ON
SYNOVIAL MEMBRANES
with especial reference to
BURSÆ MUCOSÆ
their
Anatomy, Physiology,
Histology, Pathology,
and Treatment.

R. LORD.
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"B. S. Albinii "Historia Musculeorum" p. 694

Monro on Birds p. 8.
My Respected Professors,

Whistlow is due the honour of having first noticed that the sheaths of tendons in the hand and foot are lined by thin and smooth membrane. But it was reserved for Albinius to discover that fact which he named "mucous crypts" "mucous bags" "mucous bursae" or "bursae mucosae". In his "Historia Musculorum" he enumerated sixteen pairs with a description of each. He says they are placed between tendons of muscles and bones over which they play. "Bursae subjectae musculis, maxime tendineibus eorum ad facilitatem mobilitatem" are his words.

Monro Secundus greatly increased our knowledge of bursae. He found and described one hundred and forty-three pairs in the upper extremities and in the lower thirty-seven.
Clifton Havers Nova Osteologia 1641. p.189.
Clopton Havers² took to himself the credit of first drawing attention to Synovial Membranes and their décretions which he named "Glandula Articulæ". Subsequently, observing that similar structures existed between muscles, tendons, etc., he gave them a more general appellation "Glandula Mucilaginosa".

Havers performed numerous experiments in order to find out whether the fluid of bursæ and joints were identical. He came to the conclusion that they were. In colour, consistency and properties they agreed. Heat, mineral acids, and alcohol affected both alike.

An additional confirmation was added by the discovery of some situations uniformly communicating directly (and in others occasionally) with the joint.

No one doubts their identity now-a-days. In some constitutional affections, Rheumatism, Gout, and Struma for example, joints and bursæ are similarly enlarged particularly about the wrist, ankles and knees.
They correspond also in the comparative want of sensibility when healthy and in becoming intolerably painful when the seat of inflammation. Dr. Haller poured Sulphuric Acid and other powerful caustic substances into the joints of some of the lower animals without producing sufficient pain to lead to an outward visible expression of it. On the other hand every surgeon knows how that a simple, traumatic, or accidental puncturing of a joint or bursa has led to very serious mischief and in some cases even death.

Additional reasons will be advanced further on for including both in this essay and considering them as one and the same structure.

Anatomical and Pathological Observations
Professor Syme and Goodier in Edinburgh and Mr. Coulson in London have contributed most to our knowledge of curdse and synovial membranes, in modern times.

So long ago as 1841 we find Mr. Syme contributing papers on this subject to the Edinburgh Monthly Medical Journal. At intervals up to the present time he has continued to advance curdseal literature. For my own attention being drawn to the subject I have to thank Mr. Syme. Every student knows how often he speaks about affections of curdse occasioned by the number of cases which present themselves.

In 1845 Mr. Goodier published the results of his investigations. Contrary to the views of many eminent anatomists and physiologists he confirmed the observations of Clifton Harris on the nature and functions of the vascular fringes found in joints. Additional facts in confirmation have been supplied by the researches of the eminent

"Lectures on Bursae and Synovial Membranes reported in the Lancet for 1854, 1850 and 1858" by William Coulson, Surgeon to and Lecturer at St. Mary's Hospital, London.
microscopeist Mr. George Rainey. Mr. Rainey says "the proper office of these fringes is to Secrete L Giovia; an office which Clifton Havers assigned to them as long ago as 1691 although his opinion has not been generally adopted by later physiologists.

Mcoulton has done good service in the surgical treatment of bursal and synovial affections. In our subsequent remarks we shall frequently have to refer to his lectures delivered at St. Mary's Hospital.

The Table of Bursae at the head of this paper is not intended to express all the bursae to be found in the body. Those only are included which may be readily met with in almost every body. Some authors speaking of them say in general terms "bursa exist over bony prominences and wherever there is likely to be the slightest amount of friction or rubbing..."
The remark is unquestionably correct but too vague and general. Many are so small that they do not become visible until enlarged and distended by fluid; the result of inflammation. Every-day experience brings to light more of these Bursæ.

Bursæ are almost wholly confined to the extremities of the muscles belonging to and acting upon the extremities.

They are not so numerous in other animals as in man.
Bursæ vary greatly as to their situation. By some they are arranged into superficial and deep.

I. Some are placed on the inner side only of tendons. For example those between the Biceps and the tubercle of the radius; and between the Semimembranosus and inner tuberosity of the Tibia.

