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(The Journal of the All-India Veterinary Association)

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THE INDIAN VETERINARY JOURNAL

[THE JOURNAL OF THE ALL-INDIA VETERINARY ASSOCIATION]

PUBLISHED MONTHLY

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

★

EDITOR

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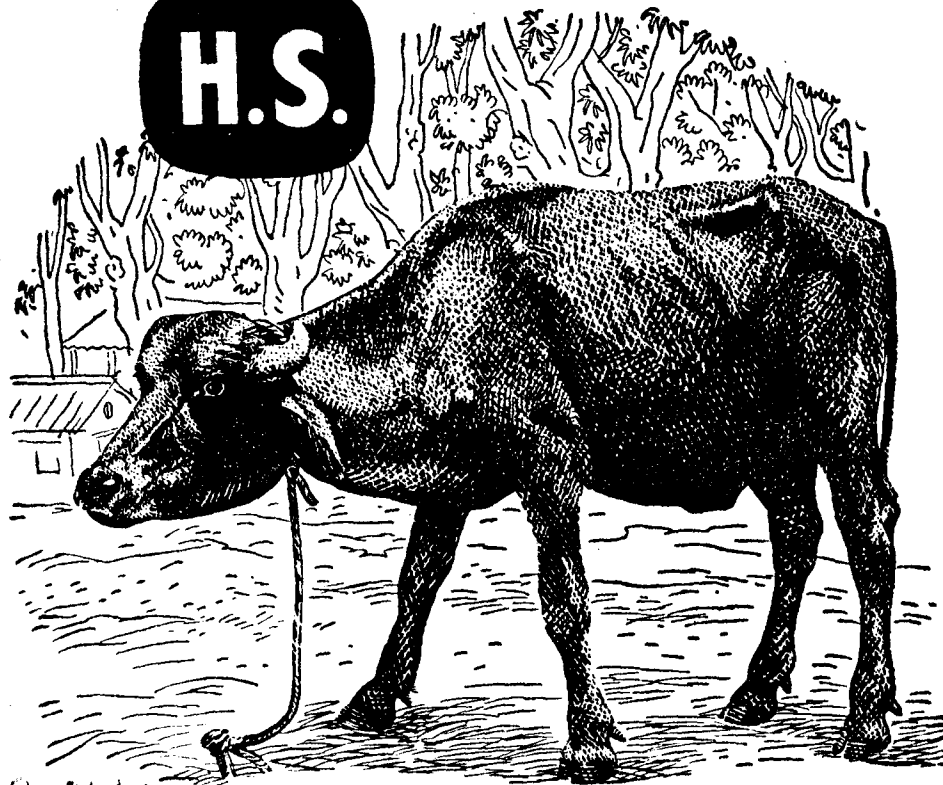
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Editorial

A MUCH NEEDED ADVICE

Prime Minister Nehru, has neither the time nor the inclination to indulge in the highly questionable past-time of tendering advice to State Administrations. But when he does it, one may be rest assured, that it must be on a matter of vital importance to the country which he loves so passionately.

A Press report appearing in the *Indian Express* of 23rd May 1958, has the following:— "It is understood Prime Minister Nehru has advised the Chief Ministers of States against appointing I. A. S. Officers as heads of Technical departments. He has favoured only Technical men being put in charge of the departments, so that the needs of the departments could be better and more effectively served".

This is a subject over which we have cried ourselves hoarse and our readers are only all too familiar with it. Under the foreign rule, it was considered that nothing was beyond the capacity of a member of the Indian Civil Service. That cadre was claimed to be the 'steel-frame' of the administration. This principle was not only enunciated but was carefully fostered and several technical posts were practically ear-marked for members of that service. This myth has long since been exploded as India has not crumbled to pieces, with the exit of this class of public servants. War years have proved how ill-equipped India was in the matter of agriculture, irrigation projects, electricity, communications and industries. That is the legacy that has accrued through not following a policy based on scientific principles, but on other considerations.

This old convention is followed in some of the States even to this day and perhaps after waiting for nearly ten years, and still finding the erratic way being pursued, the Prime Minister has thought it fit to

advise the Chief Ministers of States. Viewed from any angle, it looks to us that this is a wrong policy. We have heard it said that failure to attain the targets in the matter of food production, is not a little due to following such a wrong policy in Technical departments. Perhaps that is an over-statement and we do not agree with it.

Even the Indo-American Team which toured this country two or three years ago, had said "There is a tendency in some States or Institutions to place non-technical Administrative Officers in charge of Agricultural Research, Education and other Technical services. This is a move toward mediocrity in technology". It is this self-same advice that our Prime Minister is now trying to convey to the several States in the midst of his arduous life. In our January 1957 issue, we have ourselves dealt with this subject in great detail. We have termed it as a "Self-defeating policy". We only hope that this anomalous position in several States will soon terminate with this advice of the Prime Minister.

Lt. Col. S. DATTA RETIRES

(Contributed)

Lt. Col. S. Datta, D.Sc., M.R.C.V.S., D.T.V.M., F.R.S. (Edin.), F.N.I., lately Director of Veterinary Services and Animal Husbandry, West Bengal has been engaged for over 35 years in the advancement and development of Veterinary Science and Animal Husbandry in this country. He came under the influence of late Acharya Prafulla Chandra Ray at the University College of Science and under Prof. C. V. Raman at the Indian Association for the Cultivation of Science. He obtained M.R.C.V.S. from London in 1925. Since then he has been all along actively associated with education and research, starting first at the Bengal Veterinary College at Belgachia and then at the Indian Veterinary Research Institute at Mukteswar and Izatnagar finally since independence as its Director, being the first Indian to hold the post. After superannuation in 1954 he was re-employed as the Director of Veterinary Services and Animal Husbandry in West Bengal. His interest in under-graduate and post-graduate Veterinary Education and research has been of long standing. He also took the D.Sc. in Veterinary Pathology and Bacteriology and Diploma in Tropical Veterinary Medicine from the Edinburgh University. His discovery of the causes of about half a dozen tropical diseases of animals has been recognised, as also his initiative in formulating and executing the

National Rinderpest Eradication Plan, promotion of Artificial Insemination etc. He had been Chairman for many years of several committees of the Government of India such as dealing with Veterinary Education, Animal Diseases and Pests, hides and skin, indigenous drugs, Biological Products Standardisation and recently of Central Committee on Slaughter Houses and Meat Inspection Practices. He represented India in several international bodies in Europe, Africa, as well as in this country. He represented our country at the British Commonwealth Veterinary Conference, Rinderpest Conference in East Africa, International Foot and Mouth Disease Conference in Paris, International Genetic Congress in Edinburgh, besides being a delegate to the F.A.O. Conferences in India. He also organised international training courses on Virus Vaccines under the auspices of the F.A.O. He is a Fellow of the National Institute of Sciences of India and the Royal Society of Edinburgh and retains the rank of Lieutenant Colonel of the Indian Army.

He worked under late Colonels Acton and Knowles at the Calcutta School of Tropical Medicine and presided over the Medical and Veterinary Section of the Indian Science Congress.

Lieut. Col. A. C. AGGARWALA RETIRES

(Contributed)

Lieut. Colonel A. C. Aggarwala B.Sc. Hons., M.R.C.V.S., A.I.R.O., P.V.S. Class I (Retd), after creditably completing his assignment with the Rajasthan Government as the First Founder-Principal of the Rajasthan Veterinary College at Bikaner, has proceeded on 4 months' leave preparatory to retirement from the 25th April, 1958. The Bikaner Veterinary College stands today as a challenge for first-rate organisation, modern equipment, palatial buildings etc., amongst the Indian Veterinary Colleges which is entirely due to Colonel Aggarwala's untiring efforts and goodwill. While he deserves to enjoy his well-earned rest after 34 years of sustained and continuous work, we can say with confidence that he is physically fit and his experience will be further utilised by the profession.

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General Articles

THE ANATOMY OF THE FOETAL INDIAN ELEPHANT

Part VIII — The Head and Neck

By

D. MARIAPPA, G.M.V.C.,

Professor of Anatomy, Madras Veterinary College.

Introduction

Boas and Paulli (1908) dissected a detached head of an elephant and in their publication on the Elephant's head (Part I), have given a detailed account of the superficial muscles and their comparison with the muscles of other animals. They published their second account on the elephants head (1925) dealing with the skull, certain muscles of the head, nervus facialis, and occipito-cervical muscles. Miall and Greenwood (1878) dissected a female Indian elephant. Their description of the muscles is good, though incomplete with regard to some as admitted by them. Eales (1926) published the anatomy of the head of the foetal African elephant. Except for the brain and contents of the orbit which were decomposed, the rest is described in great detail. Rajagopal (1956) has dealt in great detail all the structures of the head and neck.

In this paper, it is proposed to describe in order — the muscles of the head; the muscles of the neck; the blood vessels and lymphatic glands; the nerves and organs. The skeletal elements will be dealt later in a paper on the axial skeleton.

Muscles of the Head

1. *Cutaneous muscle of the occiput* is present as a thick layer covering the origin of portio-superior of maxillo-labialis. The muscle fibres pass obliquely downward and outward in the fascia over the frontal region and corresponds to the *frontalis* of ox.

2. *Cutaneous muscle of the face and neck*. The facial part consists of a slip arising from the posterior part of jugal bone. The cervical part consists of four slips arising from (1) behind the auricula, (2) from fascia over supraspinatus, (3) deltoid, and (4) ventral aspect of neck. These four slips unite in front over the masseter and join with the facial part (zygomatic part of others). The muscle divides at the angle of mouth into two slips — upper one inserted to the angle of mouth blending with other muscles and the lower one inserted to the mandible.

Nerve and blood supply.—facial nerve and external maxillary artery.

Sphincter internus (parotido-auricularis) and *sphincter externus* are absent.

Superficial muscles of the Head

3. *Orbicularis oculi* (fig. 1). The portion in the upper lid is thin and that in the lower lid is well developed and confined to the orbital rim. The medial palpebral ligament and the lacrimal projection separate the two parts and give origin to their fibres.

4. *Pre-orbicular* (fig. 1), consists of two parts — dorsal and ventral, in front of the medial angle of eye. They are small and triangular, arising from the medial palpebral ligament and the lacrimal projection.

5. *Supra-orbicularis* (fig. 1) is large, on the anterior part of the upper rim of orbit. The muscle fibres curve upward and backward over the scutularis.

6. *Post-orbicular* (fig. 1) is a large band, the muscle fibres of which descend vertically from over scutularis behind the lateral angle of eye and extend down below the orbital rim.

The above four are the muscles of the eyelids inserted to the skin of eyelids.

Nerve & blood supply.—facial nerve and internal maxillary artery.

7. *Naso-labialis* (fig. 1) is small and fan shaped. It arises from the fronto-maxillary junction in front of the lacrimal projection, expands below and spreads its bundles into the upper lip — labial cushion. It covers maxillo-labialis at its origin and is less developed than in ungulates.

Nerve & blood supply.—facial nerve and external maxillary artery.

Muscles of the Proboscis

8. *Maxillo-labialis* (Levator Proboscides) (fig. 1) is large and well developed covering the dorsal face and sides of the proboscis. It unites with its fellow along the dorsal median line and at its origin it consists of superior and inferior parts.

Portio-superior is larger, arising by two slips — (1) dorsal slip is large arising from a curved line on the frontal and nasal bones above the bony nasal opening and the upper part of ramus of premaxilla bordering the nasal opening. (2) Ventral slip is small arising from the premaxilla below the origin of the former. Both the slips immediately unite and this part covers the dorsal face of proboscis upto the tip of the prehensile 'finger'.

Portio-inferior is smaller, arising from the superior maxilla below the ventral rim of orbit and above the infraorbital foramen, zygomatic

process of maxilla and the anterior part of jugal. This part covers the infra-orbital nerve and blood vessels and is in turn covered by Nasolabialis. This part unites with the other part and covers the lateral face of the proboscis and terminates along the lateral border of the anterior nares.

The muscle is not separated from its fellow by a median raphe and it consists of very coarse bundles of muscle fibres running parallel to the proboscis. A very thick layer of fascia covers the muscles of proboscis and there is very little yellow fat over the origin of the muscles.

9. *Rectus Nasi* (fig. 2). (Radiating muscles of proboscis) consists of muscle fibres that arise from the nasal tubes and radiate dorsally, ventrally and laterally between the fascicles of other muscles of proboscis and are inserted to the skin.

10. *Pars rimana* (fig. 1) (depressor proboscides) is a well developed muscle on the ventral aspect of proboscis. Muscle arises from the premaxilla and the median fibrous raphe. The fascicles pass downward, curve obliquely to the lateral face and then to the front and blend with maxillo-labialis. The direction of the bundles is upward and forward.

11. *Pars supralabialis* (fig. 1) is placed deeper to the preceding and the fascicles run obliquely downward and forward. The muscle fibres arise from the premaxilla and the fibrous septum along the ventral margin of maxillo-labialis and are inserted to the aponeurosis on the ventral aspect of the proboscis.

12. *Nasalis* (fig. 1) is fan shaped muscle above the labial cushion. Muscle fibres arise from the premaxilla and the labial cushion and pass upward through the fascicles of maxillo-labialis and are inserted to the skin.

13. *Nasalis lateralis* (dilator naris) is deeper to the maxillo-labialis over the bony nasal openings. Some fibres arise from the median fibrous raphe on the nasal cartilage and spread in a transverse plane. Other fibres arise from the upper part of the nasal bone and the ramus of premaxilla and are inserted to the nasal cartilage and the mucosa of the nasal tubes.

Nerve & blood supply (to muscles of proboscis).—Facial and infra-orbital nerves and infraorbital artery.

Buccinator Group of Muscles

14. *Buccinator proper* (fig. 1) consists of fibres arising from the maxilla about the level of I & II molars. The fibres descend downward and forward to the angle of the mouth and continue in the lips. Fibres in the upper lip pass longitudinally and in the lower lip vertically. The muscle is pierced by the *stenson's duct*.

Nerve & blood supply.—facial nerve and infraorbital artery.

15. *Buccinator — longitudinal layer* (fig. 1) (depressor labii inferioris). It arises from the medial face of the mandible near the mandibular foramen and passes forward into the lower lip, blending with orbicularis oris and mentalis.

Nerve & blood supply.—facial nerve and the external maxillary artery.

16. *Orbicularis oris.*—Each side the muscle is 'U' shaped, extending from the angle of the mouth into the lips and blending with the buccinator proper and nasalis in the upper lip and with mentalis and longitudinal layer of buccinator in the lower lip.

Nerve & blood supply.—same as for preceding.

17. *Mentalis* consists of fibres arising from the body of the mandible in front and on the side, pass through orbicularis oris and are inserted to the skin of lower lip.

Nerve & blood supply.—same as for preceding.

Auricular Muscles

Scutiform cartilage is absent.

