back. In the beginning, several small nodules appear here and there. As the disease progresses the size of nodules increases, hairs fall off and thick folds due to the thickening of the skin are gradually formed on the neck and throat, giving the appearance of elephantiasis. The affected animals show severe itching, resulting in continuous rubbing, biting and scratching due to irritation. In winter months lesions gradually heal up and animals appear to be normal, but again on return of warm season the lesions reappear assuming larger proportions. The microfilariae, which are found in the blood, measure about 130u in length, the breadth being equal to the diameter of the R.B.C. and are unsheathed. In the initial stage microfilariae are found abundantly resulting in an increase of the number of eosinophiles, which in advanced cases disappear.

Gulati (1934) recorded its occurrence in cattle in India. But he could not confirm if the causal parasite was *P. multipapillosa* or any other. In the same year, Jesus (1934) published an article on Haemorrhagic filariasis in cattle in Philippine Islands and he could establish the causal agent of the disease as a new species viz. *P. bovicola*, but only female worms were recovered by him from the bleeding nodules.

Fain and Herin (1950) described the male of *P. bovicola* collected from a cow in Ruanda-Urandi which differs markedly from that of *Parafilaria multipapillosa*, notably in the presence of a gubernaculum 44 to 56u long, the right spicule measuring 145-158u and the left 332-385u.

Srivastava (1939) recorded its occurrence in a 6 year-old bullock. He obtained large numbers of unsheathed microfilariae from fresh pieces of skin incubated overnight in normal saline at body temperature. Adults of these were found in the subcutaneous and intermuscular connective tissues, and were observed to produce subcutaneous nodules, which appear suddenly, break open, bleed and then heal up. The condition is usually seen during summer and disappears in winter. Microfilariae are never found in the blood of the host.

The points of similarity between the disease in the Japanese cattle as reported by Oguni (1927) and in the Indian cattle are the seasonal incidence, both flaring up in summer, peeling off of the skin at the slightest injury, casting off the coat in patches, and the causative agents in both discharging unsheathed microfilariae. The disease in Indian cattle differs in the absence of any predisposition of the skin, thickening of the skin at the neck etc., with subsequent elephantoid development, and in the absence of the microfilariae in the blood. Microfilariae found in Indian cattle are larger in size than those of the Japanese cattle.

Masyukov (1940) found *P. bovicola* in cattle in a collective farm in the Tuapse district

(Caucasus). The specimen collected by him did not however tally with the descriptions furnished by the earlier workers.

Daskalov (1944) found a severe widespread infection of the cervical connective tissues of cattle in Bulgaria. He collected his specimens from the affected tissues and found them to be different from those reported so far, and hence describe them as a new species *Parafilaria bulgarica*. He reported that although cervical connective tissues were severely infected, other areas such as scapular, dorsal and thoracic regions and the hind quarters and knee joints may also be invaded. The most important symptoms he noticed were the yellow-green infiltrations of gelatinous material and small local haemorrhages which constituted a diagnostic sign. Infection was highest between 7 and 16 years of age (cows 11.33%, oxen 19.25% and steers 85.71%). Massive infections were associated with the absence of subcutaneous fat.

Metianu (1949) reported on a haemorrhagic dermatitis in cattle as having a wide distribution in Rumania and found in 3% of 410 animals examined.

(iii) Parafilariasis in elephants

There is no record of a filarid worm so far in the Indian elephant, except the one by Ramanujachari and Alwar (1954). But there are two filarid worms described from the African elephant: *Filaria goosi* from Tanganyika territory, and *Loxodontofilaria loxodontis* from Belgian Congo described by Baylis (1923) and Vanden Berghe and Gillain (1939) respectively. The microfilariae in both cases were seen in the peripheral blood.

Ramanujachari and Alwar (1954) have recorded haemorrhagic filariasis in elephants endemic in the forest areas of Nilambur, Ooty and especially Wynad in Madras State. The adults occur in soft subcutaneous nodules about the size of a gooseberry, on the lateral and ventral aspects of the abdomen, and to a less extent on the outer aspect of the thighs. Blood oozes from the nodules and teams with unsheda-

ted microfilariae. The nodules become fibrosed and hardened and may become caseated too. The bleeding nodules are centres of chronic inflammation and severe pruritis. Portions of a female worm were recovered from a nodule removed under local anaesthesia and the parasite was tentatively diagnosed as a species of *Parofilaria*. But no microfilariae were detected in the peripheral blood smears of the same animal.

(iv) Parafilariasis in deer

Rukhliadev (1947) recovered *Parafilaria* from the adipose tissue of a male Crimean deer, *Cervus elaphus*, 4-5 years old, which was identified and named as *Parafilaria antipini* n. sp. The description was based on one intact male worm and several fragments of a female. The principal characters of the female were as follows: body length, 1863 m.m. x 0.3 m.m. in maximum width; left spicule, 0.492 m.m.; right spicule, 0.156 m.m. both transversely striated; and 9 pairs of pre-anal and 5 pairs of post-anal papillae. The body fragments of the female were 0.396 m.m. in maximum width; the intestine ends subterminally and blindly, the anus being atrophied. Both sexes possess a band, dotted with cuticular plaques, which extend along the body, a character distinguishing the species from *P. bovicola*. The male is distinguished from *P. bovicola* and *P. multipapillosa* by the length of the spicules and by the arrangement of the anal papillae.

III. Therapeutic aspect of the disease

Gvasaliya (1940) published an account regarding the treatment of Parafilariasis in horses. He has recommended the intravenous injection of tartar emetic 100 c.c. of 2% aqueous solution, repeated 3 to 5 times.

Potemkin and Shcherbinin (1948) treated 210 horses suffering from Parafilariasis with a 2% aqueous solution of tartar emetic given intravenously on three successive days. They obtained good results.

Bildushkinov (1949) has recommended the application of turpentine oil against Parafilariasis. He also found that 10-20 c.c. of turpen-

time oil given intravenously produced good results in horses.

Ryazantser (1949) found that 1.75% solution of tartaremetic in a dose of 100 c.c. given intravenously three times in one day was effective against Parafilariasis in horses. He treated 58 cases and found it effective in 48 (82.7%). The same drug in lower concentrations was less efficacious, while in concentrations higher than 1.75% the efficacy was not increased, and it had a toxic effect on some of the horses.

IV. Conclusion

This account will doubtless have acquainted the reader with the present status of know-

ledge on this subject of Parafilariasis. Considering that the infection in our livestock is capable of causing appreciable harm to them, and that it is fairly widespread, although seasonal, in certain States of India, there is need and scope for investigation and research into the epidemiology of the infection and especially the arthropod vector involved in the life-cycle.

V. Acknowledgement

I am grateful to Shri M. Anantaraman, Research Officer in Helminthology, and officer-in-charge, Postgraduate course in Parasitology, Madras Veterinary College, for kindly guiding me in preparing this article.

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Our Educational Tours to Ranipet and Guindy

By

K. S. REDDY, FINAL YEAR, B.V.Sc.



I. Ranipet Trip: A trip to the Institute of Veterinary Preventive Medicine, Ranipet is one of the two educational trips which fulfilled our hearts with greatest pleasure and joy during our fourth year in this college.

As students of Veterinary Medicine, it was really a worth and useful trip in revising theoretical knowledge, gained in the college on various practical lines.

We had seen with keen interest and enthusiasm the various processes connected with the manufacture of biological products like the preparation of Ranikhet, Fowl Pox, Pigeon Pox vaccines, for poultry, Black quarter and Haemorrhagic septicaemia vaccines, Anthrax vaccines and sera like, A. R. Serum, Anti Anthrax Serum for cattle. We were highly impressed to see the various modern equipments in the Institute, particularly the Freez-drying machine and the latest books in the library. We also observed the symptoms and lesions exhibited when various species of animals like cattle, sheep and poultry were challenged with these disease causing organisms.

Our two days stay, was made very comfortable by the hospitality of the Superintendent of the Institute, and we are highly thankful for all that he had done for us during our stay there.

On a retrospect over this trip, we feel, we had seen everything and had spent a memorable time in connection with the subject—Medicine. We thank the Professor and Asst. Lecturer for giving us this opportunity which we can say, have not so far had throughout the past years.