II. Others lie between tendons and ligaments of joints. For example between the Serratus and capsule of shoulder; and between the Conjoined tendon of Bicep and Siceps and capsule of hip.

III. Some are situated between tendons and external parts as well as between bones and tendons, and naturally envelope the latter. For example the flexor tendons of the fingers and toes.

IV. Some are common to two
tendons or placed between them. As for example those for the Extensor Carpi Radialis Longior and Brevior; and for the Peroneus Longus and Brevis.

V. Others are placed between tendons and external parts only or chiefly. For example the tendons of the Flexor Sublimis Digitorum of the hand.

VI. Occasionally we meet with them subcutaneously and deeply over the end of a bone left after amputation, evidently developed to lessen the pain and injury consequent upon walking or other pressure.

VII. Between the skin and bony prominences. For example over the olecranon, patella, and malleoli of tibia and fibula.

VIII. They are numerous when the
part is subject to great mobility and friction as for example in the neighborhood of joints. There are at least ten around the knee; see table at the beginning.

IX. Along the palmar surface of wrist and forearm there are two sets of deep burse. Some are small and others of considerable size. (Brinton).

Where one exists in the neighborhood of a joint it usually or at least frequently communicates with it. For example the burda between the Troch and Hiacus and capsule of hip joint. Or the one interposed between the inferior surface of the Subscapularis and shoulder joint.

In some longstanding cases of sub-ject and curvature of the spine burse have been developed, where none previously existed, over these parts subject to excessive and continued pressure.
After a leg has been amputated, burræ have formed over the end of the stump. While recent and unaccustomed pressure, it is apt to become tender and irritable. These burræ will lubricate the parts, facilitate motion, obviate the evil effects of friction and to a great extent prevent mischief which would otherwise be inevitable.
Anatomy and Physiology of Burse.

A bursa is a simple irregular cavity of varying size situated in the areolar tissue. The cavity is lined by a smooth shining membrane, enclosing a viscid fluid, and that in all points like a sac, hence the name.

Sometimes we find that the subcutaneous cellular tissue in no way altered takes the place of a properly developed bursa. Up to the fifth month of fetal life this constantly happens. (Coulton).

They may be looked upon as integumentary appendages. What the nails are to the fingers, tips these are to the skin — they protect it.

In the axilla they present the simplest form of structure. Occasionally in the adult we meet with bursae arrested in development.
They are small and contracted yet structurally complete. In some instances the anconal bursa considered by Schügerl the most perfect has been met with contracted and scarcely perceptible.

Up to the second month of intra-uterine life the subcutaneous bursa remain open.

In many persons two and sometimes three perfectly distinct patellar bursae exist in layers one above another. Other bursae may be similarly disposed. It is owing to this arrangement that when one is removed on account of disease another appears exactly in the same place and not by the accidental development of a new bursa as some would have us believe (Coulson). The second and subjacent bursa coexistent with the first enlarges and becomes visible to the eye.

Schügerl has described in the popliteal space, an external, internal and
Spencer Thornton "On the Eye" p. 89.

Quain's Anatomy p. 242.
middle but they are seldom seen except when enlarged by disease.

In some persons subcutaneous bursae are wholly absent, from which we conclude that they are not essential structures but that the comfort and well-being of the body are much interfered with all can readily see.

Deep seated bursae have been long known to anatomists, physiologists and medical men generally; but the subcutaneous bursae have not received that amount of notice they deserve.

A small bursa or elastic bag containing a little fluid is placed close to the eye ball under the attachment of each tendon to prevent undue pressure on action.

Some writers draw a distinction between deep and superficial or subcutaneous bursae. Coulson says the former do not present the same filamentous structure and contain a greater quantity of fluid than the latter. Sharpey says some reckoned
among subcutaneous bursae, do not always present the characters of true bursal sacs, but look more like mere recesses in the areolar tissue, not lined by synovial membrane; yet being larger and more defined than the neighbouring areola. Such are generally considered examples of imperfect development forming a transition between ordinary cellular tissue and well-marked synovial bursa. As such slight differences may be readily accounted for by the change of position and consequently function we prefer to consider them as identical or if differing at only in situation. One can readily understand that the epithelium and vascular fringes lining the knee-joint would require to secrete a greater amount of lubricating synovial than those in the subcutaneous patellar bursa owing to the greatly increased demand.