Extrinsic Muscles

18. *Scutularis* consists of two fleshy bellies connected by an intermediate tendon. The anterior belly is small deriving its fibres from fascia behind supra-orbicularis and another set above post-orbicular. The belly is continued behind by a thin aponeurotic tendon passing along the dorsal border of temporal gland and joins the posterior belly which is larger. This belly receives a wide sheet of fibres from the temporal region and is inserted by a fleshy tendon to the anterior border of auricular cartilage.

19. *Auriculo-occipitalis* (Cervico-auricularis). Arises from cervical fascia along dorsal median line behind auricula. The fibres converge behind auricula, upper fibres are inserted with those of scutularis and lower fibres are inserted behind the auricula.

20. *Rotator* is situated deeper to preceding. It arises from the cranial fascia in front of the preceding, expands below and curves round for insertion to the ventral edge of auricula.

21. *Auricularis posterior* (Cervico-auricularis profundus). It lies deeper to 19. The fibres arise in two slips from cervical fascia and unite to form a thick band which is inserted medial to the auricula at its anterior border.

22. *Zygomatico-auricularis* is ribbonlike, arises from the ventral aspect of zygomatic arch, passes over the insertion of sternomastoid and is inserted to ventral and posterior aspects of auricula.

23. *Adductor inferioris* is thick and quadrilateral situated between 18 and 22. It arises from the zygomatic part of squamous temporal in front of the external auditory meatus. The muscle passes upward and backward and divides into two parts which encircle the auricula. The upper part is inserted to the projection (tragus) with the lower part of scutularis. The lower part passes below auricula and blends with the preceding and is inserted to the medial side of auricula.

24. *Temporo-auricularis* is situated deeper to the posterior belly of scutularis and preceding. It is wide and flat, arises from the zygomatic part of squamous temporal and is inserted to a pointed process of the auricula.

Intrinsic muscles

25. *Tragicus* is very small and deeper to scutularis. It arises from the auricula, passes down and is inserted to the fascia on the cartilage.

26. *Transversus auriculæ* consists of thin layer of muscle fibres on the medial face of auricula radiating to the free border.

Nerve & Blood supply to auricular muscles.—Facial nerve and auricular branches of superficial temporal artery.

Mandibular Muscles

27. *Temporalis* is a large fan shaped muscle very wide at its origin and narrow at its insertion. The muscle fibres arise from the temporal fossa, frontal, parietal and squamous temporal bones. The muscle appears to have two parts — anterior and posterior. The fibres of the anterior part pass downward and backward and those of the posterior part pass downward and forward. The muscle passes deeper to the zygomatic arch and is inserted to the summit and medial face of the coronoid process on a wide quadrilateral area.

Nerve & blood supply.—Mandibular division of trigeminal nerve and superficial temporal artery.

28. *Masseter* is large, fleshy and quadrilateral muscle extending from the zygomatic arch to the vertical ramus of mandible. It consists of distinct superficial and deep parts at the origin which blend below at the insertion.

Superficial part (Masseter superficialis). The muscle has tendinous origin from the ventral border of the body of jugal. The muscle fibres run downward and backward and are inserted to the outer face below and in front of the hollow of the ramus. This part is very thick.

Deep part (Masseter profundus) has fleshy origin from the lower margin of the zygomatic arch behind the former. The fibres pass vertically downward and blend with the former at its insertion.

Nerve & blood supply.—Masseteric branch of the mandibular nerve (V) and transverse facial artery.

29. *Zygomatico-mandibularis* is a distinct muscle distinguished from masseter profundus by the direction of its fibres which run downward and forward. Behind the former, greater part of the muscle at its origin is uncovered by it. The fibres arise from the medial face of the shaft of jugal. Between this and the preceding is a venous plexus. It is inserted dorsal to the hollow of the ramus by fleshy slips.

Nerve & blood supply: same as for preceding.

30. *Digastricus* arises from the exoccipital and extends along the medial face of the posterior border of vertical ramus and is inserted to the horizontal ramus along the medial face of its posterior border, deeper to the tendon of sterno-mandibularis. The whole muscle appears fleshy, but at the junction of its lower and middle third it is narrow simulating the intermediate tendon of the muscle in other animals.

Nerve & blood supply: Facial nerve and posterior auricular artery.

31. *Occipitohyoideus* is deeper to the origin of preceding. It arises from the exoccipital and is inserted to the dorsal aspect of the muscular process of the great cornu of hyoid.

Nerve & blood supply: same as for preceding.

32. *Internal pterygoid* is small and fan shaped. It arises from the lower part of the alisphenoid and the depression on the lateral face of pterygoid hamulus and is inserted to the medial face of vertical ramus below the mandibular foramen. Its fibres run obliquely downward and backward.

Nerve & blood supply: Mandibular nerve and internal maxillary artery.

33. *External pterygoid* is much larger than that of other domestic animals. Its wide origin is from the lateral face of the pterygoid process of alisphenoid. The fibres run upward and backward and finally become horizontal at their insertion to the medial face of the neck of condyle (mandible), meniscus and the joint capsule.

Note: There is a venous plexus between the two pterygoids and another between it and temporalis.

Nerve & blood supply.—same as for preceding.

Muscles of the Hyoid

34. *Mylohyoideus* arises from the medial face of the horizontal ramus. The fibres of the anterior part are slightly oblique passing backward to meet the fibres of its fellow along the median fibrous raphe.

The fibres of the posterior part are more transverse and are inserted to the median fibrous raphe and the body of hyoid.

Nerve and blood supply.—Lingual nerves (V & XII) and lingual artery.

35. *Geniohyoideus* is a thin broad band deeper to the preceding and closely blended with its fellow. It arises from the mandibular symphysis and is inserted to the body of hyoid and small cornu.

Nerve & blood supply.—Lingual nerves (V & XII) and lingual artery.

36. *Stylohyoideus* is a small bundle arising from the anterior aspect of the muscular process of great cornu and blending with the posterior belly of digastricus on its medial face.

Nerve & blood supply.—Facial nerve and posterior auricular artery.

Keratohyoideus is absent.

Muscles of the Tongue

37. *Hyoglossus* consists of two portions — medial and lateral. *Hyoglossus minor* (or medial) consists of short bundles passing upward and forward from the thyroid cornu to the side of the root of the tongue between genioglossus and styloglossus. *Hyoglossus major* (lateral) consists of fibres arising from the anterior border of the thyroid cornu, pass on the side of the tongue medial to styloglossus upto the tip.

Nerve & blood supply.—Lingual nerves and artery.

38. *Styloglossus* is a long ribbon extending along the lateral border of tongue. It arises from the anterior process of the great cornu and its fibres are inserted along the side of the tongue upto its tip.

Nerve & blood supply.—same as for preceding.

39. *Genioglossus* is large and fan shaped. It arises by a round tendon from the mandibular symphysis above the geniohyoid. From the tendon, the muscle fibres radiate reaching the tip, body, root of the tongue and body of the hyoid as in other animals.

Nerve & blood supply.—same as for preceding.

Muscles of the Soft Palate

40. *Tensor palati* is small. It arises from the lateral face of the eustachian tube and is reflected over the pterygoid hamulus and it spreads into the aponeurosis of palate.

Nerve & blood supply.—Mandibular nerve and palatine artery.

41. *Palatinus* is small and unpaired. Its fibres arise from the median part of the posterior edge of the bony palate and spread in the aponeurosis of the soft palate.

Nerve & blood supply.—Maxillary nerve (V) and palatine artery.
Levator palati and *Palatoglossus* are absent.

Muscles of the Pharynx

42. *Palato-pharyngeus* is very extensive, the muscle fibres arise from the aponeurosis of soft palate, run upward and backward into the lateral wall of pharynx and unite with its fellow above the aditus oesophagi.

43. *Hyopharyngeus* extends from the external face of thyroid cornu to the fibrous raphe of pharynx.

44. *Thyro-pharyngeus* extends from the external face of thyroid lamina to the raphe of pharynx.

45. *Crico-pharyngeus* connects the external face of the lateral part of arch of cricoid to the pharyngeal raphe.

46. *Pterygo-pharyngeus* extends from the lateral face of the pterygoid hamulus to the raphe and is situated lateral to 42.

47. *Stylo-pharyngeus* is a long narrow ribbonlike bundle extending from the medial aspect of the muscular process of great cornu of hyoid and spreading into the dorsal wall of pharynx.

Nerve & blood supply (to muscles of pharynx).—Pharyngeal plexus and thyrolaryngeal artery.

Muscles of the Larynx

Extrinsic Muscles

48. *Sterno-thyroideus* will be described in the neck.

49. *Thyro-hyoideus* is small connecting the external face of thyroid lamina to the thyroid cornu.

50. *Hyo-epiglotticus* is unpaired, median in position and bifid at its origin. The muscle fibres arise from both sides of the dorsal face of body of hyoid and unite to form a wide muscular tendon which is inserted to the oral face of epiglottis.

Nerve & blood supply (to 49 & 50).—Hypoglossal nerve and thyrolaryngeal artery.

Intrinsic Muscles

51. *Crico-thyroideus* is small extending from the lower part of the lateral face of cricoid to the posterior border of thyroid lamina.

Nerve & blood supply.—Hypoglossal nerve and thyrolaryngeal artery.

52. *Crico-arytenoideus dorsalis*,

53. *Crico-arytenoideus lateralis*,

54. *Thyro-arytenoideus*, (Ventricularis & Vocalis).

55. *Arytenoideus transversus* (small).

These resemble the muscles of other animals.

Nerve & blood supply.—Recurrent laryngeal nerve and thyrolaryngeal artery.

Muscles of the Neck

Cervical fascia. The superficial fascia is devoid of fat and contains the *musculus cutaneous colli* (described already). The deep fascia is thick forming sheaths for muscles. It is attached to ligamentum nuchae above, cranial bones in front, extends over the thorax and shoulder and is attached to the scapula.

Lateral Cervical Muscles

Cervical Trapezius (vide part II).

Cervical Rhomboideus (vide part II), is described by others as *Rhomboideus capitis* which is inserted to a curved ridge on the supraoccipital.

56. *Splenius* is large and triangular situated deeper to preceding. It arises by a very narrow thin fleshy tendon from the spine of V thoracic vertebra to which are added fibres arising from the ligamentum nuchae. As the muscle passes forwards, it is thick and wide and is inserted by a wide fleshy tendon to a curved ridge on the supraoccipital (below rhomboideus) and the squamous temporal behind the meatus.

Note.—Behind the ear, splenius and rhomboideus capitis form a slight rounded prominence, *muscular cushion*, which is inconspicuous in the foetus but prominent in the adult Indian elephant.

Nerve & blood supply.—Superior primary branches of first five cervical nerves and inferior cervical artery.

57. *Levator anguli scapuli.* Is a large quadrilateral muscle having cervical and costal parts. The cervical part arises from the transverse processes of all the cervical vertebrae and the costal part arises from the upper parts of the first five ribs. The posterior border of the costal part blends with serratus magnus as in the horse. The two parts unite above and the muscle becomes thick and narrow for insertion to the scapula which was noted in Part II.

Nerve & blood supply.—Superior primary branches of cervical nerves from II to VIII and costocervical artery.

58. *Complexus* is large and triangular placed deeper to splenius. Its origin is extensive deriving fibres from the articular processes of first thirteen thoracic vertebrae, funicular part of ligamentum nuchae and articular process of the last five cervical vertebrae. At its origin from the

ligamentum nuchae it is confluent with its fellow. The muscle becomes narrow towards the skull and is inserted by a wide fleshy tendon to the supraoccipital in a depression lateral to the attachment of ligamentum nuchae.

Nerve & blood supply.—Superior primary branches of cervical nerves and the first thirteen thoracic nerves and dorsal rami of intercostal arteries.

59. *Trachelo-mastoideus* is small and triangular. The muscle fibres arise from the articular processes of the last five cervical vertebrae. It is inserted to the exoccipital and the squamous temporal by a thin wide fleshy tendon.

Nerve & blood supply.—Superior primary branches of the last five cervical nerves and inferior cervical artery.

60. *Transversalis colli* is small situated above the cervical insertion of longissimus dorsi. It arises from the transverse processes of last four cervical vertebrae and is inserted to the articular processes of the first three cervical vertebrae.

Nerve & blood supply.—Superior primary branches of cervical nerves and inferior cervical artery.

61. *Rectus capitis posterior major* is long and fan shaped muscle placed lateral to the funicular parts of ligamentum nuchae. It arises from the posterior end of the spine of axis by a narrow tendon, and is inserted to the supraoccipital deeper to and an inch below that of complexus by a wide fleshy tendon.

Nerve & blood supply.—Dorsal branch of II cervical nerve and vertebral artery.

62. *Rectus capitis posterior minor* is large and quadrilateral situated deeper to major and extending beyond it laterally. It arises from the posterior tubercle of atlas and widens greatly in front for insertion to the supraoccipital below and behind that of major.

Nerve & blood supply.—Dorsal branch of I cervical nerve and vertebral artery.

63. *Obliquus capitis posterior* is a small thick bundle arising from the postero-lateral aspect of the spine of axis and inserted to the transverse process of atlas.

Nerve & blood supply.—Dorsal branches of I & II cervical nerves and vertebral artery.

64. *Obliquus capitis anterior* is very large and fan shaped. It arises from the transverse process of atlas and immediately expands in front and is inserted by a wide fleshy tendon to supraoccipital deeper to

that of trachelomastoideus. The origin of the muscle is pierced by the first cervical nerve and a branch from the vertebral artery which divide it into two slips described as two tendons of origin by others.

Nerve & blood supply.—Dorsal branch of I cervical nerve and vertebral artery.

65. *Multifidus cervicis* is situated deeper to complexus. It consists of a mass of oblique bundles descending from the spine of axis, downward and backward covering the lamellar part of ligamentum nuchae and the cervical spines. The posterior bundles extend partly over the anterior series of thoracic spines to blend with complexus and the dorsal part of longissimus dorsi.

Nerve & blood supply.—Dorsal branches of cervical nerves and inferior cervical artery.

Ventral Cervical Muscles

66. *Sterno-mastoideus* is very broad at its origin from the presternum, first costal cartilage and the adjacent part of first rib. The muscle becomes very narrow about its middle and is continued by a thin fleshy tendon over the angle of jaw and is inserted to the root of the zygomatic process of the squamous temporal.

The muscles of both the sides are close together at their origin and cover sterno-maxillaris and about the middle of the neck, they diverge laterally and upward.

Nerve & blood supply.—Ventral branch of spinal accessory nerve and common carotid artery.

67. *Sterno-maxillaris* (mandibularis). It is a broad, thick, ribbon shaped muscle arising from the upper part of the anterior projection of presternum and the first costal cartilage. The muscles of both sides are together all along the neck and slightly diverge from each other at their insertion by a wide tendon to the horizontal ramus below its angle.

Nerve & blood supply.—Hypoglossal nerve and common carotid artery.