II. Central Leather Research Institute, Guindy: Another interesting feature is our one day visit to the Central Leather Research Institute, Guindy. The trip was arranged by the Lecturer in Flaying and Meat Inspection. It is a very pleasant trip and we learnt many a thing in connection with flaying, curing and tanning.

At every stage, we were impressed with the latest techniques adopted in the manufacture of leather. We were also equally impressed with the original researches done in this Institute. In addition to this, we had a very interesting lecture on the manufacture of leather. Above all, the film "From Hide to Leather" was very interesting and without which, we are sure, our trip to the Institute would not have been enjoyable. We are highly thankful to the various Research Assistants who took great pains in explaining what they are doing in the respective sections.

Our thanks are due to the Director of Central Leather Research Institute for making necessary arrangements, for showing round the Institute. We will be failing in our duty, if we do not express our deep sense of gratitude to the Lecturer and Assistant Lecturer in Flaying for the various arrangements made in seeing the Institute and making our trip highly successful.

We intend to mention here about these two trips in a very concise manner and we wish in years to come every one will utilise these two opportunities.

7 - MAY 1957

Madras Veterinary College Association

ANNUAL REPORT 1956-57



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Mr. M. Anantaraman, M.A., M.Sc., F.Z.S.

Dr. C. K. Velayudhan Nair, G.M.V.C.

Dr. D. Mariappa, G.M.V.C.

It is indeed a great pleasure to present the 21st. Annual report of the Madras Veterinary College Association. As will be seen from the summary which follows the academic year 1956-57 has perhaps been the most eventful and busiest so far as the Association activities are concerned and it is most gratifying to note that many of the traditions set forth by the predecessors have been kept up unstained.

This year was made most eventful due to the Centenary Celebrations of the University of Madras. Our Students took part in all the activities with enthusiasm and interest. A batch of 50 students under the leadership of R. Ganesh worked as volunteers at various places during the week. Our students gave performances at the Television and the open air theatre. We took part in the Centenary exhibition and we were awarded a class B Shield. Our students made a liberal contribution to the University Centenary Celebration Fund.

It is noteworthy that this year our college has gained popularity among the other colleges in the city. I am glad to say that as many as five of our students are holding offices in different Inter-collegiate organisations.

They are: 1. R. Ganesh - Joint Secretary, Madras College Students' Council.

2. Md. Ghouse Basha - Vice President, Madras Students' Adult Education Council.

3. S. S. Rama Rao - Joint Secretary, Andhra Vidyarthi Vignana Samithi.

4. G. Venugopal-Editor, Madras Student's Social Service League.
 J. M. Dewan Muthu Moham-
 ~ ~ ~ General Secretary, Madras Professional College Students' Tamil Manram.

We are affiliated to the World University service and R. Ganesh had the privilege of being nominated to the Health Committee of World University Service.

Our students have been regularly taking Part in Quiz programmes and Youth Forum conducted by the A.I.R. Madras, and I should say that they have been doing extremely well.

One of our First year students Mohamed Salahuddin had the distinction of getting the I prize in the Intercollegiate Urdu Essay Competition. Mr. S. Ramachandran took part in many of the intercollegiate debates.

P. Ramakrishna, C. J. Purushotham, and Miss P. S. Lalitha took part in the Inter-collegiate Music competition at Madras Medical College. It has become a common practice for us to sell flags, tickets, etc, and collect donations in aid of Red Cross, S.P.C.A., and other organisations.

Association Diary :

- 23- 7-56 Election of Office bearers.
 25- 7-56 Inaugural address by Dr.Lakshmi Sahai, Director, Indian Veterinary Research Institute, Sri Bertie A D'Souza, presided.
 15- 8-56 Independence Day Celebrations- Mr. P. P. I. Vaidyanathan, I.C.S., Secretary to Government, Department of Agriculture, hoisted the National Flag and addressed the members.
 Vice-President Dr. K. P. ChandraSekharan was in the chair.
 25- 8-56 Reception to new Graduates- Dr. Pattabiraman, Director of

Animal Husbandry, addressed. Dr. Bertie A. D'Souza presided. Tea and variety Entertainment at the Open Air Theatre.

- 30- 8-56 Film Show by the U.S.I.S.
 11- 9-56 Mr. S. S. Khot, Liason Officer, (Sheep & Wool) Indian Council of Agricultural Research spoke on "Sheep & Wool Development in India "
 Student Chairman presided.
 19- 9-56 Film show by the U.S.I.S.
 16-10-56 Wild Life Week, Mr. B. V. Ramanujalu, Superintendent of the Madras Zoo spoke on "Veterinarians and Wild Life." Vice-President Dr.K.P. ChandraSekharan, presided.
 20-10-56 Excursion to some places of importance in the vicinity of Madras.
 28-10-56 Excursion to the Bird Sanctuary, Vedanthangal and Mahabali-puram and Thirukalikundram.
 21 -11-56 Film show by the U.S.I.S.
 27-11 -56 Programme of Entertainment in Ventiloquism, monoaction and mimicry by Prof. Schwartz Pillai.
 7-12-56 General body meeting to discuss about our participation in the centenary celebration of the University of Madras.
 Dr. Berti A. D'Souza, presided.
 4- 1-57 Film show by the U.S.I.S.
 22- 1-57 Film Show by the U.S.I.S.
 16- 2-57 Prof. T.W. Gullickson, Faculty of Dairy Science, University of Minesota, Nutrition Adviser to the Government of India addressed the members.
 Prof. V. Mahadevan presided.
 6- 3-57 Film show by the Imperial Chemical Industries Ltd.

This year many prominent men of the veterinary profession addressed the students and a large number of films on professional subjects were screened. An excursion for the members of the staff and students was arranged. We hope that we will be able to arrange more excursions in future when we get our new college bus.

In concluding my report I wish to record my heartfelt thanks to our President, Dr. Bertie A. D'Souza, for his valuable advice and guidance. He took keen interest in our activities, and was always a source of inspiration and encouragement. The Vice-President, Dr. K. P.

Chandrasekharan was guiding us at every step and rendered invaluable help throughout the year. To him and the advisers I tender my heartfelt thanks. Lastly I wish to thank all the members of the Association including the staff without whose splendid co-operation we could not have accomplished anything.

As the out going secretary, I wish my successor and the Association the best luck and all successes in the coming years.

R. GANESH,

Secretary.

Selected List of Latest Veterinary Books

Lapage	Veterinary Parasitology	...	1956	43	5	0
Hadley	Principles of Veterinary Science	...	1954	24	12	0
Smythe	Veterinary Ophthalmology	...	1956	24	1	0
Linton	Veterinary Hygiene	...	1952	41	4	0
Sisson	Anatomy of the Domestic Animals	...	1955	67	8	0
Dukes	Physiology of the Domestic Animals	...	1955	55	0	0
O'Connor	Dollar's Veterinary Surgery	...	1956	28	14	0
Grieg	Hoare's Veterinary Therapeutics	...	1956	28	14	0
Gaiger & Davies	} Veterinary Pathology and Bacteriology		1955	28	14	0
Miller & West		} Black's Veterinary Dictionary	...	1955	24	1

Other Veterinary Books for Students & Practitioners are always available



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SOCIAL SERVICE LEAGUE

REPORT FOR 1956—57



The Social Service league of our college had its inception six years ago and its services to the poor and needy during that period have created enthusiasm among the students who have from year to year taken part in the activities in large numbers. The various sections of the league have been quite active throughout the year.

This year's activities started by the end of July with the running of a night school for the children in the slum area in Naval Hospital Road near our college. In the beginning the strength of the night school was sixty three and it has now risen to one hundred and twenty as a result of the work of a band of energetic and enthusiastic social workers of the league. Milk powder is being distributed regularly to the children attending the night school. Besides, we distributed slates, notebooks and other writing materials to the poor and needy boys of the night schools.

The members regularly visit the comparatively less fortunate people of the above slum areas and advise them on personal hygiene and environmental sanitation. We whole-heartedly thank the people of the locality for co-operating with us in carrying out our programme.