As that does they present no visible outlet by which their cavities
Brinton. "Oceope. Anatomy and Physiology."
Can communicate with the exterior of the body. Such portions as may become effete can only be discharged from the system after a previous entrance into the general mass of the circulating fluid. This fact tends to prove that their secretion whatever it may be possessed little of the deleterious quality or excretory composition which marks many of the products of the mucous system. Hence the synovial membrane possesses a double absorptive function ... removing its own secretion and that of the cartilage delegated to it owing to the physical incapacity of the latter.

The structures we have to consider in connection with bone are:—

I. Synovial Membrane.
II. Epithelium.
III. Synovia.
IV. Vascular Fringes or Havers' Glands.
V. Thalamus.
I. Vascular Fringes.

While engaged considering the marrow of bones and the fluid of joints and comparing them together Clifton Havers was led to think that the latter could not be all supplied by the central living membrane. This was about the close of the seventeenth century. He pursued the subject and ultimately arrived at the conclusion that there was a special provision made in the form of these vascular fringes. They consisted in elevations or protuberances of different shapes and sizes. The idea of gland immediately suggested itself to Haver's mind and on pressing them fluid exuded. His notions of a gland then were not what ours are now.

Dr. Clifton Havers assigned to the spleen the function of forming and supplying mucus to the general circulation. How or in what way it was effected he knew not. He named
it the officina natura. That the spleen was sometimes absent altogether and therefore not essential to life he knew quite well. By this he explained the occasional absence of lubricating mucus from the brain and joints. The present idea of its being blood-gland may in two centuries more be losted upon as quite as curious as the one Clifton Havers held.

He continued 'Muclilage is always to be found in the parenchyma of the spleen, for that it contains and exhibits such a kind of juice there is no man who has his senses and examines it, can deny. Considering moreover of what great use it is to the numerous parts of the body it is not strange that a separate organ should exist for its formation.' He next ingeniously accounts for there being the duct to carry it away, or cavity in which to store it. Thus needles to have a receptacle in or about the spleen juice the parts requiring mucus are situated
Rainey in Proceedings of Royal Society. 1846.
at the most distant parts of the body. And for the same reason each bursa could not have a duct. The secreting mucus enters the blood (how he doesn't say) and is thence carried to the joints, muscles, and tendons etc., where the glands separate it."

Haber's way of accounting for Rheumatism and Gout is peculiar. Mucus is charged with causing both. In the former it is the mucus lying between muscles and in the latter about joints. A long description of each follows, humourous, ingenious and instructive but it would take us too far away from our subject.

**Structure.** The basis consists of a very delicate transparent membrane to which Mr. Goddard has given the name of "gerninal or basement membrane." It forms the folds or processes; is studded with flattened oval cells slightly larger than blood discis, without nuclei or
nucleoli and having none of the characters of pavement epithelium.

II. The blood vessels are convoluted in a peculiar way.

III. The investing epithelium is remarkable for its form and arrangement. It is quite characteristic of organs endowed with the function of a special secretion. "Besides enclosing separately each fasciculus of convoluted vessels it sends off from each tubular sheath secondary processes of different shapes and sizes into which no blood vessels enter."

Mr. Goodenough considers them more active in the formation of epithelium than the synovial membranes, and therefore more closely allied to the secreting organs than other portions of these membranes. They hang into those parts of the cavity best fitted for containing them and acting as reservoirs of synovia. Their great vascularity and the pulpy nature of their serous covering tend to strengthen this opinion.

Vascular fringes are not confined
to joints but are found in some genera-
ally, and sheaths of tendons.

Havers divided them into two clas-
tes:—I. Simple. II. Conglomerate.
The acetabulum affords an example of
the former, and the knee in which
are four or five, of the latter.
The Conglomerate Glands do not consist
of numerous lobules or glandules as
some other glands do, but of several
superimposed membranes adhering closely
and thickly set with small round
vessicles. Through the pores of these
vessicles mucous passes and thence by
the excretory canals into the cavity
of the joint. The veins have a re-
markably tortuous course and frequent-
ly anastomose. Havers gives their
vessicles mucous. The mucous being vitreid
cannot easily pass through the pores
... the tortuosity of the veins retards
the blood and no longer time is
afforded for its segregation.