68. *Sterno-thyroideus* is situated deeper to preceding covering the ventral face of trachea. It is ribbon shaped, narrow at its origin from the first costal cartilage above the origin of preceding. In front it is thick and wider and is inserted to a rough curved line on the lamina of thyroid.

Nerve & blood supply.—Ventral branches of cervical nerves and common carotid artery.

69. *Scalenus* is a long flat muscle narrow at its origin and wide posteriorly, extending obliquely downward and backward over the first four ribs. It arises from the transverse processes of all cervical vertebrae. In front of the first rib, it divides into a large superficial and a

small deep part inserted to the anterior border of first rib. The superficial part is inserted by fleshy slips to the lower parts of II & III ribs and to IV rib above its middle.

Nerve & blood supply—Ventral branches of cervical nerves and common carotid artery.

70. *Omotransversarius* arises by a narrow flat tendon from the basioccipital and the wing of atlas. Lower down it expands into a thin sheet over the dorsal border of brachiocephalicus and over the shoulder it covers the supraspinatus. The insertion, nerve and blood supply were noted in Part II.

71. *Brachio-cephalicus* consists of two parts at its origin. The small dorsal part arises from the exoccipital. The large ventral part arises from the basioccipital by a large round tendon. These two parts unite and form a thick muscle covering the lateral aspect of neck extending to the shoulder. Its insertion, nerve and blood supply were noted in Part II.

Jugular furrow which is very distinct in other animals is not apparent in the elephant due to the shortening of the neck.

72. *Rectus capitis anticus major* covers the ventro-lateral aspect of the cervical spine. The muscle arises from the anterior faces of the transverse processes of last four cervical vertebrae by small tendinous slips which unite in front and form a round tendon which is inserted by a round tendon to a depression on the basioccipital.

Nerve & blood supply.—Ventral branches of cervical nerves and common carotid artery.

73. *Rectus capitis anticus minor* arises from the ventral face of arch of atlas and is inserted to basioccipital medial to major. It is very close to its fellow at the origin and insertion.

Nerve & blood supply.—Ventral branch of first cervical nerve and vertebral artery.

74. *Rectus capitis lateralis* is a small bundle arising from the lower end of the transverse process of atlas and inserted to the exoccipital.

Nerve & blood supply.—Same as for preceding.

75. *Longus colli*.—Muscles of both the sides do not meet on the ventral median line as in other animals. The muscle covers the ventro-lateral aspects of the vertebral bodies. It arises by tendinous slips medial to the insertion of the thoracic part from the bases of transverse processes of the last four cervical vertebrae. The muscle is continued by a thin tendon which is inserted to the tubercle of atlas. The thoracic part was described under Part VII

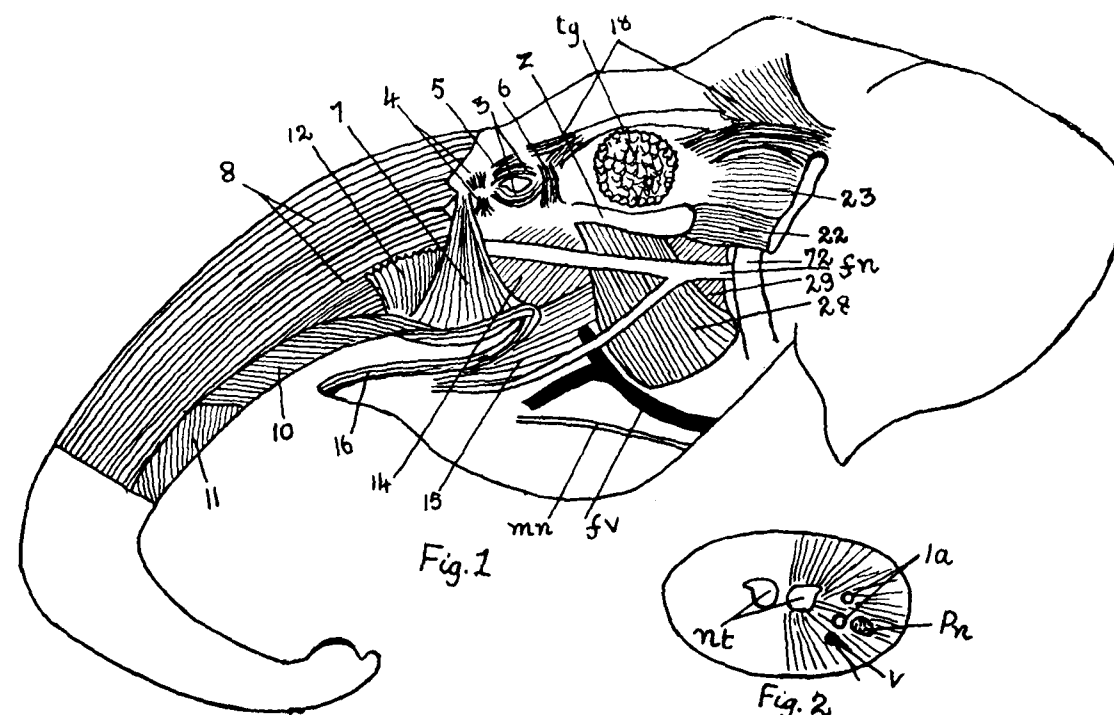
Nerve & blood supply.—Ventral branches of cervical nerves and common carotid artery.

[To be continued]

The Anatomy of the Foetal Indian Elephant

Part VIII—The Head and Neck

By D. MARIAPPA



EXPLANATION TO FIGURES

Fig. 1. Lateral view of head.

z, zygomatic arch; tg, temporal gland;
fn, facial nerve; mn, mandibular branch of lingual nerve (V);
fv, facial vein.

Numbers correspond to those given to the muscles in the text except 72 to be read as 66.

Fig. 2. Transection of proboscis showing radiating fibres of *rectus nasi* round the nasal tubes—nt; la, branches of intraorbital artery; Pn, proboscideal nerve and V, vein.

A Case of Bovine Pyelonephritis

BY
P. S. RAJULU



Fig. 1

Medial sections of the left and the right kidneys showing inflammation of the pelvis and thickening of the calyces with the cut edges seen prominently.

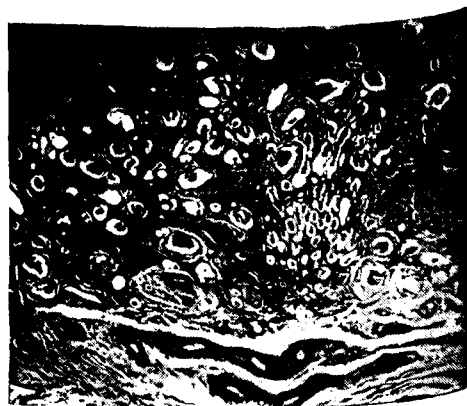


Fig. 2

Interstitial changes, thickening of blood vessels, disappearance of many nephrons. X 22.

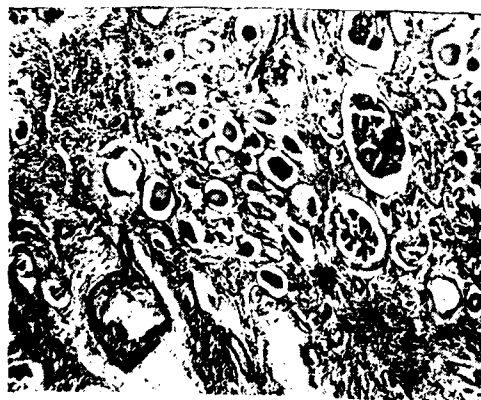


Fig. 3

Hyaline casts inside the tubules, thickening of vessels and fibrosis of glomeruli and interstitial changes. X 95.



Fig. 4

Inflammatory reaction in pelvis, ascending infection, inflammatory cells in the epithelium of the calyces. X 68.

A CASE OF BOVINE PYELONEPHRITIS

By

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Corynebacterium pyogenes is probably the most important and widespread member of the Genus *Corynebacterium* found in association with animal disease in general, and bovine disease in particular. Being essentially a pyogenic organism it produces limited disease, usually in tissues and organs and is often the common cause of suppuration in cattle, sheep, goats and swine. Since its first isolation and description by Lucet (1893), this organism has been isolated by workers in different parts of the world, from lesions in various organs in almost all the domesticated animals and fowl. Mclean *et al* (1946) recovered *C. pyogenes* along with *C. ovis* from war wounds of soldiers in the last war in South and West Pacific islands. A fatal case of human infection by this organism has been reported in a shepherd (Halbron *et al*, 1940) in France and the man died with abscesses in lungs, kidneys, and spleen. It has been suggested that *C. pyogenes* is widely distributed in healthy cattle, goats and pigs and that some factor or factors like other bacterial or viral infections, stimulate infection into activity. It has also been reported that in healthy horses an occasional serum sample showed a high level of antitoxin, which is specific and could have only occurred in the presence of a specific stimulus, the stimulus being the presence of *C. pyogenes* toxin. (Lovell 1939). That it occurs most often in close association with other organisms as in mixed bacterial infections seems to be the approved conception and therefore one is sometimes forced to presume that it is unlikely that *C. pyogenes* can cause primary disease.

Occasionally *C. pyogenes* has been isolated from bovine nephritis (Lovell 1943) and this infection cannot be confused with the classical Pyelonephritis due to *C. renale*. The lesions due to *C. renale* are pathologically different from *C. pyogenes* infection, because in the latter, the lesions are of the nature of numerous abscesses in the kidney tissue. The pus from abscesses caused by *C. pyogenes* is said to be homogeneous in character with faint greenish tint. (Lovell 1943).

Hutyra and Marek (1949) in their 5th edition have stated that the naturally occurring cases of pyelonephritis in bovines are caused by *C. renale* and that it is a more common disease of cows than in bulls and bullocks. The identification of this organism is chiefly based on the description of Jones and Little (1925 - 1926) and Merchant (1935) summarised and adopted by Topley and Wilson (1946). This organism is sufficiently characterised by its morphology and typical diphtheroid

character—inability to liquefy gelatin, solid serum, and coagulated egg. It forms acid in glucose but not lactose, maltose and sucrose. It does not produce haemolysis. Lovell (1946) described two more tests for the identification of *C. renale* (1) Its ability to split urea (2). Formation of a clear zone surrounding the colonies of this organism on milk agar. The organism can also hydrolyse arginine. Hence this organism has a group of differentiating characters and cannot be mistaken for any other member of its Genus.

An instance of Pyelonephritis was recorded in a bovine during a postmortem examination. The animal was a Government breeding Bull No. 252 and as such was used at stud. After about a period of 2½ years at stud, the bull gradually lost condition and became progressively weaker and was admitted in the Veterinary College Hospital. At the time of admission, its rectal temperature was 103·6 F. The hock and fetlock joints were swollen and enlarged. The animal passed hard mucus-coated pellets of dung. Bilateral corneal ulceration was noticed. Both the eye balls slightly receded into the sockets. Blood smears revealed no organisms. Dung revealed ova of *Trichuris* and *Strongyle Species*. Urine was passed in small amounts at frequent intervals and yielded copious amount of mucocatarrhal sediment. Microscopical examination of sediment revealed pus cells, casts and debris and Gram-negative bacteria. Urine contained 1% Albumin. Cultural examination revealed Coliform bacteria only. Serological test was negative for Brucellosis. Repeated examination confirmed the above findings. The animal had a low grade fever, temperature never rising beyond 103·6 F. noticed at the time of admission. These findings combined with the clinical picture were indicative of nephritis. The animal was put on symptomatic treatment. During the course of the treatment, the animal developed pneumonia and was treated with massive doses of penicillin. The animal was discharged having regained its normal state of health and vigour after having stayed in the hospital for a period of 5 months. 8 months after discharge, it was brought back to the hospital in a debilitated condition. Clinically it presented the original picture and in addition, was suffering from chronic intermittent diarrhoea. It was suspected for Johne's Disease, in addition to nephritis. Microscopical examination of bowel washings and bowel-pinch smears revealed acid-fast organisms morphologically indistinguishable from *M. Johnei*. The animal was eventually destroyed.

Postmortem findings confirmed the microscopical examination of Johne's Disease. The right kidney weighed 2 Lbs. 5 Ozs. and the left kidney 1 Lb. 9 Ozs. After studying the gross specimen with a view to collect material for bacteriological examination if necessary, the upper surface of the right kidney was seared with a heated spatula and the

kidney was incised with a sterile knife so that the ends of the incision were within the seared area. On section, the calyces were found thickened and cut edges stood out prominently. On pressure, flakes of yellowish purulent material escaped from them. Pelvic fat was gelatinised. The capsule was thickened and fibrosed and was found adhering to the cortex while external surface was greyish, rough and pitted. Urethral mucous membrane was diffusely congested and thickened and contained flakes of purulent material. All the above changes were also present in the left kidney but to a lesser degree. Mucous membrane of the urinary bladder was thickened and thrown into folds and a few shreds of yellowish purulent material was present. Blood smears examined just before and after death revealed no organisms.

Material was collected for bacteriological examination from various places, from the yellowish purulent material as it oozed out of the cut ends of various calyces and was plated out on a series of 5–10% horse blood agar plates, plain nutrient agar plates, so as to obtain discrete colonies and also sown in plain broth and serum glucose broth tubes. The plates were incubated aerobically and anaerobically at 37°C. Pure cultures of *C. pyogenes* were isolated. Minute transparent colonies, discernable to the naked eye, appeared after 48 hours incubation, on blood agar plates with clear zones of haemolysis around them. In serum glucose broth, growth appeared as finely granular sediment in 48 hours. The organisms were Gram-positive, appeared as short coccobacilli, arranged characteristically either in parallel bundles or at acute angles. The narrow petal like shape of the individual cells was frequently seen with only its tip showing as a stained end. Barred staining with methylene blue was seen. Neisser's method failed to reveal metachromatic granules. Plain agar and plain broth yielded no cultures. The organism liquefied gelatin, coagulated egg and coagulated serum. Litmus milk was acidified, clotted in 48 hours and after further incubation digestion of the clot became evident. The organism fermented glucose, lactose and maltose producing acid but no gas. Hiss's serum water was used as basis for sugar media.

Pathogenicity test was conducted as follows: The organism was grown in litmus milk for 72 hours at 37°C. and filtered through Seitz filter. Two mice were inoculated intravenously with 0·25 c.c. of the culture filtrate. The mice died in 3½ and 5 minutes respectively, with symptoms of respiratory distress.

Material collected from the floor of the urinary bladder was subjected to similar bacteriological examination which failed to reveal *C. pyogenes* but gave rise to colonies of Coli-aerogenes group of organisms.