- At the request of Madras Students' Adult Education Council a batch of four students were regularly sent weekly to the two centres at Swathantranagar and Rotarynagar to conduct classes for adults under the Captainship of Mr. Md. Ghose Basha, the Student Chairman of the college. Useful work as sales of Red Cross flags, Armed Forces Welfare Association flags and S.P.C.A. Flags were done by our social workers.

Our college social service league is affiliated to Madras Students' Social Service League, an inter-collegiate body to federate the social service activities in the different colleges of Madras and to coordinate their activities to enable the student body as a whole to play a more effective role in the work of social amelioration. Our league have taken very active part in the activities of this parent student organisation. This year nine delegates from this college were deputed to attend the 7th conference of the Student Social Workers at Vivekananda College, Madras. Our league participated in socio economic survey of the Meenambakkam village and also helped Madras Students Social Service League in laying of roads at Meenambakkam village and Guduvancheri along with other Social Service leagues. Eight members of the league attended the certificate course in social service conducted by the M.S.S.S.L. and it is noteworthy that all these students from this college secured cent percent result in the examination for the Social Service Certificate.

In University Centenary Exhibition stall of the M.S.S.S.L. we participated along with other colleges. We displayed the various activities of our league by means of charts and photographs and these were highly appreciated by the public.

As we expect to receive a motor ambulatory clinic for the college in the near future, we hope to do some work on the Veterinary and Animal Husbandry aspects. It is our desire to take this type of specialised work in some of the villages in the National Extension blocks near Madras city.

It is my duty to thank our Principal, and Vice-President of the association for the necessary impetus and encouragement given to the league. Before winding up let me thank all the members of the social service league for their whole-hearted support and assistance in performing the various duties of the league. It is earnestly hoped that the league will grow

from strength to strength and stand in the years to come as a beacon light to the youth of the land beckoning them to the highest ideals of service and sacrifice.

P. KRISHNAN KUTTY,
Secretary, Madras Veterinary College
Social Service League.

*Every man who observes vigilant, and resolves steadfastly,
grows unconsciously into genius.*

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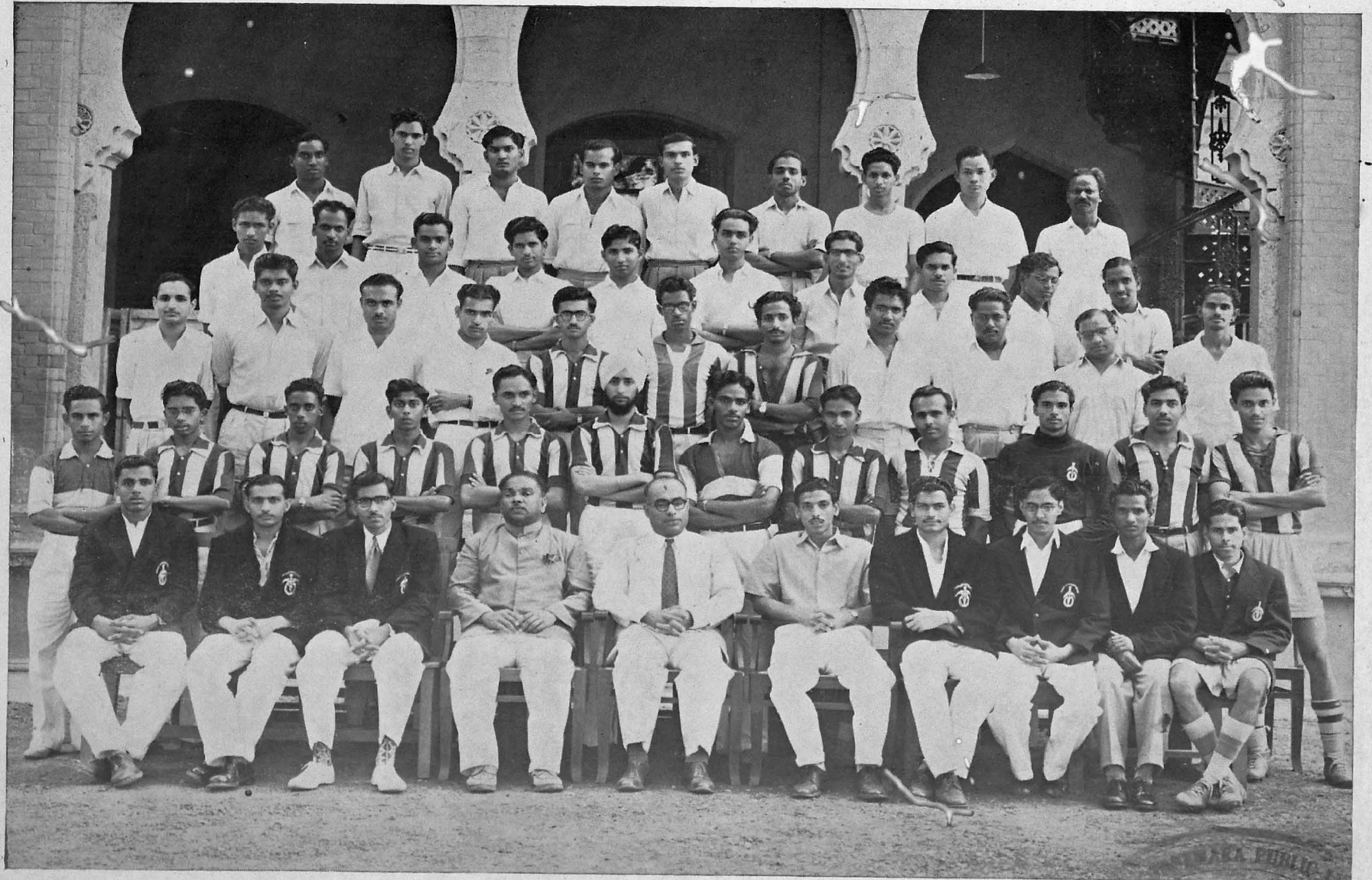
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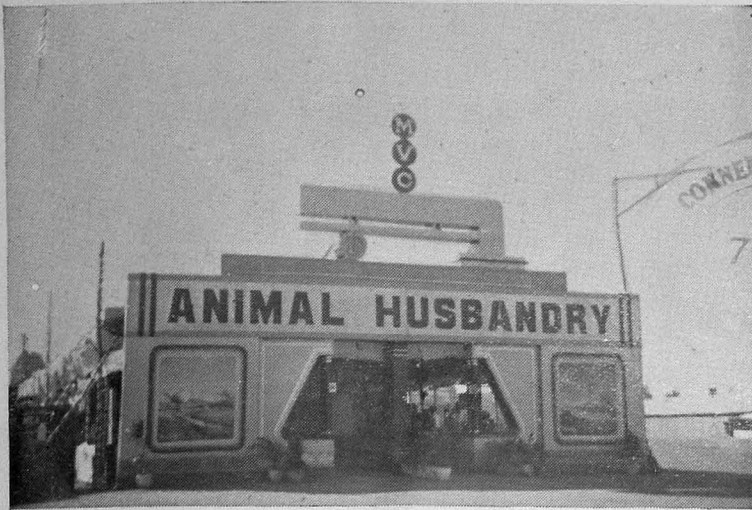
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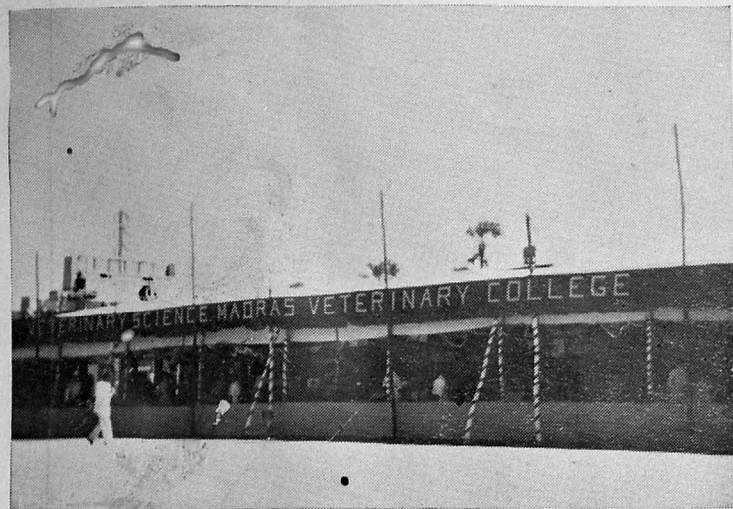
MADRAS VETERINARY COLLEGE ATHLETIC ASSOCIATION 1956-57



