the filter were washed off into a quantity of sterilised water, equal in amount to the broth of the culture taken. The suspension was heated at 60° C. for thirty minutes. Rabbits were inoculated as follows:

No.	Weight.
1 ...	1,750 grams inoculated with 3 c.cm. filtrate.
2 ...	1,150 " " " 3 " " suspension.
3 ...	1,150 " " " 3 " " " "
4 ...	1,610 " " " 3 " " " "
5 ...	1,150 " " " 0.75 " filtrate, 0.75 c.cm. suspension.
6 ...	1,150 " " " 0.75 " " 0.75 " " "

Immediately after they were inoculated in the other flank with $\frac{1}{2}$ of a suspension of a 3-days-old agar culture of plague obtained from the same broth culture. Two controls were also inoculated with the same quantity of the living culture alone. The controls both died, one in forty-eight hours, the other in three to four days; a large number of bacilli were found in the heart blood.

Nos. 1 and 2 both survived, but No. 1 was ill for six days.

No. 3 died in three days, but very few bacilli were found in the heart blood, either by the microscope or by cultivation.

No. 4 survived.

No. 5 died in forty-nine hours, but no plague microbes were found in the heart blood, so it cannot be said to have died of plague.

No. 6 survived.

It appears from this experiment that the filtrate alone conferred power to prevent or to modify an attack of plague; rabbit No. 1 probably had plague, but survived.

The suspension of sterilised microbes seems to have conferred bactericidal properties, for the blood of the rabbit No. 3 contained few bacilli compared to that of the controls.

The mixture of filtrate and suspension of sterilised microbes protected rabbits Nos. 5 and 6 from plague infection, for no plague bacilli were found in the blood of rabbit No. 5. The dose of the mixture was equivalent to 0.75 c.cm. of culture; this dose was taken, and not 1.5 c.cm., as appeared from the first experiments to be required, because in this last experiment older, and therefore stronger, culture was used.

Lustig and Galeotti² state that the immunising property is a nucleo-proteid contained in the bodies of the microbes, and that if Haffkine's prophylactic has any immunising property, it is due to the nucleo-proteid dissolved or still contained in the bodies of the microbe. But this would not obtain in the above experiments, for the cultures were made in slightly acid broth—that is, ordinary beef broth without the addition of an alkali, so the nucleo-proteid would not be dissolved. Moreover, the cultures used were young and the microbes probably all living and not in a state to give up their nucleo-proteid.

These observers advocate a prophylactic made of a solution of the nucleo-proteid obtained from microbes grown on solid media, and they say that Haffkine concurred with their view when he tried to test the strength of his liquid by the quantity of deposit produced in the cultures. This no doubt is so, for inasmuch as the bactericidal property is conferred by substances contained in the dead bodies of the microbes, he naturally tests the strength of the prophylactic by the amount of deposit. The primary object is to produce a prophylactic substance, but Haffkine, on theoretical grounds, thought the supernatant fluid, by virtue of the toxins, conferred power to withstand the toxins formed if the persons did contract plague after being inoculated—that is to say, it reduced the case mortality; for these reasons he preferred to keep the supernatant fluid in his prophylactic.

The foregoing results show experimental confirmation of the theory. I recognise that many more observations should be made. I used up all the rabbits procurable in Bombay at the time, and was unable to obtain any more, but I hear that these experiments have subsequently been repeated and confirmed by Captain Milne, I.M.S., at the same laboratory.

REFERENCES.

¹ A Discourse on Preventive Inoculation. Delivered at the Royal Society, Sweden, on June 8th, 1899, by W. M. Haffkine, C.I.E. ² BRITISH MEDICAL JOURNAL, February 10th, 1900.

