

two muscles, viz., the *flexor brevis annularis* and the *flexor brevis medii*. Transverse sections of the ligament render this very evident.

In the suspensory ligament of the ox a considerable amount of muscular tissue is found upon both surfaces, and the transverse sections show that this penetrates into its substance in the form of four circular outlines which lie side by side. The fleshy fibres are more abundant than in the case of the horse, but still a considerable amount of fatty tissue enters into the construction of the outlines, and in this are placed nerves and blood-vessels. These four outlines are the remains of the four fleshy bellies of the two flexores breves which amalgamate and transform so as to constitute the ligament.

In the sheep not a trace of muscular tissue is to be found, either on the surface or in the interior of the ligament. The four circular outlines are seen on transverse section, however, but they are entirely formed of fatty tissue. What is of peculiar interest in this case is that in this fat the nerves and blood-vessels are still present.

The camel which the author had an opportunity of examining was a very young specimen, and its foot had been prepared by a fine gelatine and carmine injection. This in some measure obscured the intimate structure of the suspensory ligament. Not a trace of muscular tissue or fatty tissue could be detected either on its surface or in its substance. So complete was its transformation that not a single clue to its origin could be discovered. It is quite possible however that in a fresh uninjected specimen traces might be detected.

The suspensory ligament in these animals has undoubtedly been called into existence by the need for such a structure in the foot, and by the comparatively small value of the intrinsic muscles from which it is developed. The intrinsic muscles of the hand and foot have as their function the production of the more rapid and precise movements of the digits. In the animals which possess a suspensory ligament such a function is of no importance, whereas a powerful brace to provide against over-extension at the metatarso-phalangeal joints is an absolute essential.

But the study of the suspensory ligament of the fetlock suggests other interesting points: 1. The process of transformation of muscle to ligament appears to be effected by a fatty degeneration of the muscular fibres with a coincident multiplication of the connective tissue elements. Here, therefore, is what is usually regarded a pathological change assisting a morphological process. 2. The nerves of supply to the muscles are apparently unaffected by the change. In the sheep, in which there is not a trace of muscular tissue, they are seen in the substance of the ligament of a size relatively as great as in the ox or horse. 3. The presence of muscular tissue, where from its small amount it cannot possibly exercise any appreciable function, is peculiar. To account for its continuous existence we must of course suppose that it remains in a state of tonic contraction. The continuance of nerves in the ligament will enable it to maintain this condition.

SOCIETIES AND ACADEMIES
PARIS

Academy of Sciences, September 12.—M. Wurtz in the chair.—The following papers were read:—Remarks on a memoir of MM. Lœwy and Perigaud on flexure of telescopes, by M. Villarceau.—On the comparative qualities of water of the Isère and of the Durance, as regards irrigation and provision of soil, by M. de Gasparin. He compared the constitution of the liquids at points where all the affluents were united, and at different epochs. The two rivers are closely alike as to the quality of the slime they deposit, that of the Isère being only a little more argillaceous (which slightly favours the state of suspension). Now the Durance is largely utilised for irrigation, and enriches the departments of Bouches-du-Rhône and Vaucluse especially with fertile soil; and it is suggested that a like benefit should be derived from the Isère, in Isère and Drôme.—On a new mode of exploitation of mines of sulphur, by MM. de la Tour du Breuil. They apply the principle of raising the boiling point of water by means of a dissolved salt. Chloride of calcium is so used; the bath containing 66 per cent. of it. The apparatus consists of two rectangular vessels coupled and inclined. When the operation is terminated in one, the boiling liquid is directed into the other, which is previously filled with ore. While liqutation is going on (which takes about two hours) the first vessel is emptied and re-charged. One furnace suffices. The sulphur produced