Microscopically, the severe and diffuse character of the lesion was conspicuous. The tissue destruction was extensive. In some places, the entire renal tissue was replaced by fibrous connective tissue, with varied amounts of cellular infiltration. Thick bands of fibrous tissue ran in a criss-cross fashion both in the cortex and medulla. The intense necrotic changes completely masked the structural changes in the renal parenchyma. The glomeruli appeared much smaller than normal, with large clear capsular spaces around them, and showed lobulations of the tuft. The capsule was highly thickened and fibrosed. At places the Bowman's capsule was denuded of its epithelium which was found in the capsular spaces. The glomeruli showed periglomerular fibrosis and partial hyalinisation. The inflammation was chronic in character and there was little abscess formation. The inflammation extended haphazardly, destroying the renal tissue followed by healing and fibrosis. There was a wide spread interstitial inflammation with cellular infiltration of polymorphs and round cells. The process was seen only in patches and in the intervening places, the tubules were dilated, lined by flattened epithelium or denuded completely of its epithelium and filled with pink staining colloid like material. Pelvic portion showed round-celled infiltration and fibrosis. The arteries and smaller arterioles showed a thickening of all the coats—diffuse hyperplastic sclerosis—usually associated with arterial hypertension in man. The other change was endarteritis obliterans—a fibrous thickening of the intima with narrowing of the lumen, such as may occur in any chronic inflammation.

Discussion

The case under report is a typical bilateral pyelonephritis in a male bovine. The term pyelonephritis is an interstitial renal inflammation of bacterial origin involving the mucous membrane of the pelvis and kidney parenchyma, leading, after recurrent attacks, to extensive tissue damage, healing and cicatricial contraction, the end result being a widespread total destruction of renal tissue. Whether it is the result of haematogenous infection or an ascending extension from the urinary tract is usually difficult to decide. It is customary to believe that pyelonephritis without urinary obstruction and without hydronephrosis, as in this case may appropriately be haematogenous or descending pyelonephritis. But microscopically the section of the pelvis revealed inflammation of the mucous membrane with small abscesses in the surrounding kidney parenchyma with cellular infiltration with polymorphs and round cells and radial extension of the inflammation suggestive of ascending infection. Pyelonephritis is usually regarded as a primary acute infection which either healed completely or developed into chronic degenerative form with ultimate destruction of kidney parenchyma.

But in this case under report as far as it can be gathered from its history, the disease pursued an insidious course from the onset without any recognisable initial acute attack. The apparent recovery, the animal exhibited after treatment with penicillin is misleading. The end stage is one of chronic renal insufficiency with uraemia. The cause of death in uncomplicated cases is undoubtedly uraemia and in complicated cases the death is usually due to inter-current unrelated diseases, because of the insidious course of the primary infection. To what extent an associated arterial hypertension dependent on renal condition governs the prognosis in animals, is not well-understood.

Whatever may be the route of the infection, the disease affected more severely the medulla, where the inflammatory changes eventually led to cicatricial contraction and compression of the tubules. The tubules underwent atrophy. At places the lumen of the tubules were greatly distended, often occluded with hyaline casts which appeared in the urine, this being characteristic of pyelonephritis. The kidney showed wedge-shaped areas of inflammation extending through the cortex and medulla to pelvis, resulting in the formation of a wedged shaped scarring.

It has been stated that when inflammation subsides these wedge shaped scars are found between areas relatively normal or hypertrophied tubular tissue. This appearance is recognised as characteristic of pyelonephritis. In these areas the glomeruli and obstructed tubules undergo hyalinisation—the glomeruli by periglomerular fibrosis, capsular thickening, compression and adhesion of the glomerular capillaries. (Anderson).

It is characteristic that in pyelonephritis the tubular destruction is greater than glomerular injury with minimal proteinuria.

The typical bovine pyelonephritis is not only caused by *Cornebacterium renale* but can also be caused by *Cornebacterium pyogenes* as can be seen from this case. It is known that *Cornebacterium pyogenes* is sensitive to penicillin, but the lesion in which it was located was of the type that it was impossible to completely eliminate the organism by the use of penicillin, which fact may be taken to explain the recurrence of the disease subsequently. The pneumonic complication responded very quickly to the administration of penicillin, though the etiology of the complication remained undetermined. Synchronously the renal syndrome also abated though it recurred after about a period of 8 months.

The other organs, lymph glands were carefully examined during the post-mortem examination. But they had failed to reveal any foci of infection. Cultures from the bladder and ureters failed to

reveal *Cornebacterium pyogenes*. How the presence of urine and the presence of *E. coli* and the other organisms of coli-aerogenes group adversely affect the viability of *Cornebacterium pyogenes* is not understood. *Cornebacterium pyogenes*, does not split urea. Under these circumstances it can safely be assumed that after the primary bilateral ascending infection of the kidneys, secondary infection of the bladder with *Bacterium coli* might have supervened. The low grade fever, loss of appetite, weakness, prostration, corneal ulceration, eye-balls receding into the sockets and swollen joints are characteristic of uraemic syndrome. Severe emaciation and systemic disturbance seen in the case can also be attributed to the effects of the toxin elaborated by the organism.

Conclusion

A case of naturally occurring bovine pyelonephritis due to *Cornebacterium pyogenes* is recorded.

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THE PRESENT POSITION OF INFECTIOUS CORYZA IN CHICKENS IN INDIA*

By

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Introduction

Infectious Coryza, a serious disease of chickens characterised by inflammation of sinuses of the head and upper respiratory passages, endemic in certain areas in the Indian Union, is causing mounting losses year by year. The disease not only takes a heavy toll of young chicks but renders layers unproductive. Its etiology is still obscure, and there seems to be more than one factor responsible for this condition.

In other parts of the world, various types of coryzas have been recorded, *viz.*, Type I, caused by *Haemophilus gallinarum*, (de Blicck 1931), which has a short incubation period of 24-72 hours, and a duration of 15 days. Type II, once supposed by Nelson (1936), to be caused by coccobacilliform bodies, but later research has proved them to be identical with the pleuropneumonia like organisms (P.P.L.O.). This condition is now known as the Chronic Respiratory Disease (C.R.D.) described by Dalaplane and Stuart (1943), Hitchner (1949), and is also associated with a virus. Type III, is caused by a virus alone, (Delaplane and Stuart 1943), in which the syndromes include a distinct inflammation of the trachea and the bronchi. The incubation period is from 6 to 17 days, while the course prolongs from 21-68 days. A virus has been incriminated as the sole cause of the disease. This virus can be grown on the chorio-allantoic membrane (c.a.m.) of the embryonated chicken egg. In the young birds nasal exudate is the principal symptom. Immunologically the disease differs from Infectious Laryngotracheitis (I.L.T.) and Infectious Bronchitis (I.B.). Though antibiotics have been found useful in reducing the losses, yet so far there has been no satisfactory curative or a preventive treatment.

In India, the disease is commonly observed as an acute inflammation of the upper respiratory passages and air sinuses, accompanied by emaciation and muco-purulent discharge from the nostrils and eyes. The eyelids become glued together and a cheesy mass of inspissated pus accumulates between the eyelids. The face and intra maxillary space is distorted by oedema, and considerable respiratory distress and coughing

*Proceedings of the 12th Meeting of the Anim. Husb. wing of the Board of Agri., and Anim. Husb. in India 1957.

are present. (Plate I). The bird is unable to feed or even see. The wing feathers are matted at the side with the discharge owing to the bird rubbing its eyes against them. Chickens from 6 weeks to 6 months are most susceptible. Young birds die in numbers at this stage of the disease, while adults go light and become unproductive. Post-mortem reveals inflammation of the mucus membrane of the sinuses of the head and upper respiratory passage, but the trachea and the bronchi are not generally involved.

Synopsis of the experiments carried out

In an earlier work in the Poultry Research Division (1950) *Haemophilus gallinarum* was isolated from a field outbreak from Babugarh involving over 500 chickens. The disease was reproduced in 4 days under laboratory conditions. The organism was typed as *Haemophilus* according to reactions on laboratory media, as per Bergey (1948). The disease was controlled rapidly by the use of Lugol's iodine in drinking water for 3 weeks.

In 1952, some Coryza affected birds were received for investigation through the courtesy of Mr. Seetharam Rao, Superintendent, R. D. C. Patancheru, Hyderabad. This disease was reported not to respond to Lugol's iodine, then suggested by the P. R. D. Four of these birds were placed in contact with 120 healthy cockerels of three months of age, in four groups, with drinking water medicated with Lugol's iodine, Sulphamezathine, and Dettol, for 3 weeks, 6 days, and 5 days, respectively. A control group of no medication was included for check purposes. The drugs proved valueless, and 100% mortality occurred in 30-45 days in all the four groups. Infected cases were picked up from the four pens from 9-12 days. Fifteen days after contact infection over 50% had the disease. Nasal discharge and oedema of the face and eyelids, were the constant symptoms.

Infection tests

The fresh inflammatory exudate in saline suspension, from the affected birds when instilled intranasally into healthy chickens produced the disease in 8 to 9 days, but failed to infect by other routes.

Viability tests

The nasal exudate in broth or N.S.S. lost its infectivity after 24 hours at a room temperature of 80°F., and also after 5 days in cold store at 30°F.

Appraisal of the bacterial flora in the nasal exudate

The constantly found bacterial flora was plated from the exudate on the usual laboratory media including sealed blood agar plates.

The present position of Infectious Coryza in Chickens in India

By
S. B. V. RAO



Fig. 1
Advanced cases of Infectious
Coryza
(Hyderabad Strain).

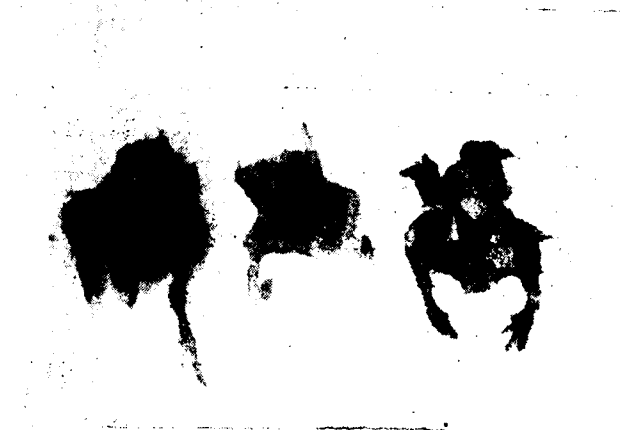
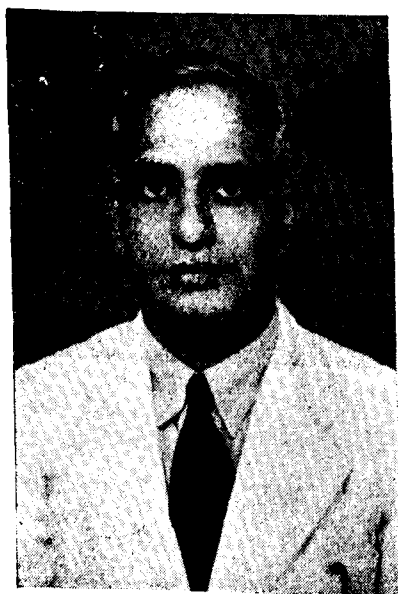


Fig. 2
Congestion and border necrosis
of livers of coryza infected
embryos, with marked stunting.

He goes abroad

(SEE NEWS AND VIEWS)



K. KANDASWAMI RAJU,
Superintendent,
Livestock Research Station, Hosur.

Among these were some gram-negative coccobacilli-form bodies. Collective as well as individual washings of these organisms from plates, however, failed to infect chicks.

The above two attempts have proved the occurrence of at least two types of Coryzas unassociated with avitaminosis A or Pox. The specific nature of the disease-producing entity, in the second outbreak was not determined, though the presence of an active agent was evidenced by the infection experiments.

Some conditions simulating Coryza

In the meanwhile when several trials were made to determine the etiology, interesting information was gathered as side lights, which would help in the diagnosis of the true Coryza types. One such condition, causing the involvement of the eye as in Coryza, was associated with a severe infestation of round worms, which presumably interfered with the metabolism of vitamin A, and thus brought about the eye syndrome as is encountered in avitaminosis-A, despite a good supplement of greens in the feed. The other condition which simulated Coryza of one or both eyes, was an unusual form of fowl pox in which the cutaneous and buccal lesions were rarely seen, and the disease kept on smouldering through the growing flock with a slow spread. This flock had been vaccinated with pigeon pox virus a few months previously, and the disease occurred sporadically, perhaps as the low grade immunity waned off in different birds.

One of the etiological entities-possibly a virus

A third attempt was made in 1954 to check up for a virus in its etiology. Eleven-day old embryos were infected by the C.A.M. route, with a germ-free filtrate obtained by Maurer's filter-strip method, from a field outbreak. Stellate fine plaques were discernible on the C.A.M. after 84 hours of incubation in the third passage. (PLATE II) The saline suspension of the slightly oedematous membrane in broth, produced a mild form of the disease in healthy chickens.

Incidence in Hyderabad

During the year 1957, a fourth attempt was made to throw some light on the cause of the disease, at Sitarampet, Hyderabad, at the request of Dr. Shetty the then Director. The place is excellent for investigation of this nature as the disease prevails throughout the year, the incidence being greater soon after the rains. Mr. Seetharam Rao, the District Veterinary Officer runs a poultry farm in the Hospital compound. He reports, the poultry development work has come to a stand-still due to its ravages. An average of 80 Coryza affected chickens are brought to the out-patient clinic daily since several months, which

has given ample opportunity to the D.V.O. to try the various drugs, and antibiotics cited below. Though there appears to be a small percentage of cures by such treatment, he feels the backyard farmers, as well as large flock owners have become frustrated in their attempts to raise chickens for want of a good preventive or a curative agent. The disease as it occurs at Seetharampet now, and as I learn in several other places of Hyderabad is somewhat different from what we have seen before. According to the records available in the hospital even chicks of 2 weeks of age are affected, but not below that age. On the Poultry Farm, I observed an acute infection, in 2--3 weeks old chicks which had killed 160 out of a batch of 220 during the early part of this year within a period of 4 to 5 days.

Symptoms

The common symptoms are rhinitis, huddling, ruffled feathers, occasional sneezing and gasping with audible rales or rattle. The course of the disease runs from 10 days to 3 weeks, depending upon the virulence of the organism and the age of the affected birds. Fifty per cent of young chicks became casualties while the morbidity involves 70% of the survivors. In all infected cases, the growth is affected, chicks became light, sexual maturity is delayed, and they became highly susceptible to pox and Helminths.

Postmortem lesions

Autopsy revealed a new syndrome in addition to the inflammation of the upper respiratory passages, namely, the involvement of the trachea and sometimes even the lungs. Oedema of the face or the eye lids was rarely seen, while a severe congestion of the trachea with stripes of linear haemorrhages under the mucosa was occasionally present and in some the air sacs were thickened and cloudy.

These lesions are meaningful and point to a possible existence of a more serious disease such as caused by viruses rather than by the *Haemophilus* or P.P.L.O.

Treatment

Mr. Seetharam Rao, has valuable data of the treatment he has tried on thousands of birds on the backyard, as well as on other bigger farms, of which I am giving a synopsis hereunder with his permission.