Moreover, although removed from
injury their situation exposes them to gentle compression during flexion and extension which favours the secretion and discharge of the synovia. A mild vis etergo does no harm but good. When the parts are most subject to the wear and tear of friction and the demand for lubrication is increased more synovia will be thrown out owing to greater pressure on the glands. Wise contrivance that.

Some contain globules of fat especially those of hip and knee joints... more rarely a few scattered cartilage cells. Indeed some observers have supposed and asserted that this was the only thing they contained subservient only to the mechanical office of filling up spaces which would otherwise be left vacant during the movements of joints. But the peculiar arrangement bears no resemblance whatever to those which merely secrete fat. The convoluted vessels of the former do not by their anastomoses enclose spaces like the smaller capillaries
Physiology p. 217, 218.

of the latter.

In certain diseased conditions similar fringes are seen covering the entire surface of the synovial membrane. They are larger and form a mass of pedunculated adipose growths projecting into the cavity. Dr. Carpenter says "they distinguish synovial from serous membranes." Most observers consider them identical structures but having different secretions. We shall consider this more in detail subsequently. He adds "these fringe-like processes are covered with a different kind of epithelium, being spheroidal, from that which covers the rest of the lining membrane and there can be little doubt that they constitute the secreting apparatus for the synovial fluid."

These fringes are not to be confounded with synovial, mucous or alar ligaments.

Kolliker, since the researches of Ranney were published has taken up the subject. In the main he agreed with Havers, Goodair and Ranney.
"Cyclopedia of Anatomy and Physiology\np. 520. by Dr. Wm. Brinton.

Havers "Nova Osteologia" p. 190
He also observed the curious "non-vascular secondary processes" described by Rainey. "The larger" he says "consist of fibres of areolar tissue in the centre and a covering of epithelium cells which seem not infrequently to be converted into a homogeneous membrane, studded over with cell nuclei."

"The globular epithelium embedded in a plentiful matrix afford indications of active secretion. The distended cells slightly compressed, burst. Or, it may result from distension beyond what the wall of the cell can bear. Such, we are asked to believe goes on in other secreting organs."

The absorptive process goes on with equal rapidity. Not only is the synovia to be re-absorbed but wasted and effete matters after undergoing the histolytic change, pass away by the same channel.

"The fringes have a reddish appearance. Though soft they are not friable else injury had often befallen them in the multifarious movements of the joints."
They are the same in the lower animals as in man. They vary in shape and size. Some are long and broad running to a point at the summit. Some from a broad basis taper upwards in the form of a cone. Others are like fringes. Their position varies also. Some lie in small recesses of the joint.

For the accommodation of the larger there is a special arrangement. Harvers' Gland in the acetabulum affords a good example. Nature has provided a depression which in the dried skeep measures from one to one and a half inches long and from half to one inch broad. Under no circumstances whatever can an undue amount of pressure be made upon it. Had the head of the femur adapted itself exactly and fit up every available nook and corner of the acetabulum, Harvers' gland would have been too much at the mercy of circumstances.

In the three joint are three glands
similarly situated. Also in each joint of the fingers and toes are two such structures placed on the palmar and dorsal aspects respectively. They are situated where they cannot in any way interfere with the motions of the joint.
'Gray's Anatomy
II. Synovial Membranes.

Are thin delicate membranes. On the free surface is a layer of tessellated or pavement epithelium. It rests upon or invests a very delicate, structureless, basement membrane. Outside the latter is a thick layer of cellular tissue which forms a thalamus in which blood vessels, nervous filaments and lymphatic ramify.

The membrane propria is very thin and translucent but compact enough to retain gases or liquids.

"In the fetus this membrane," says Joyebe, "is continued over the surface of the articular cartilages. But in the adult it is absent excepting at their circumference upon which it encroaches for a short distance. It then invests the inner surface of the capsular or other ligaments enclosing the joint and is reflected over the surface of any tendons passing through its cavity."
"Allgemeine Anatomie."

"Physiology p. 126."
as the Popliteus in the Knee and tendon of Biceps in the Shoulder.

Henle's affair is that the Synovial membrane is continued over the cartilage as a villous epithelium covering of nucleated cells resembling those which line the serous membranes and other parts of the joint.

In Todd and Bowma's Physiology we meet with the following passage:

"The folds of membrane noticed in joints (the articular ligaments of Knee for example) and which contain fat Clpton Havers and other anatomists erroneously imagined to perform a glandular office and to secrete the Synovia." How do we account for such a strange statement?