is very cheap (about five francs a ton) and pure. Fusion is possible all the year, as no sulphurous acid is produced; and the extraction is very complete.—The Secretary called attention to the subscription opened for a statue to Lakanal at Foix (Ariège).—On radiophony produced by lampblack, by M. Mercadier. Not only is lampblack the best thermophonic agent at present, but it is susceptible, like selenium, of playing the rôle of the electric photophone. Instead of selenising one of the faces of his metallic double-spiral receivers, M. Mercadier covers it with lampblack, and they give good effects with intermittent solar, electric-light, and even gas, radiations. When exposed in dark to a copper plate gradually heated with an oxyhydrogen blowpipe, no sound is heard in the telephone till the plate is raised to a dull red; then it gradually increases in intensity. The author is disposed to consider the phenomenon *photophonic* rather than *actinophonic*. The resistance of these receivers diminishes as the temperature rises (from 2° or 3° to 50°), and the variation (very small) is represented nearly by a straight line.—Explanation of a contrast in double circular refraction, by M. Croullebois.—On the magnetic metals, by M. Gaiffe. He experimented with nickel and cobalt, obtained electro-chemically and variously treated before magnetising; some bars being kept hard, others annealed, and others annealed and forged. The figures show what a comparatively great coercitive force these metals (and especially cobalt), may acquire in a pure state, while pure iron, obtained by the same means, gives inappreciable deflections in the magnetometer. The annealed and forged samples produced the greatest effects (the annealed coming next). The weak coercitive force of the metals on issuing from the galvanoplastic bath, is attributed to the presence of hydrogen in combination with them.—On metaldehyde, by MM. Henriot and Oeconomides.—On the rotatory power of albuminoid substances of blood-serum, and their determination by circumpolarisation, by M. Fredericq.—On permanganate of potash employed as antidote to the poison of serpents, by M. de Lacerda. A solution of snake poison having been injected subcutaneously under the thigh of a dog, and a 1 per cent. solution of permanganate of potash a few minutes after, the latter prevented all local lesion (abscess, &c.); there was merely a very slight swelling. In other cases of injection into the veins the permanganate proved a powerful antidote.—M. Maumené communicated accounts of a new apparatus for fractional distillation, and of one for measuring the alcoholic richness of mixtures of alcohol and water.

CONTENTS

PAGE

THE STRUGGLE OF PARTS IN THE ORGANISM. By GEORGE J. ROMANES, F.R.S.	505
OUR BOOK SHELF:— Pfeffer's "Pflanzenphysiologie."—Dr. SYDNEY H. VINES	506
"The Norwegian North Atlantic Expedition, 1876-1878"	506
Ormerod's "Manual of Injurious Insects"	506
Reyer's "Zinn"	507
LETTERS TO THE EDITOR:— The Progress of Meteor-Spectroscopy.—Prof. A. S. HERSCHEL	507
Sun-Spots.—J. B. N. HENNESSY (With Diagram)	508
<i>Pronemena sluiteri</i> , Hubrecht.—P. HERBERT CARPENTER	509
<i>Polydonia frondosa</i> .—Prof. ALEXANDER AGASSIZ	509
Constancy of Insects in visiting Flowers.—J. T. POWELL	509
Brewing in Japan.—Prof. R. W. ATKINSON	509
Integrating Anemometer.—CHARLES E. BURTON	510
Red Rainbows.—A. TREVOR CRISPIN	510
Hay Fever.—W. MATTIEU WILLIAMS; M. C.	510
Electric Light in Collieries.—SESAMY	510
THE ORIGIN AND FUNCTIONS OF THE BRITISH ASSOCIATION. By E. W. HARCOURT, M.P.	510
THE INTERNATIONAL EXHIBITION AND CONGRESS OF ELECTRICITY AT PARIS	511
THE CAUSE OF COLLIERY EXPLOSIONS.	512
THE LANDSLIP AT ELM.	513
PHENOMENA DEVELOPED BY HELIOSTATIC STAR-DISKS. By Dr. G. W. ROYSTON-PIGOTT, F.R.S. (With Illustration)	514
NOTES	517
OUR ASTRONOMICAL COLUMN:— The Satellites of Mars	520
The Satellites of Saturn	520
The Fourth Comet of 1874	520
Ancient Star-Positions	520
PHYSICAL NOTES	521
GEOLOGICAL NOTES	522
GEOGRAPHICAL NOTES	522
ECONOMICS AND STATISTICS VIEWED FROM THE STANDPOINT OF THE PRELIMINARY SCIENCES. By P. GEDDES, F.R.S.E.	523
THE PROPER PROPORTIONS OF RESISTANCE IN THE WORKING COILS, THE ELECTRO-MAGNETS, AND THE EXTERNAL CIRCUITS OF DYNAMOS. By SIR WILLIAM THOMSON, F.R.S.	526
FUNCTIONAL METAMORPHOSIS OF MUSCLES. By D. J. CUNNINGHAM, M.D., F.R.S.E.	527
SOCIETIES AND ACADEMIES	528