Biological experiment

The D. V. O. has tried in several thousand chicks the injection of nasal exudate intramuscularly, and found in controlled experiments, that the immunity conferred is somewhat erratic lasting from 25 to 45 days. After this period the immunized chicks succumb to the disease.

(This experiment was carried out as per recommendations of the I. C. A. R. after the 4th D. I. O's Conference, Poona, March, 1953).

Chemotherapy experiments

(a) *Procaine Penicillin*.—10,000 to 15,000 units/c. c. of distilled water, 1/M for 3 days, and later continued twice a week for a protracted period of 3 weeks effected a cure; but some relapses did occur.

(b) *Streptomycin*.—100 to 120 mgs/c.c. in distilled water 1/M repeated for 3 days, and then once a week for 3 weeks, usually effects a cure but sometimes the disease recurred.

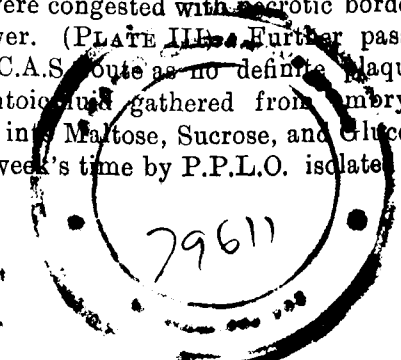
(Caution.—25 mgs of Dihydro-streptomycin sometimes proved toxic, causing immediate death in 2 week old chicks).

(c) *Terramycin*.—25 mgs/c.c. distilled water in 6 to 12 weeks old chicks every alternate day in 3 injections cured 50% the cases.

(d) A combination of *Penicillin* and *Streptomycin* in three injections of 10,000 units and 50 mgs/c.c. for three days 1/M effected a cure in 60% of the cases.

Diagnosis. Suspicion of a Virus involvement

As it was difficult to differentiate this disease from (1) Coryza type III (Virus), (2) Chronic Respiratory Disease, or (3) Infectious Bronchitis, as found in the United States and Canada, the routine laboratory diagnostic procedures for the latter two diseases were followed, after eliminating the bacterial factors like the *Haemophilus*, and the *Pleuro-pneumonia* like organisms involved in Coryza and C.R.D. respectively. The presence of *Haemophilus* organism was definitely ruled out in a culture of the infected tissue material, but it was difficult to confirm the absence of P.P.L.O., as fresh media for growing the latter was not readily available. Samples of the infective material from different outbreaks, were sown in 7, 9, and 11 day old embryos, by the c.a.m., c.a.s. and Y/S routes, using penicillin alone, and Penicillin/Streptomycin to get a bacteria-free inoculum. In both c.a.s. and c.a.m. routes, 50% of the younger embryos were either killed or stunted in 48 to 72 hours where penicillin alone had been employed, but all embryos were healthy and hatched out where both antibiotics in combination had been used. In subsequent passages where no antibiotics were used, the kill was erratic, while stunting of a small percentage of the embryos was constant. The livers of the younger embryos were congested with necrotic borders particularly of the left lobe of the liver. (PLATE III). Further passages up to fourth were made by the C.A.S. route as no definite plaques were seen on the C.A.M. The allantoic fluid gathered from embryos showing liver lesions were inoculated in Maltose, Sucrose, and Glucose which are usually fermented in a week's time by P.P.L.O. isolated in



C.R.D. cases, but these were not attacked, probably suggesting the absence of these organisms.

It is difficult to interpret the embryo lesion or their death pattern at this stage. The penicillin treated exudate used for the primary inoculation of the embryo reproduced the disease when injected intranasally and intra-tracheally, in a small percentage only, of the day-old chicks after 7 to 13 days infection. These chicks used in the experiment were from the same flock as was exposed to the disease for over several generations, hence presumably from naturally immune parents, perhaps with inherent antibody protection up to 2 weeks. Further work had to be postponed owing to circumstances beyond control.

Conclusion

A plea for more work to be done.

At the present moment it appears to be too premature to be definite about the existence of any of the three above cited respiratory diseases. The present attempt though far from being a methodical approach, yet suggests the possibility of the existence of any of these diseases, and argues the urgent need for a coordinated research plan to study the problem in all its aspects, throughout the country.

It is observed that one of the well informed and notable workers, Dr. Pandey (1957) has concurred with the above suggestion in his note to this Conference, and has gone further by stating, that he viewed with concern the existing set up for investigation into some of the serious but obscure respiratory diseases, as inadequate, and then each disease problem merits exclusive and thorough investigation before the control measures could be practicable. He emphasizes that some of the entities causing symptoms of "Coryza" could be dangerous viruses, requiring special technique to isolate and type them, hence the need for more well organized and equipped Poultry disease diagnosis laboratories in the country which should co-ordinate the research with the Poultry Research Division of the Indian Veterinary Research Institute.

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ISOLATION OF PENICILLIN RESISTANT STRAINS OF STAPHYLOCOCCUS AND STREPTOCOCCUS FROM CASES OF BOVINE MASTITIS IN INDIA

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Introduction

Acquired resistance to chemotherapeutic agents by micro-organisms was first noticed by Ehrlich in 1913 in connection with treatment against trypanosomiasis. In recent years the problem has become more acute, especially in connection with the large scale use of antibiotics. Fortunately, it is a problem that concerns only a small number of organisms, at least as far as is known up to the present day. Even then, drug-fastness of bacteria has become a great problem and the seriousness of it is mounting up each day. Organisms that are implicated are *Mycotuberculosis*, *Staphylococcus*, coliform organisms and some of the non-haemolytic or α haemolytic streptococci, like *Str. viridans*, *Str. faecalis* etc. In human medicine the first two organisms are causing much concern with their acquired drug resistance. In veterinary medicine the only organisms of importance, in this respect, are *Strphylococcus aureus* (= *Micrococcus pyogenes* var *aureus*), and to certain extent coliform organisms.

Mechanism of the development of drug resistance is not yet fully understood. In case of penicillin resistance a multiple of factors has been shown to be involved. Certain strains of bacteria release into the surrounding medium an enzyme, called penicillinase, which converts penicillin into penicilloic acid which is not bactericidal. Some strains of bacteria do not liberate penicillinase but rapidly degrade penicillin when it comes in close contact with the bacteria. Other strains escape the effect by developing a lowered affinity for penicillin.

In human medicine a good amount of work has been carried out in surveying the incidence of percentage of penicillin resistant Staphylococci amongst human patients and hospital nurses. According to these findings a good proportion of strains of Staphylococci isolated has been found to be resistant to penicillin and the percentage has steadily increased from year to year.

The problem with regard to the drug-fastness of organisms causing animal disease mainly concerns the occurrence of penicillin resistant strains of Staphylococci in case of bovine mastitis. Some work has been

carried out, on this subject, in Great Britain and results so far obtained have shown a steady increase in the number of incidence of penicillin resistant Staphylococci in dairies.

Price *et al* (1954) reports on the isolation of penicillin resistant strains of Staphylococcus in 6 out of 13 herds tested. Sellers (1957) reports that 9 strains of Staphylococcus resistant to penicillin have been recovered from 57 herds selected at random. The cows selected for this work were clinically normal. Loosmore (1957) states that in a survey work with materials from clinical cases of mastitis an increase in the percentage of penicillin resistant *Staph. aureus*, from 40 to 70 per cent, was observed. Tee (1957) reports that in two years the incidence of penicillin resistant strains of *Staph. aureus* in a survey in herd milk sampling increased from 9 per cent to as much as 37 per cent.

There has so far been no report of penicillin resistant strains of micro-organisms isolated from cases of animal diseases in India.

Materials and Methods

Isolation of organisms.—In the present work specimens from two dairies (A & B) were tested.

Dairy 'A' is a small herd dairy comprising 38 cows, and 35 of these were found to be suffering from chronic mastitis. Milk sample was collected at random from 19 of these 35 cows. Seventeen milk samples yielded positive results on cultural examination and two samples were negative on aerobic culture. 17 organisms, one each, were isolated from these specimens. The organisms isolated were—six beta-haemolytic streptococci; one viridan type streptococcus; one non-haemolytic streptococcus; six haemolytic, coagulase-positive, aureus coloured staphylococci; two aureus coloured, coagulase-positive, non-haemolytic staphylococci; and one *B. coli* organism.

Dairy 'B' is a large dairy with over a thousand milking cows. Incidence of mastitis in this herd, as revealed by bacteriological survey, is nearly 70 per cent. Milk samples from 25 clinically affected cows were collected to carry out a preliminary test. Two samples proved negative on aerobic culture. All the rest proved culturally positive and the organisms were isolated in pure culture from each of the milk samples. The relevant organisms were—six beta-haemolytic streptococci; two viridans type of streptococci; fourteen haemolytic, coagulase positive, aureus coloured staphylococci; and one *C. Pyogenus*.

The streptococci were typed culturally on the basis of haemolysis. Staphylococci were tested for coagulase reaction and the Corynebacteria and *B. coli* were typed on cultural and biochemical tests.

All these organisms including the strain of *B. coli* which served as a good control, were tested for their susceptibility towards penicillin. The penicillin was in the form of sodium salt.

Test for resistance to penicillin.—The method employed for titration was the serial dilution method. The dilutions were made in plain broth. The final dilutions of penicillin used were 0.25, 0.5, 2.5, 5, 12.5, 25, 50, 100, and 1000 units per ml. The inoculum was half ml. quantity of a 1:100 dilution of a twenty four hour broth culture of the organism under test. Besides the strain of *B. coli* which served as a good control for penicillin resistance, one penicillin susceptible strain of coagulase positive Staphylococcus was used as a control. The test culture was made up of one single colony picked up from the seed plate and not a number of representative colonies. In addition, one beta-haemolytic Streptococcus (Strain BOL S/65) and one coagulase positive Staphylococcus, both of which were highly susceptible to penicillin, also served as good controls.

The titration culture tubes were examined every 12 hours and the final reading was taken after 72 hours of incubation.

Results

In dairy 'A', from which 17 strains of micro-organisms were tested for penicillin resistance, one beta-haemolytic Streptococcus, one viridan type of Streptococcus, one non-haemolytic Streptococcus, and one strain of coagulase-positive haemolytic *Staph aureus* were found to be highly resistant to penicillin. The strain of *B. coli* was, as expected, extremely resistant to penicillin. The results are tabulated in Table I. It will be observed that the strains of Streptococci were most resistant than the Staphylococcus strain. The former resisted penicillin even up to the concentration of 100 U/ml. Again, it is of some interest to note that the haemolytic Streptococci were comparatively more resistant than the non-haemolytic one.

In dairy 'B', out of the 23 strains of different types of organisms tested for penicillin resistance, one strain of beta-haemolytic Streptococcus and one of coagulase positive Staphylococcus, showed considerable resistance to penicillin. Here also, the Streptococcus showed more resistance than the Staphylococcus. (Table I).

Discussion

The results recorded above, though of preliminary nature, have proved unmistakably that there exist in India, penicillin resistant strains of micro-organisms causing mastitis. The organisms comprise both Streptococci and Staphylococci. Available literature reveals no record of any haemolytic Streptococcus becoming penicillin resistant. In the present work, however, two strains of haemolytic Streptococcus have been found to be the most resistant.

TABLE I
Results showing the titre of Penicillin resistance of certain strains collected from dairy 'A'

Sl. No.	Description of strains	Growth in different Unit/ml dil. of penicillin									
		0.25	0.5	2.5	5	12.5	25	50	100	1000	
1	BOL S/2 (Non-Haem. Strepto)	+++++	+++++	+++++	+++++	+++++	+++++	+++++	++	—	
2	BOL 239 (<i>Staph. aureus</i>)	+++++	+++++	+++++	+++++	+++++	+++++	+++++	—	—	
3	BOL 247(1) (B-5a-haem. Strepto.)	+++++	+++++	+++++	+++++	+++++	+++++	+++++	+++++	—	
4	BOL S/64 (Viridan Strepto.)	+++++	+++++	+++++	+++++	+++++	+++++	+++++	+++++	—	
5	BOL S/65 (Beta-haem. Strepto.)	—	—	—	—	—	—	—	—	—	
6	BOL 288 (<i>Staph. aureus</i>)	—	—	—	—	—	—	—	—	—	
7	BOL 185 (<i>B. coli.</i>)	+++++	+++++	+++++	+++++	+++++	+++++	+++++	+++++	+++++	

The number of resistant strains might have been higher, if a suitable number of representative colonies, instead of single colony, were picked up for using as the test inoculum. For, it is known that all infections are not homogenous and mixed infection with penicillin resistant and penicillin sensitive staphylococcus may be present in a given animal.

The presence of such penicillin resistant strains in mastitis cases poses a very serious problem for the Veterinary profession in the country. Inspite of the fact that the resistant strains are more commonly found in human hospitals where it presents a much more serious problem, Veterinary profession must be very careful to avoid a similar condition.

The first and foremost action to be taken would be to carry out further intensive survey on the occurrence of such strains. The study should not be confined to penicillin. The role of other antibiotics, in this respect, should also be studied. It is not sufficient just to carry out one single survey in certain dairies. The work should be repeated at suitable intervals to see if the incidence of drug-fast strains of micro-organisms is on the increase. While on this subject one should explore the possibility of cross infection from human beings and the possibility of the occurrence of resistant strains amongst farm workers should be explored.

As regards the precautions that are to be taken in order to minimise drug resistance, it is necessary to be very careful in using the modern medicines, like antibiotics. Injudicious and reckless use of antibiotics is the main cause of rendering bacteria resistant to these drugs. Antibiotics should be prescribed only when it is absolutely necessary. Even then, a proper bacteriological examination and typing of the causal organisms should be carried out in order to prescribe the right drug. In certain countries antibiotic sensitivity of the organism is first tested before choosing the drug for treatment. The dose should be the minimal effective dose, and treatment should be carried out for the absolutely essential minimum period. Combination of drugs and rotational use of drugs are other useful practices. As far as possible, narrow spectrum drugs should be preferred over the broad spectrum ones. In this connection proper utilisation of surgical and immunological methods would considerably reduce the necessity for using antibiotics. Some workers advocate introduction of newer drugs. It is good, so far as it goes. But, then there is obviously a limit to the extent to which one can introduce newer drugs.

While considering the precautions against antibiotic resistance of microbes one should bear in mind that there is possibility of the

emergence of drug-fast strains following feeding of animals with antibiotics, which is done now-a-days, in order to hasten the rate of growth.

Summary

A number of penicillin resistant strains of micro-organisms collected from cases of bovine mastitis in two dairy farms have been isolated. This is the first report of such occurrence in India. Suggestions have been made regarding precautions that should be taken in order to minimise the appearance of drug resistant strains.

Acknowledgment

My thanks are due to Sri M. Chakravarty and Sri G. K. Ghosh for technical assistance.