SOCIETY OF AMERICAN BACTERIOLOGISTS.—A society of American bacteriologists has recently been formed, and held its first annual meeting at New Haven in December last in connection with the meeting of the American Society of Naturalists and Affiliated Societies. Over thirty bacteriologists from various parts of the United States were present, and twenty-six papers were read. Professor W. T. Sedgwick, of the Massachusetts Institute of Technology, was elected President, and Professor Conn, of Wesleyan University, Secretary and Treasurer for the ensuing year.

A CONTRIBUTION TO THE STUDY OF THE PITUITARY BODY.

BY
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[From the Physiological Laboratory, University College, London.]

(PRELIMINARY COMMUNICATION.)

OLIVER and SCHÄFER¹ found that a saline decoction of the pituitary body of the sheep produces a marked rise of blood pressure when intravenously injected. Howell² observed that this effect is due solely to the infundibular portion of the body. He noted also that the result of one dose is to diminish, or even annul, the action of a second, unless a considerable time be allowed to elapse. He concluded that the active substance of the infundibular part of the pituitary body was not derived from the grey matter of the organ.

Schäfer and Vincent³ describe both a pressor and a depressor substance. The pressor substance is soluble in salt solution, insoluble in alcohol and ether. The depressor substance is soluble in salt solution, in absolute alcohol, and in ether. An alcoholic extract, therefore, would contain only the depressor substance. The active substances are not destroyed by boiling, and can diffuse through parchment paper. The results of injection as observed by Schäfer and Vincent are that the first dose gives a marked elevation of the blood pressure, while subsequent doses produce a fall. This fall (due to the depressor substance) is evanescent, and can be repeated at frequent intervals, the pressor effect, on the contrary, being produced only by the first administration. The work of Schäfer and Vincent was performed with material taken from the ox, and the animals used for experiment were cats.⁴

Our own investigations upon the pituitary body have been performed, as were those of Schäfer and Vincent, with ox material, but we have employed dogs and rabbits for purposes of experiment. Our results have been in the main confirmatory of those obtained by the above-mentioned observers,⁵ and we are able to add some facts in regard to the histological, chemical, and comparative physiological aspects of the question.

1. Since a saline decoction contains both the pressor and the depressor substances, we have chosen it as the starting point for further research. If this saline decoction be treated with excess of alcohol, a precipitate forms which contains nitrogen, is evidently proteid in nature, and cannot be redissolved in saline. The alcoholic filtrate from this precipitate evaporated *in vacuo* to dryness yields a residue soluble in ether, and which in saline solution produces marked depressor effects only. If our saline decoction of infundibular pituitary be half saturated with ammonium sulphate, a flocculent precipitate falls. This precipitate may be freed from ammonium sulphate by dialysis, and presents the appearance of a proteid body which is insoluble in distilled water, but soluble to a moderate extent in normal saline 0.9 per cent. This latter solution, when injected intravenously, produces only marked pressor effects of a lasting character.

2. We find that saline decoction of the pituitary body of teleostean fishes (*Gadus morrhua* and other species) produce effects identical with those obtained with mammalian gland, namely, a marked rise on the first injection, and a distinct fall on subsequent injections. This renders it probable that the pituitary body is functionally the same throughout the vertebrate kingdom.

3. The infundibular part of the pituitary being presumably nervous in structure, it may naturally be asked if any of the above-described effects can be produced by similar extracts of nervous tissues generally. We have devoted considerable attention to this part of the subject. Briefly, our conclusions are that all parts of the nervous system, but especially grey matter of brain, produce depressor effects which are not abolished by section of both vagi. We believe that the depressor substance in these tissues is not choline. The results were obtained with decoctions from material absolutely fresh, in some cases practically living; no pressor effects were ever obtained from these nervous extracts. Is, however, the depressor effect of pituitary due to the presence of nervous

matter? This point must at present remain undecided, though there is a distinct difference in the nature of the curve obtained by the two substances.⁶

4. The extracts used in our experiments have been prepared from the infundibular portion of the ox pituitary, since it has been fully established that the hypophysis proper is inactive.⁷

In the ox this infundibular portion appears to be separated from the hypophysis by an interspace, which is, however, as will be clear from what immediately follows, nothing more than a cleft in the hypophysial portion. Even to the naked eye the infundibular portion in the ox may be seen to consist of two distinct parts, an outer yellowish layer and an inner redder core. It has occurred to us to test the activity of each of these portions separately, and we find that an extract from the central part is much more active than one from the peripheral.⁸ Probably the external layer would be found to be inactive if it could be obtained quite free from admixture with the central portion.