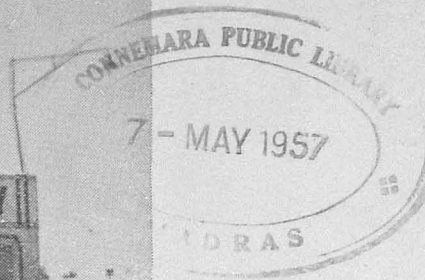
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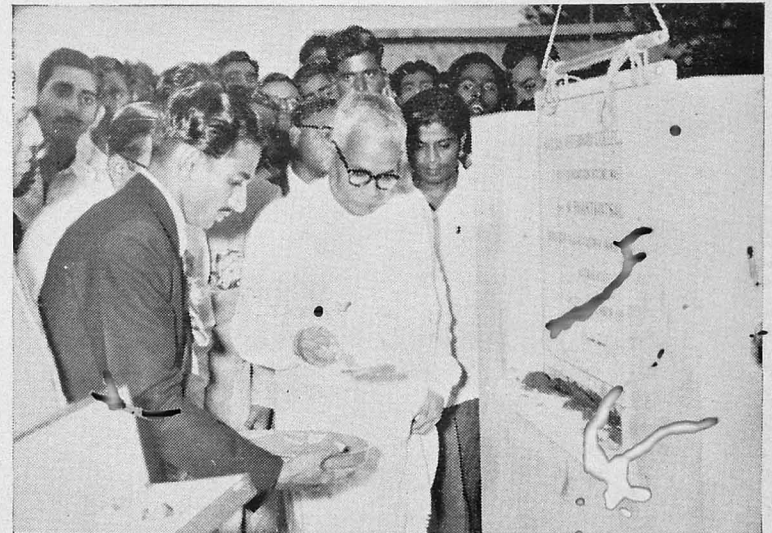
Our Stall Entrance in the Centenary Exhibition



Side view of our Stall in the Centenary Exhibition

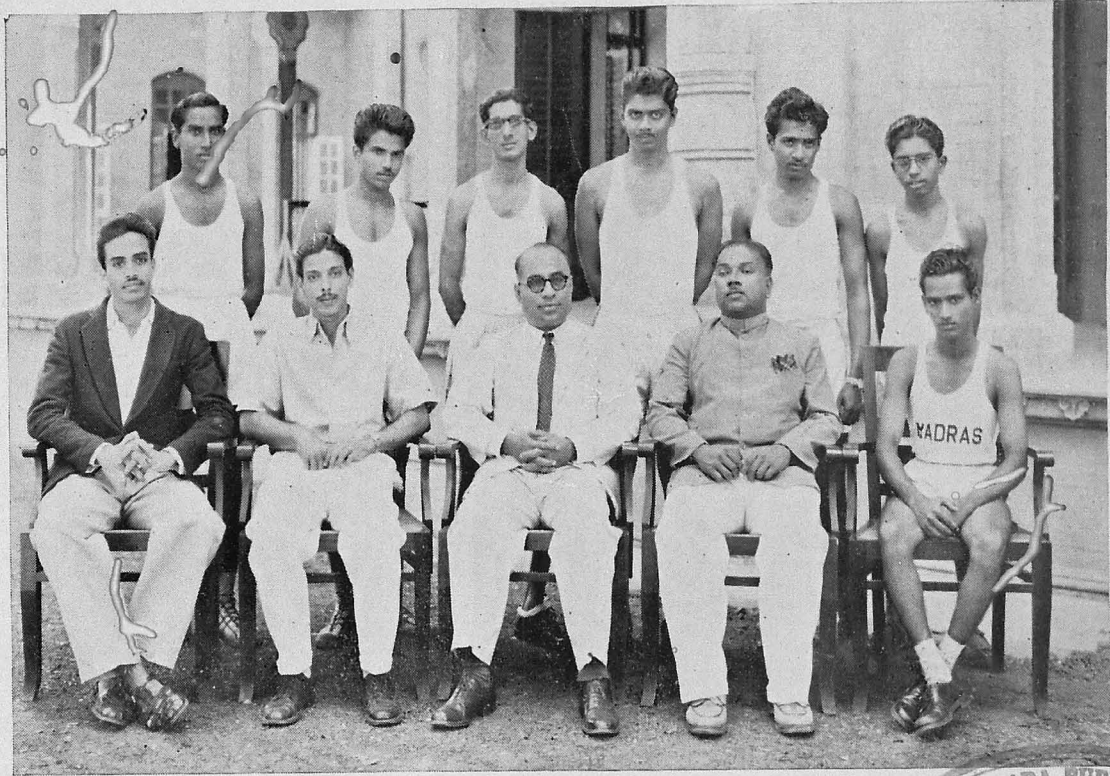


Our Warden's Report at the Hostel Day Celebrations



Our Minister laying the foundation stone for our New block

MADRAS VETERINARY COLLEGE ATHLETIC ASSOCIATION



BOXING TEAM 56 - 57

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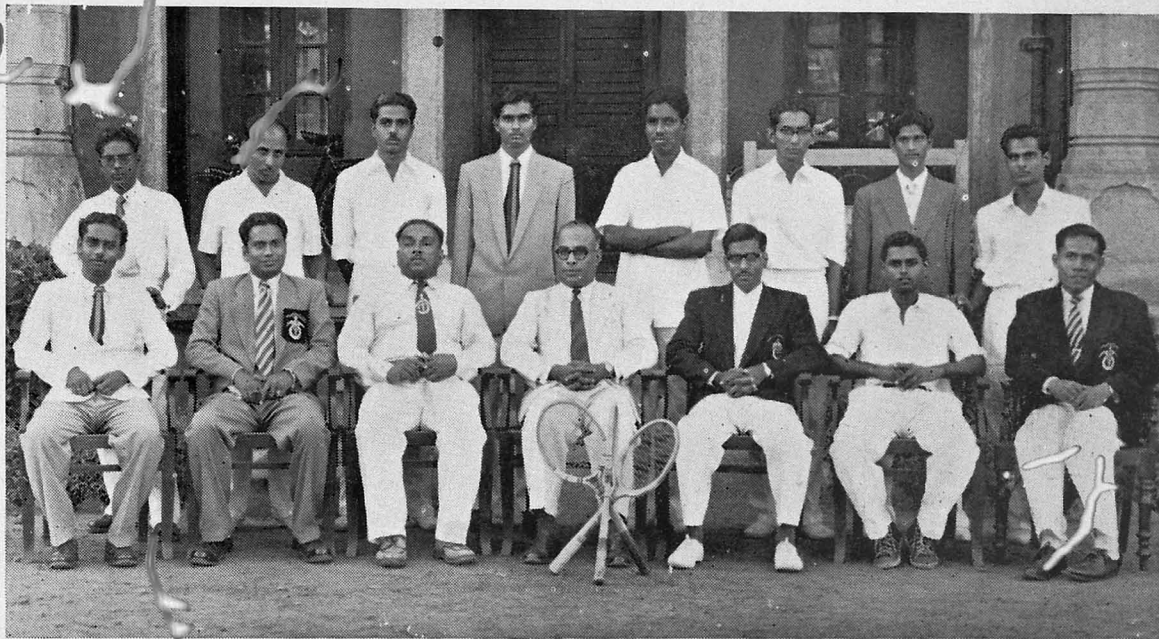
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By M. V. C. Students Social Service League