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EFFECT OF SULPHONAMIDES IN EXPERIMENTAL GLANDERS

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Reports of successful treatment of glanders have recently appeared in some foreign literature, (1, 2 and 3). The present official policy in India under Glanders and Farcy Act No. XIII of 1899 is to destroy all glandered animals. If successful treatment for glanders is available, a few animals, especially valuable ones, can be saved. With this in view small-scale experiments, both *in vitro*, and in guinea-pigs, were undertaken to find out the efficacy of sulphonamides in the treatment of glanders.

In vitro experiments

Sulphathiazole (M & B 760), Sulphamezathine (I. C. I.) and Sulphadiazine (M & B) were the three sulpha drugs chosen for experimental trials. Lahore IV and Mona Cultures of *Pfeifferella mallei*,

which are being maintained in the laboratory on 4% glycerine agar and potato slants, were the strains selected for study. These strains also grow well on nutrient agar. The above strains are revived through male guinea-pigs about every six months. The virulence of Mona strain is more than that of Lahore IV as on intraperitoneal inoculation of 24-48 hour growth of broth culture of Mona strain, Strauss reaction is evinced within about 96 hours and the animals die in about 10-12 days.

Inhibitory action of the drugs on growing glanders bacilli was tested by the Oxford cup method (4). Twenty-four hour growth of Mona and Lahore IV strains of *Pf. mallei* was washed in 5 c.c. of N.S.S. to match with Burroughs Wellcome Standard opacity tube No. 1. 0.5 c.c. suspension of each of the above strains was inoculated in separate petri plates. 10 c.c. of melted nutrient agar at 48°C was poured into the plates and the glass cylinders were then placed in position. Solutions of the drugs were made in glass-distilled water in dilutions of 1 in 1000, 1 in 5000 and 1 in 10,000. Three drops (each drop being 0.04 c.cm.) of each of the above dilutions of individual drug were put in the three glass cylinders in the petri plates. The petri plates were kept in the refrigerator overnight and afterwards incubated at 37°C for 48 hours. The diameters of zones of inhibition were measured by scale.

TABLE I

Diameters of Zones of inhibition in centimeters.

	LAHORE IV			MONA		
	1/1000	1/5000	1/10,000	1/1000	1/5000	1/10,000
Dilution	1/1000	1/5000	1/10,000	1/1000	1/5000	1/10,000
Sulphathiazole	1 cm.	3 cm.	nil.	4 cm.	2 cm.	nil.
Sulphamezathine	2 cm.	nil.	nil.	1.5 cm.	0.5 cm.	nil.
Sulphadiazine	8 cm.	4 cm.	2 cm.	7 cm.	4 cm.	2 cm.

It will be seen from Table I that all the three drugs tested possess satisfactory inhibitory effects on the growth of glanders bacilli in both the strains used.

In vivo experiments.—Twelve adult male guinea-pigs were distributed into four groups of three animals each and were kept in four separate cages. One of these groups served as the control batch. One of the guinea-pigs from each of the three drug-treated groups was stained at the back to distinguish it from the rest, in case it showed any toxic effect due to dosing. The three guinea-pigs of the control group and two of each of the experimental groups were infected by intra-peritoneal

injection of 0.5 c.c. of saline suspension of Mona strain of *Pf. mallei*. The suspension was made by washing 48 hour growth on 4% glycerine agar with 5 c.c. N.S.S. which tallied with between tube No. 3 and 4 of Burroughs Wellcome Standard opacity tubes. The coloured guinea-pigs of the experimental lots were left uninoculated. Soon after inoculation of the culture all the guinea-pigs of the experimental groups, except the controls, were given 100 mgm. of each of the drugs mixed with their feed. The dosing was continued for seven days consecutively and then discontinued. No green fodder was given to animals for a week. All the surviving guinea-pigs were sacrificed twenty-one days after experimental infection. Cultures were attempted from testes, organs and heart blood on glycerine agar and in glycerine broth but no growth was obtained. No post-mortem lesion in guinea-pigs was also found.

TABLE II

Sl. No. of Guinea pigs	Weight of Guinea-pigs in grammes	Description	Drug-100 mgm. per day for 7 days consecutively	Date of experimental infection	Date of death	Date of sacrifice	Recovery of organisms
1	685	Uncoloured	Sulphathiazole	8-1-54	—	29-1-54	negative
2	625	"	"	not infected	—	"	"
3	590	Coloured	"	8-1-54	—	29-1-54	"
4	620	Uncoloured	Sulphamezathine	not infected	—	"	"
5	595	"	"	8-1-54	—	"	"
6	612	Coloured	"	not infected	—	"	"
7	625	Uncoloured	Sulphadiazine	8-1-54	9-1-54	"	"
8	592	"	"	8-1-54	—	29-1-54	negative
9	635	Coloured	"	not infected	—	"	"
10	570	Uncoloured	Control without any drug	8-1-54	15-1-54	"	isolated
11	630	Uncoloured	"	8-1-54	19-1-54	—	isolated
12	586	Coloured	"	8-1-54	20-1-54	—	isolated

Leaving aside guinea-pig No. 7 in Table II which died the day following infection due to cause other than glanders, all the guinea-pigs treated with drugs survived the infective dose whereas all the three control guinea-pigs succumbed to the same dose of culture after 7, 11 and 12 days from the date of infection. In an earlier attempt to find out the certain lethal dose of Mona strain, it was observed that the above infecting dose could uniformly kill all the guinea-pigs in about two weeks.

Thus in *in vitro* tests sulphadiazine proved to have greater inhibitory power than the other two sulphonamides, although no comparative evaluation could be done under the conditions of the experiment but it confirms the results of other workers that sulphadiazine is more effective *in vitro* and *in vivo*.

Summary

Sulphathiazole, sulphamezathine and sulphadiazine were shown to have inhibitory action on *Pfeifferella mallei*. Sulphadiazine had the maximum activity.

Experimental glanders in guinea-pigs was successfully treated by oral administration of the sulphonamides.

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A PRELIMINARY STUDY OF THE URINE OF ELEPHANTS OF KERALA

By

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Kerala forests are famous for their wild elephants. Every year a good number of them are captured, tamed and employed for dragging and stacking timber in thick forests where the use of power driven machines are impracticable. Their economic value justifies the study of elephants in health and disease. It is an accepted fact that the examination of urine, faeces and blood, will be helpful in the elucidation and intelligent interpretation of the various changes in their constituents in the pathologic and metabolic disorders. A survey of the available literature shows that no study has been made in India on these lines. The notable work of Evans, (1) is most comprehensive, but the information regarding the physiological values are meagre in his treatise. The "Physiology of The Elephants" by Benedict (2) is the most authoritative book and gives valuable data. In this publication the author has stressed the nutritional aspect more.

Materials and Methods

The urine samples could be collected from twelve elephants of Kamala Circus, eight elephants from Guruvayur Devaswam and ten

samples were from animals belonging to different owners. All the samples were examined within twelve hours of collection. Toluene was used as a preservative in all cases excepting those which were examined immediately after collection. The colour, odour, turbidity, reaction to litmus and specific gravity were noted first. Qualitative tests were done for normal constituents and the urine samples were examined for detection of abnormal constituents.

Results and Discussion

Out of thirty samples examined, twelve were amber coloured, seventeen straw coloured and one greenish white. The greenish white urine was positive for bile pigments and bile salts. The addition of dilute acetic acid cleared the white colour and turbidity thereby suggesting the presence of earthy phosphates. There was no peculiar smell in any sample. All the samples examined except two were clear and watery. The greenish white sample was turbid and one sample was of syrupy consistency. The syrupy sample was having 1.2% albumin. The reaction of four samples was acid to litmus, twenty-two alkaline and four neutral. The findings regarding physical characters were in confirmation of the findings of Benedict. The average specific gravity as mentioned by Evans is 1.006 to 1.045. The average specific gravity specific gravity can be taken as 1.019. But in this study the specific gravity was seen to be definitely higher. There were only three samples with specific gravity below 1.020.

Table I shows the details of qualitative tests conducted and the results of detection of physiological constituents. Table II gives the details of examination conducted for pathological constituents, the number of positive and negative cases and also cases showing only traces. Tests were conducted as per the procedure of Hawk (3) and Cole (4).

One sample was positive for sugar and six samples were showing traces of sugar. Coffin (5) is of opinion that traces of sugar in urine may be due to a benign condition caused by a lowered renal threshold and sometimes substances other than sugar may also be seen giving the reduction test. Fermentation test for verification could not be conducted.

Two urine samples were examined from animals which were not eating normal diet for more than ten days due to impaction and these samples did not contain acetone bodies as expected. The presence of indican in nineteen cases is of some interest. According to Coffin the presence of indican is not of much importance in herbivores.

TABLE I
Qualitative tests for physiological constituents of Elephant's Urine.

Constituents	Urea	Uric Acid	Creatinine	Indican	Ammonia	Chlorides	Sulphates	Phosphates	Hippuric acid
Tests	Urease test	Phosphotungstic acid reaction	Jaffe's Test	Obermeyer's test	Cole's Exp. 169	Cole's Exp. 155 (a)	Cole's Exp. 155 (c) & (d)	Cole's Exp. 155 (b)	Cole's Exp. 170 (b)
Number of samples examined	30	30	30	30	30	30	30	30	30
Positive	30	30	30	19	30	30	30	30	30
Negative	Nil	Nil	Nil	11	Nil	Nil	Nil	Nil	Nil

TABLE II
Results of examination of Elephant's Urine for Pathological constituents.

Constituents	Sugar	Albumin	Acetone	Blood	Bile salts	Bile pigments
Tests	Benedict's test	Coagulation test	Rothemann's test	Benzidin reaction	Hay's test	Rosenbach's modification of Gmelin's test
Number of samples examined	30	30	30	30	30	30
Positive	1	2	Nil	Nil	1	1
Traces	6	Nil	Nil	Nil	Nil	Nil
Negative	23	28	30	30	29	29

Conclusion

Urea, Uric Acid, Creatinine, Indican, Ammonia, Chlorides, Sulphates, Phosphates and Hippuric Acid — the normal constituents present in the urine of other herbivores are detected in elephant's urine also. Indican is seen to be present in majority of cases.

One case was strongly positive for sugar and traces of sugar are seen in six samples. There was one sample positive for bile salts and bile pigments and two samples positive for albumin.

Acknowledgment

The writer wishes to thank Principal Dr. K. S. Nair, for giving encouragement and all facilities to do the work in the laboratory. This

study could not have been completed so quickly without the indefatigable efforts of Sri T. N. Natarajan, Laboratory Assistant, in collection of urine samples, preparation of reagents, etc.

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TABANUS FLIES AS TRANSMITTERS OF ANTHRAX — A FIELD EXPERIENCE

By

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Tabanus flies are known to disseminate anthrax and this was brought home to us vividly in an epidemic of anthrax that occurred in Supa Mahal and surrounding area of North Kanara District, Mysore State, during April-June of 1957. This was the first time in the history of the Animal Husbandry Department of the State to experience anthrax in a virulent epidemic form. In this article, the role of tabanus flies in the epidemiology of this particular outbreak is discussed and the other aspects are dealt in a separate paper by Mohiyudeen and Rao (1958).

Supa Mahal and the neighbouring tahasils are on the Western Ghats, exposed to heavy monsoons and surrounded by dense forests. Tabanus flies are seen for two to three months during summer from April to June, during which period, they are dominant and a menace to cattle and buffaloes. While the males live on nectar and plant juices, the females bite and suck blood as this is essential for the development

of their eggs. A fly known to consume 10 c.c. of blood, takes a long time to complete its feeding. Their bites are very severe and the animal's attempts to drive them away interrupt their feeding, so much so, a fly has to bite and suck blood several times to complete its feed and thereby chances of mechanical transmission of the disease are greatly enhanced. They were noticed to have greater affinity for dark objects, coloured cattle and buffaloes more than the white ones. It was reported by the local people that during the days when the flies are active, it is impossible to drive their bullock carts through the forest areas, unless accompanied by another attendant to drive the flies away from the cattle which is usually accomplished by a bunch of leaves. Buffaloes with numerous pin point haemorrhages all over their body, caused by the bites of the flies were a common sight. Up to 40 flies were counted biting one buffalo, which appeared resigned to its fate and enduring it stoically. Herms (1923) has quoted Garman regarding Gad flies (Tabanid flies) in Kentucky that the "persecuted stock appeared to have given up fighting their enemies and allowed to have their way. The switch of the cow's tail was observed to pass over the backs of the clinging flies without causing them to move." The common belief among the people is that the flies spring up from the ground on the first summer showers, known locally as "Adda malac", usual in March and that on the onset of the regular monsoons, the heavy rain drops detach their wings, resulting in their death and disappearance. The detachment of the wings by the rain drops was not observed by us but on the onset of the monsoons they began diminishing in numbers and within a fortnight they had become scarce.

In general the tabanus flies lay their eggs on vegetation and the larvae of tabanus hatch out from the eggs in 5 to 7 days. The larvae are carnivorous and feed on such aquatic animals such as insect pupae, worms or snails and larvae, including other tabanic larvae, insect pupae, worms or snails and will eat even earth-worms. (Lappage, 1956). The larval stage lasts for 9 to 10 months. (Cameron, 1951). When mature, the larvae pupates and the adult fly emerges a week to a month later from it. The presence of the flies only for 2 to 3 months in the year in the area under consideration, indicates that their life history runs on a similar pattern. The eggs are, presumably, laid in June-July and the larval stage lasts up to February-March. The soil will have become dry at this time and favourable for pupation and the adults appear by April.

Observations

The outbreak of the disease started in April. To begin with, it was diagnosed as Haemorrhagic Septicaemia by the field staff on the basis of clinical symptoms such as oedematous swellings at the brisket, sometimes extending towards the throat region. When the outbreak did

not subside and began to assume a virulent form, we were requested to camp in the area with all equipment for investigation and for appropriate action for the control of the outbreak. The disease was diagnosed and confirmed as anthrax. A remarkable feature that struck us prominently was that 90% of the affected cattle and buffaloes showed a cutaneous form of anthrax, running a sub-acute or chronic course. This form of anthrax is the usual sequela, when the method of infection is by inoculation and this coupled with the terrible infestation of tabanus flies was highly suggestive of the flies being the active transmitters of the disease. While anthrax is usually sporadic in nature, it assuming a virulent epidemic form here was obviously due to its appearance at a season when the flies are most active and largest in numbers. This was further confirmed by the following observations:—

(1) Ninety per cent of the affected cattle showed the cutaneous form of the disease and the cutaneous lesions *i.e.*, swellings, were seen on the parts of the animal's body favoured by the flies for sucking blood; these being chiefly the brisket, underside of the abdomen near the navel, sheath, flanks etc.

(2) The disease was severe in those areas where the flies were numerous; practically, the severity being directly proportional to the density of the fly population.

(3) The disease subsided on the disappearance of the flies.