At page 24 we anticipated the answer. The articular ligaments here are mistaken for the vascular or Haversian fringes of which Havers spoke and wrote.

They may be divided into:

I. Articular.
II. Vaginal.
III. Vesicular or Bursal.
I. Articular. These line the cavities of diarthrodial articulations, or those in which the surfaces glide or rub on each other. Most of the above remarks refer to this particular kind. I need scarcely add after what has been previously said that in the main these three kinds are identical. They may be and probably are in some instances slightly altered to meet the varied necessities of a changed position.

Joynlee told us that the membrane extended over the whole surface of the cartilage in the fetus. As life advanced it disappears from the centre. Pressure and friction cause its absorption or obliteration. It passes but a short way from the margin, becomes firmly adherent, and terminates. The blood vessels in the same way stop short at the margin, turn upon themselves and form loops. At the bent part they dilate considerably. The whole forms a zone which has
received the name of "circulus articulari vascularis." In the fetus the vessels like the membrane extends over the whole surface according to Joynebe. Where the membrane falls short its areolar tissue becomes interwoven with the perichondrium.

II. Vaginal. Or Synovial sheaths line fibro-ocular canals. They facilitate the gliding movements of tendons passing through them and more especially the Flexor and Extensor tendons of fingers and toes. The membrane is arranged in the form of a sheath. One part adheres to the wall of the canal and the other is reflected upon the outer surface of the tendon within. The space between the two free surfaces contains lubricating synovia. Occasionally folds or duplications of the membrane may be seen crossing them obliquely. They are called frusta.
*Vide p. 12*
III. Vesicular or Bursal. The membrane here folds upon itself and forms a little bag or bursa. The bursa is more or less flattened and situated between two rubbing surfaces. The opposite sides of the sac are in apposition by their inner surfaces which are free and lubricated with synovia: whilst by their outer surfaces through the medium of areolar tissue they are attached to the moving parts between which it is placed. In structure it presents no difference from the other two varieties just considered. They may be sub-cutaneous or deep seated as we have previously seen in a former part of this essay.

Synovial Membranes wherever found facilitate the rubbing of surfaces on each other and to prevent the injurious effect of friction.
Quain's Anatomy p. 272.

Todd and Bowmaus Physiology p. 126
Synovial compared with Serous Membranes.

At a former period they were considered to be essentially different. A few modern anatomists and physiologists hold that view still. The majority, however, in the present day have come to another conclusion. The latter say they are structurally the same but have different secretions. "Synovial Membranes differ from Serous only in their secretion."

Synovial Membranes are identical in minute structure with serous. On their free surface is a single layer of epithelium, the particles of which are polygonal in shape and of transparent texture discovered by Henle. Synovial and serous Membranes bear a strong resemblance to each other. Gendrin puts them in the same category. Nevertheless they conduct themselves differently under the influence of inflammatory mischief. Serous Membranes are more subject to inflammation than Synovial. The former
Pathological condition I should think.

Watson's Practice of Physic Vol. I. p. 185, 186.

Kirked Physiology. Ed. III. p. 325.
throw out coagulable lymph which leads to adhesion of the previously rubbing surfaces. Synovitis leads to a serous effusion into the joint which often, especially in Rheumatism, is as speedily taken up again.

Synovial Membranes have on them small eminences (granulations according to some) which ultimately become threads or trabeculae and perhaps stretch across the sac. 4

"While serum appears to be identical in general and chemical characters with the serum of the blood it differs from synovia. The latter seems to be the result of more genuine and elaborate secretion by means of the epithelial cells on the surface of synovial membranes and especially those which are accumulated on the edges and processes of the synovial fringes." 5
Grays Anatomy.


*Cyclopedia of Anatomy and Physiology
Article "Synovial Membranes."
Synovial resembles serous membrane in structure but differs in the nature of its secretion, which is thick and viscid in one case, limpid or watery in the other.

Henle and some others have included the synovial membranes of joints and bursae among the "Pseudo-Serosus Membranes," believing that neither possessed epithelium on their inner surfaces.

Brinton says: "The epithelium presents characters which distinguish synovial from serous membranes and also bursae. There is but one layer. The configuration is peculiar. The predominant shape is that of a slightly flattened spheroidal, oval or angular cell such as...

Acetic acid swells up the cell wall before dissolving it. Like those of bursa they are firmly attached to the subjacent tissue and possess little mutual adhesion. Nuclei are rare, the cells appearing to be..."
completed by the addition of the outer mem-
brane when yet extremely small.