Members of the Club with Principal and Sports Secretary

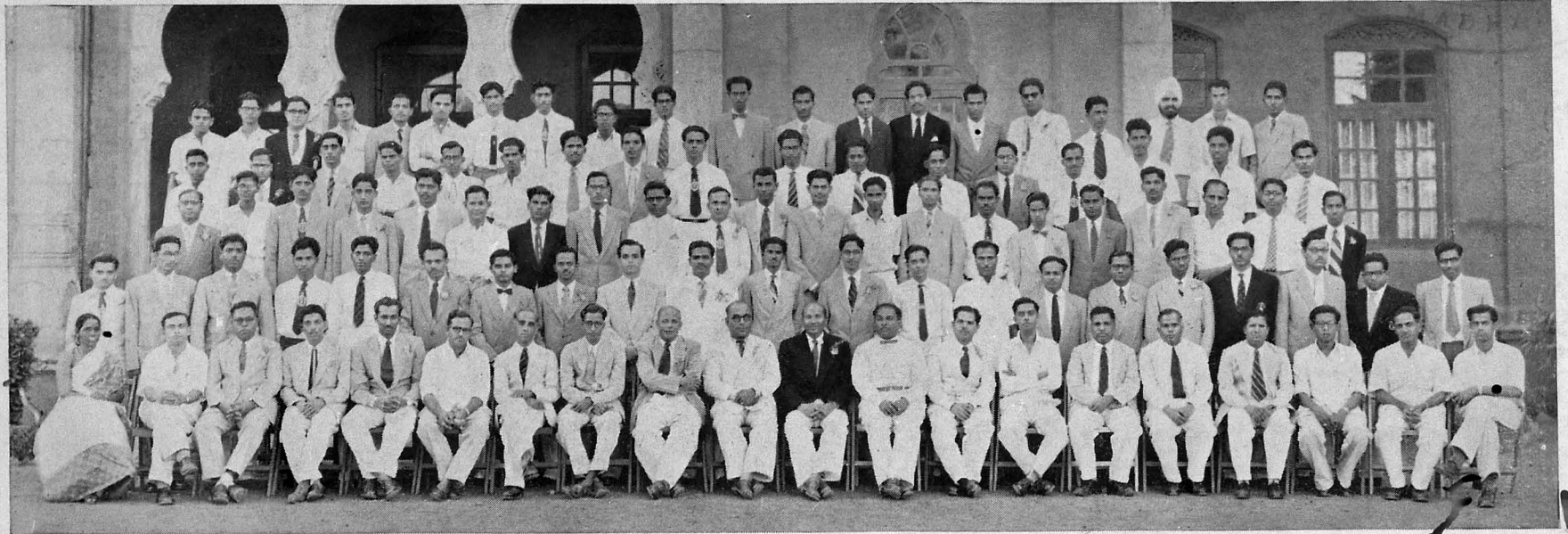


Our Students at Ranipet with our Professor of Medicine

PUBLIC
7 - MAY 19
MADR

OUTGOING GRADUATES

COMMERCE PUBLIC
7 - MAY 1957



Report of the Madras Veterinary College Athletic Association



The inaugural meeting of the Athletic Association was held on 18-7-56. The Principal Dr. Bertie A. D'Souza, the President, presided. Captains of the various games were elected at this meeting as follows :

Game	Captain
Cricket	Radhakrishna Reddy
Hockey	Kushalappa
Foot Ball	T. Prabhakaran
Volley Ball	Santhanakrishnan
Basket Ball	T. V. Varadarajan
Tennis	Padmanabha Reddy
Badminton	R. Balasubramaniam
Boxing	Md. Gousullah

There was a keen contest for the General Captaincy and V. P. Sreedharan was elected as General Captain for the academic year.

Inter Collegiate Competition : As usual we entered in the Inter-Collegiate Competitions in Foot Ball, Hockey, Basket Ball and Volley Ball. Once again in the annals of collegiate sports the name of Veterinary came to the forefront in the field of Foot Ball. We had the honour to come out successful in each and every encounter in the league matches in our zone. In the Inter Zoanal we became runners-up along with Central Polytechnic. The credit though goes to the team in general two names stand out prominently in our minds while looking back on their performances. They are K. Krishnan Kutty and S. Kandaswamy who will be leaving us shortly.

In the Boxing Championships, Samuel Kamalesan of the IV year who won the light-heavy weight event has to be given special credit for his magnificent performance. Md. Gousulla was runner-up in the pin weight.

Knock-out Tournament : We entered for the Wilson Cup, May and Baker and B V. Narayanaswamy Naidu Cup Foot Ball tournaments. Although in the past Veterinary as a team had played brilliantly and came to near success many a time, it was only in the May & Baker tournament of this year that we had the honour of annexing the shield, despite the participation of many other strong teams.

In the semifinals of the B. V. Naidu Cup tournament we had the unpleasant job of staging a walk out as there was too much of rude interference from the spectators.

University Selection : This year also we sent our boys for University selections in various games and athletics. V. P. Sreedaran in whom we had the utmost confidence lived up to our expectations and was selected for the second time in succession for the University Foot Ball team. Likewise also Md. Gousullah was selected in Boxing, the Pin weight classes. The college miler Rajkumar Soloman was selected to represent the University in the Inter-Divisional Centenary Sports. He also won the open mile event held in connection with the Annual Sports of (1) the Madras Medical College (2) The College of Integrated Medicine, and came a close second in the Engineering College.

Inter - Class Tournaments : Inter-class Tournaments were conducted in all games. This year first year students won the games championship.

In the Inter class Boxing there were many participants and the contests were keen. The interest evinced in this event of late gives an impression that given proper encouragement

and coaching our team would be well on its way towards annexation of Lalitha Memorial Shield for Boxing. This year our team was placed third in the University Boxing Championship.

A few points concerning the general difficulties in the promotion of better and coordinated sports and games are to be mentioned here. Absence of sufficient number of practice matches is the main obstacle in getting up really good team combination in all the games. As the admission to this college comes very late, tracking of new blood into the teams is found to be difficult. This defect can be somewhat off set by giving intensive training through practice matches, thereby incorporating the new finds in time.

It has been already pointed out in last years as well as in the report of years gone by that the condition of the playground demands immediate attention. The ground is uneven and during rainy season it is water logged thereby making it impossible to do anything concrete in regard to games and sports. We hope that the authorities concerned will take necessary steps for meeting this need.

A good part of the credit of our achievements in the field of sports and games, goes to our esteemed Principal whose patience and interest has resulted in the rising of the morale of the students to achieve wonderful results.

The Physical Director, who recently underwent Hockey Training under the Ministry of Education-Coaching Scheme has evinced keen interest in the promotion of sports and games. By his untiring activities in the field he has made players into strong and successful teams to annex many an honour to our college. Messrs. Rodricks, Victor and Madurai have also to be thanked for their kind help and co-operation throughout the year.

I hope that the interest taken by the authorities in the field of sports and games this year will redouble in the years to come and that the players will live up to the expectations already raised in us by their magnificent performance this year, and annex many a trophy still to be won.

DR. FRANK D. WILSON,
Sports Secretary,
Madras Veterinary College

*Who so neglects learning in his youth, loses the
past and is dead for the future.*

—EUROPIDES.

Cameo-Studies of our Foot-ball Players

By

“THE WHISTLER”

Sometime back a leading local daily had described “Veterinary College Football XI as one of the strongest among the collegiate teams”. By their performances our soccer boys have demonstrated in no unmistakable manner that indeed our college Football team is one to be reckoned with. The “May and Baker” Shield is ours now, and in the League we occupy the second place along with the Central Polytechnic team yielding the place of honour to the Pachaiyappa’s College XI. We now occupy an honoured place in the collegiate football map; and all honour to our footballers who have made such a happy state of affairs possible. Individual thumb—nail sketches of our footballers are presented here.

1. **Joseph Raphael**: Our colourful “keeper” from the ‘Land of the Pagodas’. On this day virtually unbeatable under the bar. Safe and reliable, his lapses (happily few and far between) are inexplicable.

2. **Krishnan Kutty**: Right full-back. Calm and collected under any pressure. Specialises in powerful clearances and long upfield passes to unmarked forwards. A veritable Rock of Gibraltar on whom has floundered many a move by the opposing forwards.

3. **Bhojan**: Left full-back. A new comer to the team. A dependable back, who reveals in a ‘rough house’. If he could control the direction of his hefty clearances he will blossom into a first-rate fullback.

4. **Sridharan**: Right half-back. A graceful player, imparts a touch of elegance to everything he does, be it tackling an opponent or setting his own winger in motion. Uses his ‘head’ to advantage. A hard player, very difficult to get away from. Selected for the University team for the last two years running.