5. On microscopical examination it is clear that this peripheral layer of the infundibular part is of a glandular nature,⁹ resembling the hypophysial portion of the organ. In some animals, notably the dog, we have been able to satisfy ourselves that it is nothing more than a reflection of the hypophysis over the infundibular part, as in many of our sections these two portions are confluent. In other animals—for example, sheep—the hypophysial and infundibular portions are in direct contact with each other, no cleft in the glandular portion being observable.

6. The infundibular portion of the gland has been described as possessing the histological features of grey nervous matter. Kölliker¹⁰ speaks very doubtfully about the matter, even the results of investigation by the silver chromate method. We have so far been able to detect only very few undoubted nerve cells in the infundibular part of the pituitary.¹¹

NOTES AND REFERENCES.

¹ *Journ. of Physiol.*, xviii, 1895. ² *Journ. Exp. Medicine*, iii, 1893. ³ *Proc. Physiol. Soc.*, March 18th, 1899, in *Journ. of Physiol.*, xxiv, 1899, p. 19, and in *Journ. of Physiol.*, xxv, No. 1, September 18th, 1899. See also *Brit. Assoc. Reports*, Dover, 1899. ⁴ *Cf. Cyon (Pflügers Archiv*, lxxi, 1898) also *ibid.*, lxii, 1898. Biedl and Reiner, *Pflüger's Archiv*, lxxiii, 1898. Cleghorn, *Amer. Journ. of Physiol.*, ii, 1899. ⁵ There is one difference which appears to be due to idiosyncrasy on the part of the animals employed for experiment. The fall of pressure on repeating the injection is not mentioned by Howell, although he obtained almost constantly in the dog a preliminary fall as the result of the first injection. Schäfer and Vincent did not find this in their experiments, which were nearly all performed upon the cat. The present authors have frequently observed the preliminary fall in dogs described by Howell, but have also in most cases obtained a pure fall on a subsequent injection. ⁶ See Howell also Schäfer and Vincent, *loc. cit.* ⁷ This is contrary to what we had expected, as we can find no glandular-looking cells in the central portion. Those noted by Schäfer and Vincent (*loc. cit.*) were in the outer layer. ⁸ Schäfer and Vincent (*loc. cit.*) have shown that the depressor substance of pituitary is not choline. ⁹ *Cf. Berkley, Brain*, 17, 1894. ¹⁰ *Genebelehre des Menschen*, ii, Sechste Aufl. 1896. ¹¹ We have, however, so far not employed any special methods for demonstrating nerve cells.

ABSTRACTS OF

THE ARRIS AND GALE LECTURES

ON

THE ANATOMY AND PATHOLOGY OF THE RARER FORMS OF HERNIA.

Delivered before the Royal College of Surgeons of England.

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LECTURE II. ENCYSTED HERNIA.

MR. PRESIDENT AND GENTLEMEN,—The term “encysted hernia” is one which for well-nigh a century has been the subject of abuse. There has long been, and there still continues to be, much difference of opinion as to the most apt and appropriate names for some of the less common forms of hernia. The term “infantile,” introduced in the year 1803 by the first William Hey of Leeds for a certain condition of hernia which it in no sense accurately described, has recently been appropriated by Lockwood for that variety of hernia in which a separate peritoneal pouch is dragged down into the scrotum,

probably by an aberrant attachment of the gubernaculum. The majority of surgeons who have written since Lockwood's admirable work was published have accepted, unhesitatingly and with complete accord, his description of that hernia and his restrictive adoption of the term “infantile” for it.