All these peculiarities might perhaps be generalized in the statement that these cells appear to be in a younger and more active stage of cell-life than those of the turse.

For the sake of a great man we have put in the foregoing. After all we fail to see a sufficient difference to constitute a distinction. That Acetic Acid has the effect mentioned is not new or peculiar to them. That they are younger, more active, and of varying shapes does not on those accounts make them anything but epithelial cells. Some epithelial cells are ciliated others are not but all physiologists on that account consider them essentially different.3 Certainly not. In our opinion remains what it was before, viz; that all synovial and serous membranes are structurally identical.
Muller's Archives 1843.
III. Epithelium.

Epithelium lines the inner surface of the synovial membranes. They are the active secreting structures.

Reichert first detected its presence in the case of Burse, the existence of which we have been Henlé denied. To the discovery he added nothing more. He did not describe them.

On the free surface of vaginal or articular synovial membranes is one or more layers of polygonal tessellated epithelium first noticed by Henlé.

"The different individual cells which may be found floating in the field of the microscope exhibit great diversities of appearance so as to offer almost every gradation of cell growth. Free nuclei may be seen and perfectly developed cells with contents either transparent or very faintly granular and another modification mainly consists in the increased
granularity of the contents of the cells and
in the assumption of a more or less poly-
gonal outline. Acetic Acid partially dissol-
ves the cell wall and renders the nucleus
more distinct. The subsequent alterations con-
sist in a gradually increasing flattening and
widening both of the cell and nucleus but
especially of the former which finally more
than doubles the diameter of the polygonal
cell and at the same time reduces its depth
to a mere scale.

The forms which appear gradually to
predominate in quantity are

In the serous membranes with few exceptions
indeed the cells become hexagonal. But in the
outline of bursal epithelia the oval or circle
slides into the polygon by many gradations.
Generally speaking there is but one layer
of cells, and these usually more or less polygonal.
Most of the epithelial cells are spherical and
of various sizes some of them being extremely
large. All of the larger contain a pale and
Dr. Brinton in the "Cyclopedia of Anatomy and Physiology" p. 516.
rather flattened nucleus which is in contact with a part of the inner surface. The cells are also of singular delicacy and transparency and are to all appearance distended with a fluid the refractility and colour of which closely approximate to that of water.

I have been unable to verify the existence of a basement membrane.

The areolar tissue which forms the foundation of the membrane being diverted at this point to join with the ligaments and perichondrium, the vessels are left comparatively naked; and so far as I have been able to make out upon these bare capillaries the cells are seated without the intervention of any membrane.

What a strange statement is this last. How strong the evidence it affords of the probability of the existence of Goodier's basement membrane.
IV. Thalamus.

Adipose and cellular tissues form the thalamus or bed in which nerves, lymphatics and blood vessels ramify. They connect bursa to the surrounding tissues. Where they rest on a bone a thin piece of cartilage is interposed.

In some parts of the body the masses of fat are so large as to project somewhat into the cavity of the synovial membrane.

The yellow fibrous tissue enters largely into the formation of this areolar tissue. It possesses a remarkable reticulum arrangement. Its individual fibres are unusually large.

White wavy bundles of the white fibrous tissue may be seen stretched across near the surface of the bursa. It forms a much more consolidated membrane than the yellow. It is strong and laminated; having few openings or interspaces.

Immediately joining the bursa is another condition of the above tissues.
It is much more lax and has received the appellation of Sub-serous tissue. Great variety is met with.

"At a little distance from the interior are arranged the bloodvessels the capillary meshes of which are of tolerably large size and generally take a more or less quadrangular shape. It is by no means unusual to find one, two, or more fat cells lying comparatively isolated in this mass of tissue, with a loop or curve of capillary thrown around them in the ordinary manner.

Of the nerves of these membranes I am not qualified to speak."

The vessels are very numerous and arranged into plexuses. They are very tortuous, sometimes almost spiral. They are greatly elongated even the minute capillaries. Excepting in very rare instances the bloodvessels like the membrane cannot be traced beyond the edge of the cartilage. There they turn back upon themselves and form a number of loops.
V. Synovia.

It is a mucoplaginous fluid found in all joints these and turce.