5. **Dawson**: Center-half. An ubiquitous player, who is always in the thick of the fray defending vigorously and feeding his forwards

judiciously. Has a penchant for playing as a ‘sixth forward’ and taking long range shots to the goal; this habit of his has paid good dividends indeed. He is inclined to be boisterous and his comments could be heard all over the ground!

6. **Kandasamy**: Left half-back. A persistent tackler, and a very good half-back indeed. His frail frame belies an indomitable will and grim determination. He asks for no quarters nor yields any! Consistency is his forte.

7. **Thomas Amaldoss**: Right extreme. Very speedy. Can Unsettle any defence with his fast runs down the wing and capital cross passes to the centre. Specialist in taking corner kicks. A live-wire player who is potentially a scorer whenever he is in possession of the ball.

8. **Sellakumar**: Right Inner. A new comer. This lanky player was slow to find his feet in the beginning. He has come into his own right now. Combines beautifully with his winger and centre forward. Must learn to be less ‘boot-shy’.

9. **Ramaraju**: Centre-forward. A scheming leader of the attack with good ball control and dribbling ability. An opportunist who converts his chances profitably with a quick rising shot taken on the run. Could be immensely more valuable if only he can quicken his movements on the field.

10. **Naidu**: Left Inner. A new comer to the team. A dashing forward, he can kick powerfully and purposefully with either foot. Has the commendable habit of running back up the ball and relieving a sorely tried defence.

11. **Prabhakaran**: Left extreme. Popular skipper of the team. A keen trier. Handicapped by lack of inches and weight he tries to overcome his difficulties with persevering toil. Has the happy knack of getting the best out of his team-mates.

FOOTBALL



As a matter of fact I am at a loss what to write about this Year's football team, not only because it was an unique combination but also in creating a history in Veterinary Foot-ball field. Truly speaking my gratitude towards my team-mates is beyond expression and I do not find adequate words to express it. I am sure our college will be proud of this year's team because of its splendid performance in the various tournaments it took part in. Our college attained a rare distinction in the foot-ball field by winning the coveted May and Baker Trophy. And if not for a slight misfortune could have been joint holders with Pachaiyappa's college for the Inter collegiate league championship title. Anyway we came very close being runners-up along with Central Polytechnic. In the B. V. Narayanasway Naidu Cup tournament conducted by the Pachaiyappa's college we reached the semi-final stage, but unfortunately could not compete further due to some unforeseen scenes on the field.

In giving a review of this year's performances I must say that we had one of the most successful seasons in the inter-collegiate league matches, having won creditably all the seven matches scheduled for our zone, thus creating an unbeaten record.

We opened the series with a victory over Loyola college and maintained this status throughout. Though the inter-zonal meets were delayed for sometime it did not materially affect the play and our players were almost in good form.

As usual this year also our defence was very strong and special mention must be made of

the brilliant performances exhibited by Krishnan Kutty, Kandaswamy, Sreedharan and Samuel Dawson. Our stubborn custodian Joseph Raphael did excellent work-under the bar. Bojan in the back line, Chellakumar and Naidu in the forward line justified their inclusion. Our centre-forward Ramaraju and right-extreme Thomas Amaldoss did splendidly in this season and were the main scorers for our team.

I congratulate Sreedharan in this second successive selection to the Madras University Foot-ball team and hope he will perform the hat-trick next year. I wish all the junior players a successful future career and the best of luck to them. I also wish the best of luck to my successor.

In giving this report I also take the opportunity in thanking our Principal and other staff members for their encouragement given to us. My special regards are due to Dr. F. D. Wilson, Sports Secretary and Sri P. U. Narayanan, Physical Director for their enthusiasm, selection, encouragement and diplomacy. If not for their help we could not have come out in glowing colours.

Lastly but not the least I thank each and every student of this college separately for encouraging us and putting new life into us throughout this season.

Thanking you one and all.

T. PRABHAKARAN,

Final Year B. V. Sc.

Foot-ball Captain.

HOCKEY REPORT

We started the season with little or no practice. The strength of the team was reinforced by the addition of Madappa, Jayachandran, Solomon the scorer of the team and Abraham.

We opened the season by playing against Loyola, but we lost to them by 2 goals to 1 and Solomon was the scorer. The second match was played against Christian college. We lost to them miserably by 5 goals to 1. This utter defeat was partially due to lack of team combination and mostly due to the absence of our energetic and enthusiastic goalkeeper Habibullah Khan.

Other matches we played were against Engineering, Jain, Madras Medicals and New

College. In this connection mention must be made of the match with New College, which we won creditably through Solomon, who scored a hat-trick.

As our team did not show any further improvement, we did not enter in the Knockout tournaments.

I thank all the players for their kind cooperation and wish them all the best of luck.

Lastly my thanks are also due to the Sports Secretary and the Physical Director for their ready cooperation and enthusiasm.

K. S. KUSHALAPPA,
Captain.

The College Tennis Team

I have great pleasure in submitting the report of the activities of the college tennis team during the academic year. Elections were held early in the year for the selection of the captain in a friendly atmosphere. Many friendly matches were arranged during the 1st and 2nd terms of the academic year and the performance of the teams were indeed creditable. As most of the members belonged to the senior classes and also due to certain inevitable circumstance, it was not possible for the team to compete in the intercollegiate championships. I am quite sure had we competed we would have put up a great display. There are many promising youngsters in the 1st and 2nd years who under the

proper guidance of our able Sports Secretary and Physical Director will bring prestige to the college tennis association. Interclass tournaments were conducted during the last term and the championship was won by the first year students.

The standard of tennis in the college had shown remarkable progress during the last two to three years. We at this rate I am quite confident that the college team of ours will be one of the strong in the intercollegiate leagues and knockout tournaments. With the best wishes to my successor.

P. PADMANABA REDDY,
Captain.

BASKET - BALL

The distinction of the best player of the season goes to K. Kutty who played at back-zone. We cannot forget his wonderful performance in our match against Engineering college. In the four matches we played in the inter-collegiate league this season we scored a total of 160 points. Of this Dawson our ever-green hero scored 53, Varadan 50, John Joseph 26 and Ramaraju 18.

On behalf of my team I thank the Sports

Secretary and the Physical Director for their kind guidance and encouragement. My special thanks are due to Mr. Ramaraju the Vice-captain for his valuable suggestions on and off the field. With a little more practice and effort I am sure my successor can bring up a good team. Good luck to him.

VARADARAJAN, I.N.

Captain.

CRICKET

Though our college team did not enter in any Inter-collegiate tournaments yet we played a number of practice matches, winning most of them.

This year the team was not strengthened by the addition of any first years, but most of them showed keen interest at the nets. I am sure with certain amount of practice and some more enthusiasm, this team will be in no way inferior to some of the best city College teams. I am proud to say we final year knocked

off the inter-class tournament cricket cup without much difficulty from our juniors.

My thanks are due to the Sports Secretary and the Physical Director for the guidance given and for making us possible to play a number of practice matches. I thank all the players for their kind and ready cooperation.

Wishing my successor best of luck.

K RADHA KRISHNA REDDY,

Captain.

BOXING

A creditable impression was made by our college boxers this year in the inter-collegiate and inter-university tournaments. In the inter-collegiate we were placed third.

The commendable performance which our boxers displayed was really appreciated by the spectators. But for some slight ill-luck our young, unexperienced but promising boxers could have done still better. But any how I am sure the foundation laid by this team will spring up into a fine monument in the near future.

The ease with which Mr. Samuel Kamalesan won over his tough opponent reveals his effi-

ciency and experience in this field. This is what the papers reported about him "Similarly with Samuel Kamalesan of Veterinary chasing R. Krishnamurthy of Engineering around the ring, in a furious attack, the referee stopped the fight and declared Kamalesan the winner". Being the Vice-captain of our team he had many helpful suggestions for which the team is indebted to him.

Mr. Raphael could have added honours to the team but for his sudden ill health.

Mr. S. C. Parthasarathy, Mr. Chandrasekharan and Mr. Gnanaprakasam put up a good show and fought well, but could not help losing to somewhat experienced boxers.