(4) Flies collected off the animal's body were crushed between two slides and the smears so obtained examined for anthrax bacilli. A simple and easy way of making the collection was by putting a thin handkerchief over the fly on the animal's body and folding it up along with the fly and with a little care transferring it to a bottle and corking it with cotton wool. In this condition they were alive for a long time. At the beginning, the flies were collected at random from any part of the animal's body and were found negative. But, as the smears of the fluid taken from the swellings, by aspirating by a syringe, were positive for anthrax in many cases, it was decided to collect some flies engorging on a cutaneous swelling. Accordingly, four tabanus flies replete with blood, off the swelling on the lateral sides of the navel of a he-buffaloe were collected. These four flies were examined 16 hours after collection and out of them three were found positive for capsulated anthrax organisms. Smears made from the proboscis of these flies also revealed the organism. The sero-sanguineous fluid from the swelling from the same animal was also positive. On the day of collection, this buffaloe was showing all typical symptoms of cutaneous anthrax. It was treated with penicillin and cured. More elaborate and comprehensive experiments in the field could not be set up as the control of the epidemic was a more urgent problem to us.

At the same time the local medical officer who was well aware of the situation, interestingly enough, recorded six cases of malignant pustule in human beings. Three cases were brought to our camp and the smears taken from the pustules were positive for organisms morphologically identical with anthrax bacilli. All the six cases had history of deaths of animals in their houses and three of them had definite history of the bite of a tabanus fly on the spot of the pustule.

It was observed that when tabanus species are dominant other biting flies are few but the latter increase as the former diminish in numbers. During May and June the majority of the flies were tabanus species. A collection of flies made by us on the 20th June were identified by Dr. Alan Stone of the U. S. National Museum as follows:—

1. *Tabanus indiana* Ric.
2. *Tabanus bicinctus* Ric.
3. *Chrysosoma montana* Ric.

Discussion

Morris (1918) proved transmission of anthrax by tabanus species in 40% of 70 cases in which the flies bit between four hours before death and five minutes after death. Virulent cultures of anthrax were obtained by him from *Tabanus striatus* caught feeding on a carcass. Oshufev and Lelep (1935) stated that various species of tabanids were seen attempting to feed on carcasses and though unable to ingest blood in the absence of circulation and blood pressure, picked up the infection and *B. anthracis* were found on the proboscis. In specially devised experiments they found that anthrax bacilli were present for 5 days in the proboscis and for 2 days in the crop and stomach. The bacteria were not pathogenic to the flies and the virulence did not decrease either in the proboscis or when passing through the digestive tract. They were excreted for 2 days in the faeces. These authors believe that the transmission of anthrax by Tabanid flies is more likely to arise from carcasses than from living animals and in support argue that the flies while attempting to feed on carcasses succeed only in infecting their proboscis but are unable to suck any blood and have again to approach living animals to satisfy their hunger and thus cause dissemination of the disease. Whereas, in the affected living animal, the bacilli are present in sufficient numbers in the peripheral circulation only in the septicaemic stage, a few hours before death and hence the period during which the Tabanus can acquire infection is limited and on the other hand if they were to bite an animal in the septicaemic stage, they can engorge fully without disturbance as such animals will be too weak to drive them away and thus there will be no need for the flies to approach

other animals and mechanically transfer the infection. In this regard, these authors do not seem to have bestowed attention to the fact that in cutaneous anthrax, usually seen when Tabanids are involved in transmission, the bacteria are present in the swellings commonly occurring in such sites of the animal's body as are preferred by the flies for sucking blood. Naturally, the flies are likely to visit the same spots and acquire the infection easily, as has been shown by our observations. The same authors have stated that in certain parts of Northern Russia, where Tabanids are abundant, they may be responsible for 80% of cases of anthrax among horses and cattle during summer. In these areas, the peak of the epizootic coincides with the maximum abundance of Tabanids and the infection in horses and cattle is usually cutaneous and is accompanied by swellings localised in the parts of the body most accessible to the flies. Our observations are exactly similar. Kramveld and Mansjoer (1939) found that out of some *Tabanus rubius* which had fed on an animal infected with anthrax, many excreted anthrax bacilli in their faeces till their death (up to 13 days). Anthrax bacilli could be isolated from the proboscis of the flies for a week. The bacilli did not multiply in the intestinal tract; some were digested and some excreted. This indicates that infection by contamination of the wounds (caused by the bites of the flies) by their faeces containing anthrax bacilli may also be common.

Conclusions

- (1) *Tabanus* flies are important vectors of Anthrax.
- (2) A cutaneous form of anthrax is produced among cattle and buffaloes when *Tabanus* flies are the transmitting agents, characterised by swellings localised in such areas of the animal's body, which are preferred by the flies for sucking blood.
- (3) Anthrax bacilli are present in the cutaneous swellings and can easily be recovered.
- (4) Anthrax may assume a virulent epidemic form if it occurs at a season when *Tabanus* flies are active.

Acknowledgement

Our thanks are due to Dr. K. S. Shetty, G.M.V.C., Ph.D. (Edin.) Director of Animal Husbandry and Veterinary Services in Mysore, Bangalore, under whose direct supervision the investigations were carried out and control measures adopted, and for constant encouragement and permission to publish this article, and to Dr. V. P. Rao, M.A., D.Sc., Officer-in-charge of the Commonwealth Institute of Biological Control, Bangalore Centre, for kindly getting the flies identified.

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Clinical Articles

FURTHER RESULTS WITH SULPHAMEZATHINE IN RINDERPEST

By

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In continuation of my article on "sulphamezathine as a single injection cure in Rinderpest" published in November 1956 issue of the *Indian Veterinary Journal*, I wish to place on record my further observations on this subject after treating again a total of 156 clinically typical cases of Rinderpest from March to end of August 1957.

As compared to the incidence of Rinderpest recorded in 1956, the one recorded in 1957 was very severe. During the above period there were in all 16 outbreaks of Rinderpest recording 184 attacks and 35 deaths. As many as 7466 vaccinations were performed by freeze dried got tissue Rinderpest vaccine.

All 127 cattle and 29 buffaloes which were clinically Rinderpest affected cases recording a temperature range of 104° to 106°F, heavy ulceration of the dental pads, gums, lips and the tongue, with shooting diarrhoea and sometimes dysentery with foetid odour, extreme weakness etc. were treated by giving a single massive dose of 100 c.c. subcutaneously of sulphamezathine sodium solution 33.1/3% (I.C.I.) and

The response to the above line of treatment confirms these factors. Probably amelioration of the symptoms was due to the following reasons :—

(1) Calcium gluconate in massive doses acts as blood volume expander and thus overcomes circulatory failure, assists in clotting and helps in heat regulation.

(2) Vitamin C :—maintains the vascular frigidity and both have anti-anaphylactic action. And also aids fibrinogen synthesis 1957.

(3) Adrenalin :—A cardiac stimulant and raises blood pressure owing to its action on capillaries and thus promotes peripheral circulation.

(4) Chemotherapy with sulfamezathine to combat any latent infection. The above clinical observations made here tend to show that this treatment has some specific value.

Acknowledgment

I express my thanks to Shree R. N. Ganguli, District Animal Husbandry and Veterinary Officer for permitting me to publish the case records.

Abstracts

Canine Spirocercosis and Its Treatment with Special Reference to Trans-thoracic Surgery of the Oesophagus for Enucleation of the Parasitic Nodule.—By M. N. MENON, *Professor of Surgery, Madras Veterinary College.* Thesis approved for the award of the Fellowship Diploma of the Royal College of Veterinary Surgeons of the United Kingdom.

It is gratifying to note that the Royal College of Veterinary Surgeons of the United Kingdom awarded the Post-graduate Diploma of F. R. C. V. S. for the first time to an Indian national, who is a member of the staff of the Madras Veterinary College, for the work done at this College and its clinic. This award speaks very well of the Madras Veterinary College, where an appreciable number of members of our profession have worked and are working for post graduate research degrees of the Madras University.

This work which is of a pioneering nature, is a valuable contribution to Veterinary Science as it is an entirely new approach to the treatment of Canine Spirocercosis, a commonly encountered malady in dogs and considered hitherto as incurable.

The thesis consists of three parts besides the introductory chapter. In the introduction, the incidence of Spirocercosis in Madras City as

evidenced from among the dogs brought to the College clinic is indicated. Out of 861 post-mortems conducted on dogs during the ten year period from April 1946 to March 1956, 211 carcasses revealed the infection indicating an incidence of 24.51%.

In Part I, a chapter deals with epizootiology. The disease was most commonly found to manifest itself in adolescent dogs particularly the well-fed ones of the larger breeds. Clinical evidence of the infection from among 4,715 dogs admitted in the hospital during 1955—1956 was observed in the descending order in terrier types, Alsations, Cocker Spaniels, non-descripts and Dachshunds, the overall percentage working to 1.15% only. But of the 4,668 samples of faeces from adult dogs examined in the course of three years from April 1953, 199 samples (4.3%) proved positive for the ova. This figure could indicate only the open lesions involving the alimentary tract. The other chapter deals with pathogenesis, clinical signs and diagnostic methods. The location of the gross lesions in 247 dogs autopsied is tabulated. One hundred and ninety-four cases revealed lesions in the thoracic oesophagus alone, 47 in aorta and oesophagus, (3 in aorta alone and 1 in stomach and thoracic oesophagus) lumbar fascia over psoas magnus, and mediastinum respectively. A photograph reveals a lesion involving the left auricle. The observations indicated the thoracic portion of oesophagus usually the segment lying caudal to the level of the base of the heart as the most common site of infection. The lesions observed suggested the migration of the parasite from the aortic wall to the oesophagus by direct penetration of the intervening alveolar tissue. The macroscopic as well as the microscopic picture of the lesions and the clinical signs exhibited by the patients are described in detail. Besides faecal examination, screening and X-raying before and immediately after administration of shadow meal, endoscopic examination and as a last resort exploratory thoractomy are suggested for detecting the parasitic nodules in the oesophagus.

Part II deals with treatment. As treatment of Spirocercosis with salts of Diethylcarbamazine is purely palliative, the total surgical removal of the parasitic nodule was thought of and carried out successfully. Details about the surgical anatomy of the thorax and oesophagus, approach to the post-cardiac segment of the oesophagus through the right chest wall following the rib resection technique, partial oesophagotomy and the post-operative care are described. The author obtained complete success in a total of 12 such operations performed during the five year period, 1952—1956.

Part III contains reprints of four publications of the Professor, which appeared in this journal (*I. V. J.*, 29, 377, 537; 31, 63; 32, 295),

three of which pertain to the subject of the thesis while the fourth deals with exploratory laparotomy in porcine surgery.

V. S. A.

Johne's Disease of Cattle and Sheep in New Zealand.—BY R. A. CHANDLER, B.Sc., Ph.D., F.R.C.V.S., *The British Veterinary Journal*, Vol. 114, No. 1, January 1958.

Johne's disease of both cattle and sheep exists in New Zealand. The disease in cattle is considered of major importance; the disease in sheep has so far resulted in a few losses but it constitutes a potential menace to the sheep industry. Diagnosis is based on symptoms, history and a complement-fixation test. Confirmatory diagnosis is made by post-mortem examination. The presence of an appreciable number of "acid-fast" bacilli in the smears of faeces and of ileo-caecal and other intestinal specimens is one of the most reliable indications of the existence of the disease. Johnin has been used as a diagnostic agent, but opinions differ as to its value. The use of the Hole Complement-fixation test has been investigated. The results confirm the value of the test and show it to be one of the best available for Johne's disease in its clinical stages. A micro complement-fixation test has been developed which offers advantages over the Hole test in respect of technique and economy of technical staff. Results obtained with this microtest compare very well with those of the Hole test and it has been adopted as the routine test in New Zealand. The treatment of Johne's disease is uncertain. Several antibiotics were used *in vitro* and *in vivo* without any effective result. Palliative treatment with intestinal astringents has been undertaken in New Zealand, but it did not retard the clinical progress of the disease. Control of the disease has been the subject of a field vaccine trial over a period of years. The vaccine, in question, was the same as evolved by Vallee and Rinjard. Vaccination has resulted in elimination of clinical cases of the disease on the farms concerned, and appears to be the best method of control available. Extension of the use of the vaccine is desirable but its effect on any subsequent tuberculosis eradication scheme must be considered, since vaccinated Cattle react to the tuberculin test.

The first case of the disease in sheep was first confirmed in 1952. Since that date the disease has been confirmed on 15 properties. There is no evidence that the disease has appeared suddenly in those areas. A study of Johne's disease in sheep in New Zealand further reveals that mortality is low, the disease occurring mainly in breeding ewes. The symptom of diarrhoea is not commonly seen, but emaciation is marked and the disease is fatal. Diagnosis in life is based on history, symptoms, examination of the faeces and the micro complement-fixation test. Vaccines are being studied and a trial begun on an affected property.

A. MUKERJI.

Anaesthesia and Narcosis in the Horse:—BY J. G. WRIGHT, (*Vet. Record* Vol. 70, No. 16).

Prof. J. G. Wright, delivering a lecture on Anaesthesia and Narcosis in the Horse, at the Royal Veterinary College, under the auspices of the University of London, has summed up his views as follows:—

1. The most satisfactory method we possess for inducing deep narcosis and light general anaesthesia in the horse is chloral hydrate administered by slow intravenous injection.

2. For deepening the induction anaesthesia and its maintenance for prolonged interferences, an ultrashort or short-acting barbiturate is preferred to inhalation anaesthetics.

3. Whenever possible the horse is cast and restrained before administration so that injection shall be precise and the degree of narcosis assessed as administration proceeds. An efficient casting team is essential.

4. The method has two main disadvantages; the first that great technical care is necessary during injection and secondly, the recovery rate is relatively slow.

5. In regard to chlorpromazine hydrochloride, the place it has in equine surgery is not established. Its use can be associated with danger to the animal.

6. In the present state of knowledge regarding the assessment of depths of narcosis and anaesthesia in the horse I would view the introduction of muscle paralysing agents into horse surgery with grave misgiving.

Beta-Ray Therapy in Veterinary Practice:—BY P. J. DALTON, *The Vet. Record*, Vol. 70, No. 11, P. 233.

Limitations of X-ray therapy in large animal practice are (1) Size and restricted mobility of machine (2) Dependence upon appropriate supply of electricity (3) Recourse to general anaesthesia to restrain the patient (4) Precautions to be taken to protect the operator and (5) Difficulty of delivering correct dosage to the eye and the environs.

With the advent of radio active substances which emit beta-rays this kind of therapy may become the treatment of choice in certain cases. Strontium-90 and radio active phosphorus appear to emit the desired type of rays to produce radiobiological changes. They are highly useful in lesions not more than 3 m.m. thick. Emitter can be held to a close distance from the lesion. Author has found 2000-6000 rad at 3-7 days interval useful. American workers favour doses in the

region of 20,000 rad at a single application. Beneficial results are manifest in 7-10 days. Tissues with cells less differentiated and more rapidly dividing are more likely to be radio sensitive.