I propose to retain the term “encysted,” which is strikingly appropriate for that variety of hernia which Hey described and figured, and which Cooper subsequently verified. I would define encysted hernia, therefore, as that form of hernia in which the sac, with its contents, wholly covered on the outer side by a reflected layer of serous membrane, hangs downwards from the internal ring in the cavity of the processus vaginalis. The portion of the processus vaginalis containing the hernia may be the whole as far upward as the internal abdominal ring, or may be only the upper portion, that lying in the inguinal canal, along the cord; the lower portion, tunica vaginalis, having in this case been shut off by the ordinary fusion process occurring at the upper end of the testicle.

This form of hernia, from some misconception which I do not understand, has not received adequate recognition from the later English authorities. Macready, in his work on *Ruptures*, mentions encysted hernia only in a footnote, which is very brief, but is at least of sufficient length to show that he does not appreciate this variety. Lockwood, who has contributed by far the best work on hernia of any English authority of recent years, in defining and describing “infantile” hernia, has overstepped, as I think, the very definite boundary between infantile and encysted hernia, and has made an attempt to include some of the latter among examples of the former.

Birkett, in his article in Holmes's *System*, gives a good account, based upon Forster's observations, of one form of this hernia. Other authorities either ignore the subject or quote without question the work of one or other of the writers I have named.

HISTORY.

The first case of this kind is probably that which occurred to Méry at the Hôtel Dieu in 1701. Forster's case, recorded in Sir A. Cooper's work, is described as follows:

A shoemaker, aged 31 years, who died of strangulated hernia. On dissection, the following were the appearances: When the scrotum was divided the tumour was brought in view, taking the course of the spermatic cord, evidently involved with it, and much contracted at the ring. On investigating further and cutting carefully through the tunica vaginalis of the cord near the ring, a fluid escaped. I then continued the incision to the bottom of the scrotum, through the tunica vaginalis of the cord and the tunica vaginalis testis, which I now found to be one cavity, the edges of which, being turned back on either side, exposed a hernial sac pendulous from the ring and descending towards the testicle. From this it evidently appeared that the hernial sac and its contents were contained in the tunica vaginalis of the spermatic cord, which formed only one cavity up to the ring. On opening the hernial sac, it was found to contain a portion of small intestine, of a claret colour and in a mortified state.

At Hey's request the specimen from this case was examined by Sir A. Cooper and Mr. J. Pearson, and the following was their report:

In consequence of Mr. Hey having expressed a wish that the encysted hernia of the tunica vaginalis taken from a patient of Mr. Forster's in Guy's Hospital, and preserved in the Museum of St. Thomas's Hospital should be carefully examined,

We, the undersigned, have inspected the preparation above mentioned with much care, and the result of our inquiry is:

1. That the bag in which the intestine is incarcerated hangs within the tunica vaginalis testis, and reaches nearly to the superior edge of the epididymis.
2. The only connection which this bag has with the tunica vaginalis is at its orifice, at which part it adheres firmly to the tunica vaginalis.
3. From this adhering portion the bag hangs like a pear depending from its stalk, within the tunica vaginalis.
4. The tunica vaginalis forms a smooth unbroken surface, as usual.

We are, etc.

(Signed) ASTLEY COOPER.
JOHN PEARSON.

Dupuytren and Aston Key also wrote of this hernia, but little or no advance was subsequently made until the appearance in 1865 of an important monograph by Bourguet, of Aix. Other writers have added one or more cases occurring under their observation. Among these are Berger, Monod, and Terrillon, D'Arcy Power, Heaton, and Selcke. There can, I take it, be little doubt that there has been considerable confusion in the description of cases as being “encysted.” Many cases of hernia in association with hydrocele of the tunica vaginalis have been included under a misap-