The success of Mr. Govindarajan with K. O. over a Engineering boxer in the first round is worth mentioning. Mr. Rajkumar Solomon and Kovil Pillai also gave a tough fight to their opponents. Mr. Chandrasekaran and Kovil Pillai are two good promising boxers who will certainly shine and will bring credit to the college provided they keep up their standards. Mr. Nanchiappan of I Year is another promising boxer.

I myself was a runner-up in the inter-collegiate. I was selected to represent the University of Madras, in the Inter-University boxing tournament again. I was a runner-up.

On behalf of myself and the team I take it as my sincere duty to thank Dr. F. D. Wilson, our Sports Secretary for the keen and kind interest he took in encouraging the boxers.

The encouragement he and our loving Principal gave us by taking pains to come all the way to Tambaram needs special mention and special thanks.

The ex-University Boxer Mr. Purushotham who was our coach really proved to be a good one and I thank him for his tips to our fighters.

The help Mr. P. U. Narayanan, our Physical Director, rendered to us is unforgettable. My sincere thanks are due to him also.

As a captain I thank my team for extending their kind cooperation. I wish my successor better luck in the inter-collegiate boxing.

GHOUSSULLAH HUSSAIN SAYEED,
Boxing Captain.

VOLLEY-BALL

A report at the end of this year to all my colleagues, who had very kindly chosen me to serve the cause of Volley-ball in our college, is the occasion to take stock of the situation. It is also the occasion to bid a hearty farewell to our seniors, and eagerly await the opportunity to welcome many more new faces in our midst. We had a similar opportunity to start with when Krishna Iyer, Subramanian and Chandrasekharan joined us.

To our credit is the convincing victory in our meet with Theogaraya College. We were also allowed an easy walk over by the Central Polytechnic. But it is only in adversities can our dogmatic qualities exhibit themselves. We had to lose against Christian and Stanley, but only after a tough fight where everyone of our team exerted with a deep sense of team-work and sportsman spirit.

Our specialists in the field have been - Sreedharan with his powerful spikings and Chinnaraj and Balu with their fine placings. I earnestly hope that my successors would be able to show substantial improvement in our talents by constant concentration on intensive practice the benefit of which we could not have for various reasons.

I take this opportunity to thank my running mate Chinnaraj our Vice-captain and all my colleagues in the team who had extended their whole hearted cooperation.

On behalf of our team, I thank the Sports Secretary, Dr. F. D. Wilson and the Physical Director, Sri P. U. Narayanan for their expert advice and benevolent attention.

R. G. SANTHANAKRISHNAN,
Captain.

BADMINTON

“The important thing in the Olympic games is not to win, but to take part. The essential thing is not to have conquered, but to have fought well”.

—Pierre de Coubertis
Founder of the Modern Olympiads.

The same thing holds good for any game. Accordingly, our team took part in the Betrum Memorial Tournaments. Our players fought

well but without success. This is not because our players lacked in their talent but it is only because of want of practice.

In the Inter-class tournaments though there was tough fight, the Final years proved their superiority over the juniors.

BALASUBRAMANIAN, R.

Captain.

Madras Veterinary College Clinical Club

REPORT FOR 1956-57



Student Chairman :

Mr. S. Kamalesan, IV year.

Secretary :

Sri M. Kandaswamy, IV year.

Treasurer :

Sri A. Ramakrishnan, III year.

Class Representatives :

Sri K. Venkataraman, IV year.

Mr. Syed Hameed Hasan, III year.

It is our proud privilege and pleasure to put on record the activities of the clinical club for the year 1956-57. During the year under review we were able to carry forward the standard of the clinical club and keep up the glorious traditions set up by our predecessors.

We started our clinical club activities quite early this year with much enthusiasm and interest. An important change during this year regarding the office of the club is the creation of the office of a Treasurer open to the Third years. Professional subjects of clinical and academic value were discussed during this year. The opportunities provided by the club went a long way in improving the art of speaking on the part of students. During the

year the routine of the meeting was altered by the introduction of a new practice of openers of discussion. After the subject for the day was treated by the student speakers it was kept open for discussion. Not more than 3 members at a time served as openers. The question hour then followed. This welcome changes provided more chances for aspiring members to speak on the subject presented by the speaker. Seven meetings were held during the year and all the meetings were attended by almost all the members. Every member took a keen interest in the activities of the club. In this regard the interest evidenced by the third years, despite the fact that they are new to clinics, is commendable.

A resume of the meetings held under the auspicious of the club is furnished below :

1. 13th September 1956

President :

Sri K. Venkataraman, IV year.

Speaker :

Mr. Joseph Raphel, IV year.

Subject :

Clinical manifestations of Rickets.

2. 31st October 1956

President :

Sri A. R. Krishnan, IV year.

Speaker :

Mr. S. Komalesan, IV year.

Subject :

Traumatic pericarditis.

3. 7th November 1956

President :

Kumari G. Subhashni, IV year.

Speaker :

Sri Sitanath Mahapatra, IV year.

Subject :

Chronic Luxation of Patilla in Bovines.

4. 14th November 1956

President :

Sri S Kuppaswamy, IV year.

Speaker :

Mr. P. Padhi, IV year.

Subject :

Canine Distemper.

Opener :

Sri Sitanath Mahapatra, Mr. D. W. Ezekiel
and G. Vasudeva Rao, IV year.

5. 26th November 1956

President :

Mr. D. W. Ezekiel, IV year.

Speaker :

Sri K. Ganga Raju, IV year.

Subject :

Nasal Schistosomiasis.

Opener :

Sri M. Kandaswamy & A. Somasundaram,
IV year.

6. 5th December 1956

President :

Sri D. B. P. Chandrasekhara Rao, III year.

Speaker :

Sri A. Mohana Rao, IV year.

Subject :

Foot and mouth disease.

Opener :

Sri C. Sriramachandramurthy, S. Kamalesan
and M. Kandaswamy, IV year.

V C—15

7. 9th January 1957

President :

Sri K. R. Parthasarathy, IV year.

Speaker :

Sri K. Venkataraman, IV year.

Subject :

Retained Placenta.

Opener :

Sri Sitanath Mahapatra & M. Kandaswamy,
IV year.

8. 15th March 1957

VALEDICTORY ADDRESS

President :

Dr. Bertie A. D'Souza, Principal.

Speaker :

Dr. T. Venayaga Mudaliar, Editor, Indian
Veterinary Journal and General Secretary,
All India Veterinary Association.

The first prize for the best speakers was given to Sri Sitanath Mahapatra for his subject "Chronic Luxation of Patilla" and second prize to Mr. S. Kamalesan for his subject "Traumatic Pericarditis." The prize was donated by our Principal, Clinical Staff of the College and hospital.

All the clinical professors and the staff of the hospital section made themselves convenient to be present at all the meetings. The senior staff members of the departments of Animal Nutrition, Pathology, Anatomy, Parasitology and Bacteriology also attended our meetings as and when their guidance was sought for. The principal, inspite of his heavy administrative and other work made himself convenient to attend our meetings now and then and give us valuable advices.

We thank our Principal for his valuable advices and help. He gave first preference to the club.

We thank our Professor of Surgery, Dr. M. N. Menon, for wholeheartedly taking keen interest in the club and for his enthusiastic encouragement and kind cooperation. He has been a fountain of inspiration behind the activities of the club.

We thank our Professors Dr. C. K. Velayudhan Nayar, Dr. M. S. Ganapathy and Dr. M. C. Chellam in helping the arrangement of the meetings which made it possible for the club to achieve all that it had during this year.

We thank our Principal and the clinical staff of the college for having got up two prizes for the best speakers.

We hope that the club will continue to

function in the ensuing years to serve the purpose for which it was founded and we are confident that the Principal and the staff of the college will continue to extend their goodwill as in the past.

I wish all success for the future.