M. S. J.

News and Views

Sri K. Kandaswami Raju, G.M.V.C., A.I.D.I.:—Superintendent, Livestock Research Station, Hosur, Madras State, has been selected and sent on deputation for advanced dairy training in Denmark and other European countries under a F.A.O. fellowship. He left Madras on the 2nd June 1958 and will be away for about four months. We are sure he will come back greatly benefitted to continue his good work at Hosur. We wish him bon-voyage and safe return!

The Indian Science Congress:—The 46th session of the Indian Science Congress is scheduled to meet in Delhi from January 21 to 28, 1959. The Duke of Edinburgh will be one of the distinguished participants as the representative of the British Association for the advancement of Science. Dr. A. Lakshmanaswamy Mudaliar, Vice-Chancellor of the Madras University will preside. Let members of the Veterinary profession muster strong at the Congress.

Two more Fish Farms for Madras:—The Government has approved a scheme to start two more fish farms, one in Sathanur Reservoir in North Arcot District, and the other in Manimuthar Reservoir in Tirunelveli District. The work of stocking these reservoirs with *Tilapia* has already been commenced. From these farms, *Tilapias* will be sent to the smaller tanks and lakes in Municipal and other areas for breeding purposes.

The Mail, dated 26th May 1958.

The Common Carp, a prolific breeder like the *Tilapia*, first obtained from Bangkok and now grown in Bhavanisagar Fish Farm, will be ready for distribution for breeding purposes in other fish farms in the State early next year, as they are expected to reach the adult stage then.

Improvement of Livestock:—The State Livestock Development Board, Madras has, at its last meeting, accepted in principle that intensive schemes be drawn up for improving livestock in the first instance in the Block Development areas.

In accordance with the above it has recommended that schemes be chalked out for the purpose under three heads: Firstly to grow

fodder, secondly to provide sheds both for milking and for maintenance of cattle under hygienic conditions with copious water supply and lastly to establish a unit for the supply of a balanced concentrated feed. It is estimated that each of these units would roughly cost Rs. 30,000.

Details in regard to the blocks which should be chosen for this purpose are, it is stated, being worked out. The intention appears to be that, to start with, twelve block areas, are to be chosen.

A Press release dated 27th May 1958.

A Gem of an advice:—Presiding over a Co-operative function recently at Vellore, Dr. Radakrishnan gave expression to an advice, which India of to-day, has reason to particularly remember and follow. He said "Great nations are never built out of small men. It is big men, not in size or wealth, but big in heart, character and outlook, it is such people who can build up a nation."

You have to-day a great leader, acting as Prime Minister of our country, full of enthusiasm and dedication to selfless work. If ever there is an emancipated man, free from all prejudices of caste and community, race and religion, province and language, he is there, the symbol of the hope of this country.

Even he with all his great qualities of leadership had to admit that the way in which things have drifted was not very appealing to him and he felt suffocated. He proclaimed his sorrow and appealed to the people at large that the task awaiting is a great one and if we do not devote our energies we could not achieve the goal.

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falling in line with the experience of more successful dairy-men in the world? It is a discipline by itself and if you cannot start practising it in a Block Development area, where else could you do it?

It was in January, 1956, we set apart a section of this *Journal* for some form of National Extension Service on Animal Husbandry matters, to be of benefit to Village level workers and rural folk, and called it the "Block Development Corner". We wrote then that "we invite articles to this section, more particularly from workers in that field. Short reports on the plan of work proposed and pursued at State-level will be helpful to exchange notes between workers in several States". The response so far has been very disappointing. We made it clear that "to the extent this co-operation is forthcoming, this section will be kept open, in spite of great pressure on our space". The pressure is now ever on the increase, in spite of our converting the *Journal* into a monthly. The question that naturally faces us to-day is whether to keep the B.D.C. going.

Even a short account of work that is done at each development centre, with regard to livestock improvement, dairying, sheep-development, goat-rearing, poultrying, duck rearing, fodder growing, etc., may throw out some new ideas to others. The Animal Husbandry workers at all such centres should immediately seek the permission of the authorities concerned to publish such articles. We do not expect that anybody will decline permission for such a national piece of work. As we stipulated before, the articles should be "extremely concise, precise, purposeful and easily intelligible to village level workers and rural folk". We appeal once again to all those interested in the great plan of national development to make the utmost use of this section. We intend watching and waiting till the end of this year and then taking a final decision.

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The All-India Veterinary Association

THE RESERVE FUND

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

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

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

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

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

Jai Hind!

T. VINAYAKA MUDALIAR,
Editor,
The Indian Veterinary Journal,
and
General Secretary, A.I.V.A.

Block Development Corner

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

MILK RECORDING — A MEANS TO AN END

By

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

Retired Livestock Development Officer, Government of Madras.

Milk-recording is a term, which you very often hear in connection with dairying. It is nothing but the simple process of weighing out daily (not measuring), the morning and evening milk yields of individual cows, giving each one of them a number or a name and recording their performance, in the course of a lactation or over a given period. Such recording could also be done periodically, say once a week or twice a month and striking out the average. But daily recording would naturally be more accurate.

Perhaps, milk recording has failed to catch your imagination, as it merely records what is already an accomplished fact and does not in any way contribute towards any *immediate* increase of the precious fluid in the pail! Further it involves extra labour and time, which you feel you can ill-afford to spare in your low economic position of to-day. I quite well understand your view point. But you are out to improve your economic lot in every possible way, under our National plans, so that your sons and grand-sons may have happier and more prosperous days and the country as a whole may stand to benefit.

Milk-recording is only a means to an end and as such you cannot expect it to be either spectacular or of immediate benefit. The end will more than justify the time and trouble involved. It is the experience of better developed countries, that milk-recording is a powerful weapon in the armoury of a dairy-man to bring about rapid development of dairy industry. Let us see how this is brought about.

To build up any successful industry, it is essential to first look to the economy of production. Dairy industry is no exception to this golden rule. You must have an eye on the cost of production of milk. You cannot be loosing all the while by keeping un-economic cows. The only way to know this is to record the milk-yield of individual cows. There are other reasons as well, equally valid, besides this commercial view-point of profit and loss. I shall come to these presently.

So you must know your cows that produce for profit and those which are a drag on your already all too slender resources. Armed with this knowledge, you can plan for increased production on scientific lines and watch the results of your efforts. The only yard stick to assess the success of your efforts is, milk-recording. What are those efforts which you will adopt to stimulate increased production? You will start feeding them *adequately* on the basis of their production with a well-balanced ration. You have been told in an earlier article that a cow needs a *maintenance* ration of three pounds of concentrates and a *production* ration of one pound of concentrates for every three pounds of milk produced. How are you to compute this correctly if you are not going to do milk-recording? This is therefore a first step at increased production of milk. You have to feed adequately to produce sufficiently. There is no other short-cut. By adopting this simple method you increase your milk production by fifty to sixty percent, even with your present lot of cows. What more, you avoid possible wastage of food on uneconomic cows and thus save your hard-earned money. How are you to know all these and understand the value of correct feeding without recording the milk yield?

Next, milk-record serves as an index between your high grade cows and low grade cows. It forms the basis for selective breeding (which I had explained in a previous article) with regard to milk character. By mating the best to the best, from two or three different lines or families, you soon find your milk production shooting up higher and higher with every succeeding generation of cows. Thus it will be seen that milk-recording regulates the breeding policy of your stock to bring about rapid improvement. Also, it will help you to study seasonal variations in milk-yield and variations from lactation to lactation, total lactation yields or annual yields and thus arm you sufficiently like a good dairy-man to build up your dairy industry without any fear of dislocation.

Besides, milk recording helps you to sell your good cows at a great premium and to get them registered easily in a herd-book, when one is opened.

Further, any sudden drop in the yield will put you on the guard against any possible disease lurking in the herd and thus make you take necessary precautions.

You may turn round and say I know my good cows from bad ones without any such record. But your knowledge at best could only be a guess-work, without proper statistical basis for it. Is there any harm in trying to regularise your knowledge on scientific basis and

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THE WEST BENGAL VETERINARY ASSOCIATION

Proceedings of the meeting of the Executive Committee held on 18-5-58

A meeting of the Executive Committee of the West Bengal Veterinary Association was held on 18-5-58 at 14/B Balaram Ghosh Street, with Dr. S. L. Sen in the chair. The following resolutions were adopted :—

1. Resolved that the 'Alumni Bulletin' should be the mouth-piece of the West Bengal Veterinary Association and the Alumni Association of the College. The question of publication of a journal will be considered when the preliminaries for the journal are finalised.

2. The proposal of the amalgamation of Veterinary and Livestock work was placed before the members along with a copy of the editorial of the *Indian Veterinary Journal*, May 1958 issue and it was resolved to convey the warm feelings of the Members to the Editor for writing the editorial on a problem that has baffled the progress of the State for the last few years.

It was also resolved that the attention of the State Government be invited to the editorial comments on the subject as the Government appear to have agreed in principle from the way they have given the designation of Director of Veterinary Services and Animal Husbandry. The designation may imply that the two departments have already been amalgamated; but livestock department is still functioning absolutely separately under a separate directorate. It is requested that the Government may take up the matter as suggested in the editorial.

3. The members of the West Bengal Veterinary Association note with great anxiety the recent advertisements of West Bengal Public Service Commission for gazetted posts in Veterinary Directorate, in which the M.R.C.V.S. and the Degree in Veterinary Science have been declared as essential qualifications. This has debarred the Indian Diploma holders, having specialised post-graduate diploma or training in special subjects with age old experience to their credit. The members refer to the advertisement of the Union Public Service Commission (Advertisement No. 20 dated 17-5-58) where degree or diploma of an Indian University or a recognised institution has been equated together,

for posts of Professors (Central class I) and Lecturers (class II) for the Post-graduate College of Veterinary Science. This clearly indicates that it is the policy of the U.P.S.C. to broad-base such competition from all sections of Veterinarians with the object of selecting the best and the fittest. Contrary to this policy, the West Bengal Public Service Commission have restricted such scope for competing freely to higher posts. It was also resolved that the above facts be immediately brought to the notice of the W.B.P.S.C., the U.P.S.C., the State Government and the Government of India.

4. Resolved that the Government be requested to revise the age limit for service for the Veterinary Graduates of the Bengal Veterinary College and the representation sent by the Honorary Secretary to this effect, is unanimously approved.

5. Resolved that the Government be requested to reconsider the decision of shifting the Bengal Veterinary College from its present place to Haringhata, as in the opinion of the members, the interest of Veterinary Education will not be served properly by such an action. The members feel that the issue is not merely an administrative convenience but is also predominantly a matter of public interest. The Association is always at the service of the Government to convince the Government on this vital subject.

Calcutta,)
18-5-58.) ANUPAM CHATTERJEE,
Honorary Secretary.

S. L. SEN,
President.

**Proceedings of the meeting of the Executive Committee,
Bengal Veterinary College Alumni Association held on 17-5-58,
with Dr. M. R. Ghosh in the chair.**

Resolved that the Vice-chancellor of the Calcutta University be requested to take steps to start a condensed B.V.Sc., course at the Bengal Veterinary College as early as possible. The Bengal Veterinary College being one of the oldest of Veterinary Colleges in India, has produced a large number of Veterinary Graduates who are serving in different States in India and in Far-Eastern countries. These Diploma holders and their respective Governments are anxious to have them duly qualified with a degree in Veterinary Science, as otherwise these people are unnecessarily victimised in All-India competitions for no fault of theirs.

The meeting dissolved with a vote of thanks to the chair.

A. CHATTERJEE,
General Secretary.

Reviews

Bergey's Manual of Determinative Bacteriology.—By Robert S. Breed, E. G. D. Murray and Nathan R. Smith. Seventh Edition. 1957. Price. Publishers: Messrs. Bailliere, Tindall & Cox, Ltd., London. W. C. 2.

The Seventh Edition of Bergey's Manual of Determinative Bacteriology is definitely an improvement on the previous edition and is undoubtedly a valuable addition to the field of microbiology. A welcome change is the separation of the material into two volumes—one volume containing an outlined classification of micro-organisms adequately studied and described, with the appropriate keys and the other, dealing with micro-organisms not adequately described and not definitely classified. It is thus a very handy and useful volume.

The revised international code of nomenclature of bacteria and viruses has been strictly followed in the classification of micro-organisms. The publication is indeed timely, coming as it does at a time when there is a good deal controversy regarding classification of micro-organisms. Eminent workers from various countries have contributed to this volume and thus have enhanced the value and prestige of the book.

The natural key has been prepared with great thoroughness and care. An artificial key at the end is a welcome addition and should certainly prove helpful.

B. N. RAI.

Joint FAO/WHO Expert Committee on Milk Hygiene—First Report.—
Issued as WHO Technical Report Series No. 124—pages 54.

As is the case with all FAO publications, this brochure is a remarkable condensation of all aspects of the 'Milk trade' from its place of production to that of its distribution and consumption. It is concise and yet comprehensive, including such cognate subjects as administrative set-up and legislative measures required, etc. A plan for future co-ordinated research by FAO and WHO, is also indicated.

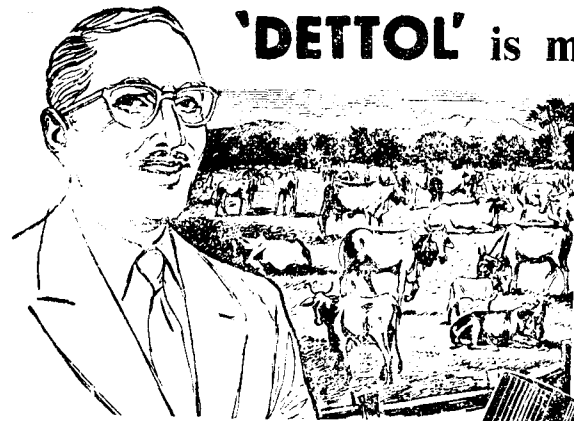
Bringing to bear a practical approach to the subject and taking due cognisance of the conditions prevailing in economically backward countries, the report should prove of great value to those countries in all its discussions and recommendations, more particularly at a time when several countries have on the anvil schemes for better milk production both in quality and quantity.

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M. S. J.

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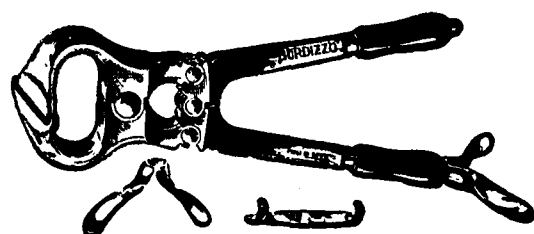
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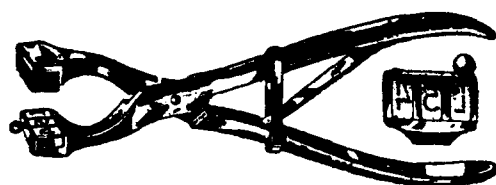
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