M. KANDASWAMY,
Secretary.

OUR MAIL

Inland

Christian Medical College, Vellore.
College of Engineering, Madras.
Madras Christian College, Tambaram.
Madras Medical College, Madras.
Stanley Medical College, Madras.
College of Integrated Medicine, Madras.
Agricultural College, Coimbatore.
Womens' Christian College, Madras.
Presidency College, Madras.
Meston Training College, Madras.
Queen Mary's College, Madras.
Law College, Madras.
Lady Willington Training College, Madras.
Teachers College, Madras.
St. Christopher's Training College, Madras.
Ethiraj College, Madras.
Loyola College, Madras.
Vivekananda College, Madras.
Central Polytechnic, Madras.
Andhra Medical College, Vishakapatnam.
Mysore Medical College, Mysore.
Agricultural College, Bapatla.
St. Joseph's College, Bangalore.
St. Joseph's College, Tiruchirapalli.
Central College, Bangalore.
St. Philomena's College, Mysore.
St. Aloysius' College, Mangalore.
Government College, Coorg.
Government Breinen College, Tellicherry.
Sri Guruvayurappan College, Kozikode.
C.M.S. College, Kottayam.
Thevara's College, Cochin.

Government College, Kumbakonam.
Government College, Palghat.
Bombay Veterinary College, Bombay.
Calcutta Veterinary College, Calcutta.
Veterinary College, Mathura.
Veterinary College, Jabalpur.
Veterinary College, Hyderabad—Deccan.
Bihar Veterinary College, Patna.
Punjab Veterinary College, Lahore.
Andhra Veterinary College, Bapatla.
T—C. Veterinary College, Trichur.
Madyabharat Veterinary College.
Rajasthan Veterinary College.
Assam Veterinary College, Gauhati.
Indian Veterinary Journal, Madras.
Veterinary Research Institute, Mukteswar.*
Veterinary Research Institute, Izatnagar.
Indian Dairy Research Institute, Bangalore.
Institute of Veterinary Preventive Medicine,
Ranipet.
Indian Council of Agricultural Research, New
Delhi.
Director of Animal Husbandry, Madras.
" " Mysore.
" " Andhra.
" " Travancore
and Cochin.
" " Hyderabad.
" " Orissa.
" " Calcutta.
" " Punjab.
Director of Veterinary Services, Madya
Pradesh.

Animal Husbandry Commissioner, Lucknow.
Pasteur Research Institute, Coonoor
Madras University Library, Madras.
Connemara Public Library, Madras.
The National Library, Calcutta.
Director, King Institute, Guindy.
Director, Rockefeller Virus Research Centre,
Poona.
Agricultural Research Institute, Pusa, New
Delhi.

Foreign

Director of Veterinary Education, Glasgow,
University.
Journal of American Veterinary Medical
Association, Chicago.
Nederlandsch Indische Bladenvoor, (Java),
Netherlands Indies.
The Puerto Rico Journal of Public Health and
Tropical Medicine, U.S.A.
Dean, Faculty of Veterinary Medicine, Univer-
sity of Pennsylvania, U.S.A.
The Director, Molteno Institute, Cambridge,
England.
Natura-en Geneeskunde, Belgium.
Editor, Veterinary Medicine, Illinois,
U.S.A.
Editor Lederle Veterinary Bulletin, New
York.
The Hon. Librarian, South African Veteri-
nary Medical Association.
Dean, College of Veterinary Medicine, Univer-
sity of Philippines.
Dean, Michigan State College of Agri-
culture.
Dean, School of Veterinary Medicine, Texas,
U.S.A.
Dean, Division of Veterinary Medicine, Kanas
State College, U.S.A.
The Director of Veterinary Services, Pretoria,
S. Africa.
The Dean, The Ohio State University, Ohio,
Columbus, U.S.A.
Gebr. Biscoff, Buchdruckereij, Verlags, Ansfalf,
Deutsches Reich.
United States Department of Agriculture
Library, Washington.
Editor, Veterinary Record, London.

Editor, Cornell Veterinarian, Ithaca, New
York, U.S.A.
London School of Hygiene & Tropical
Medicine, England.
Editor, The North American Veterinarian,
Evanston, Illinois, U.S.A.
Imperial Bureau of Animal Husbandry
Veterinary Laboratory, England.
Dean, The New York State Veterinarian,
Cornell University, Ithaca.
Haver Glover Monthly Messenger Chicago,
U.S.A.
Ontario Veterinary College, Canada.
Australian Veterinary Journal, Sydney.
Veterinary Journal, London W.C. 2, Eng-
land.
Royal Veterinary College, London.
Royal Veterinary College, Dublin.
Veterinary College, Paris.
Chief of Veterinary Services, Pasteur Institute,
Paris, France.
Chinese Medical Association, China.
College of Veterinary Medicine, Washington,
U.S.A.
Iowa, Veterinarian, Knoxville, U.S.A.
R.A.V.C. Journal, Aldershot, England.
The Librarian Medical Library, Liverpool 3,
England.
Dr. J. Russel Greig Moredum Institute, Edin-
burgh, Scotland.
Royal Veterinary College, Edinburgh, Scot-
land.
Principal, Veterinary College Berlin, Ger-
many.
Dean, School of Veterinary Science, Liver-
pool, England.
Director of Veterinary Pathology, University
of Zurich, Switzerland.
A.V.C. School, England.
Ontario Veterinary College, Canada.
Poultry Pathologist, New Jersey, U.S.A.
Royal Veterinary College, Stockholm, Sweden.
College of Veterinary Medicine, University
of California—U.S.A.
College of Veterinary Medicine, St. Paul's
Minnesota, U.S.A.
Director, Veterinary Laboratory, Weybridge,
England.

- Vlaams Diergeneeskunding Tijdschrift, Holland.
- Journal of the Royal Army Veterinary Corps., R.A.V.C. Laboratory, England.
- Dean, Faculty of Veterinary Medicine, Ceylon.
- Director, Veterinary Laboratory, Stormont, Belfast, N. Ireland.
- Director, Lister Institute of Medicine, London.
- Hannal Dairy Research Institute, Aye, Scotland.
- Spallanzani Institute of Artificial Insemination Milan, Italy.
- Foot & Mouth Disease Laboratory Pirbright, Surrey, England.
- Veterinary College, Berne, Switzerland.
- Veterinary College, Zurich, Switzerland.
- Royal Veterinary College, Brussels, Belgium.
- Veterinary School, University of Milan, Italy.
- Rowett Research Institute, Aberdeen, Scotland.

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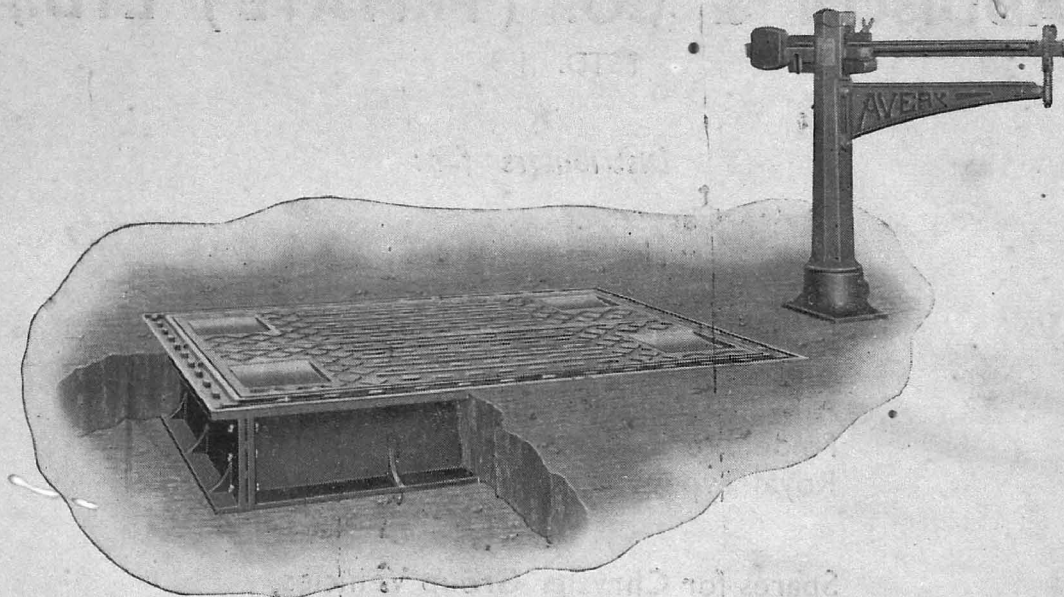


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