It lubricates and renders slippery the parts which rub on one another. It
relieves attrition, facilitates movement and protects the structures whose surfaces are
at times so strongly approximated by superimposed weight or muscular con-
traction. It prevents the rubbing sur-
faced from getting heated by friction.
It keeps the parts moist and its pre-
vents their shrinking, dryness and stiff-
ness.

The mucous enhances the lubricating
properties of the oil, and the oil pre-
vents the mucous becoming oppressed. (Harris).

Along with the cartilaginous texture
is due the length of time that friction
may go on without any noticeable ar-
rangevment.
A limb may swing upon its hinge
or play in its socket many hundred
times an hour for sixty or seventy years
"Talley's Theology" Edited by Brougham and Bell.
together without diminution of its agility or power of motion.

The vital property of assimilation has unquestionably something to do with it. As wear and tear goes on assimilation follows by which tissue is restored and waste repaired and so the original is kept up.

There is a late improvement in what are called "friction wheels" and consist of a mechanism to ordered as to be regularly dropping oil into a box which encloses the axle, nave and certain balls in which the nave revolves. To a certain extent it imitates the arrangement in joints and bursae but with this difference that in the latter it is not only dropped but manufactured and that just in the proportion as it is needed."

The infinite wisdom of our great Creator and Preserver is strikingly and beautifully illustrated here.
In health there is only just sufficient Synovia to bathe and keep moist the free surfaces.

Synovia has a viscid oily consistency... of a pale straw colour and possesses a slightly saline taste.

If mixture of the Muriate of Iron, Milk, Water, Liquor Potassae or the Salts of Potassium be added no change is produced.

Heat Causes slight Coagulation. The liquid becomes opalescent and milky. The deposit of coagulum is greatly increased by the addition of Strong Nitric Acid after the heat has been applied. The addition of Strong Nitric Acid throws down a dense white deposit which is greatly increased by heat. Strong Nitric Acid added in excess to the deposit dissolves and restores it to its original appearance.

Alcohol and Ether throw down a gelatinous white precipitate.

Acetic Acid renders the whole more transparent. The field of the microscope
is covered with molecular matter as shown in Fig V. page 50.

Microscopic Appearances.

**Fig I.**

**Synovia.**

250 diam.

**Fig II.**

250 diam.

Another view of the same specimen.
Fig. III.

250 diam.

Another view of the same specimen.

Fig. IV.

250 diam.

Another view of the same specimen.

Fig. V.

250 diam.

After the addition of Acetic Acid.
Another specimen.

In allowing some synovia to stand for two days after I had obtained it, there appeared a mucoid substance floating in the fluid at the bottom of the vessel. Fig. VII is some of it as seen under the microscope.
Most observers ascribe to it a faintly reddish tint but that I think is frequently due to a small admixture of blood. It has an alkaline reaction. It bears a strong resemblance to the white of egg hence its name.

**Frerichs' Analysis.**

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<table>
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<tr>
<td>Water</td>
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<td>Fat</td>
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<tr>
<td>Albumen and Extractive Matter</td>
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<tr>
<td>Salts</td>
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<tr>
<td><strong>Total</strong></td>
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**Marqueron's Analysis.**

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<tr>
<td>Fibrin</td>
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<tr>
<td>Albumen</td>
<td>4.52</td>
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<tr>
<td>Chloride of Sodium</td>
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<tr>
<td>Soda</td>
<td>0.71</td>
</tr>
<tr>
<td>Phosphate of Lime</td>
<td>0.70</td>
</tr>
<tr>
<td>Water</td>
<td>80.46</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.</strong></td>
</tr>
</tbody>
</table>
Simon's Animal Chemistry
Trans. Sydenham Society.
Vol. II. p. 416.
John's Analysis ²

92.80 Water
6.40 Albumen

0.60 Extractive Matter, with
0.60 Chloride of Sodium, and
Carbonate of Soda

0.15 Phosphate of Lime

99.95

Berzelius' Analysis

of Serum
of the Cerebral Ventrices.

998.3 Water

4.09 Chloride of Sodium, and
4.09 Chloride of Potassium.

1.66 Albumen

2.32 Lactate of Soda, and
Alcoholic Extract.

0.28 Soda

0.35 Extractive with traces of Phosphates.

1000.
Dr. Owen Reed.
The chemical composition of serous fluids is very variable: indeed it is very probable that scarcely any two of them are exactly alike in this respect.

"Thus it appears that in Synovia according to Margueron 11.86 per cent of Fibrin is present which coagulated soon after it was obtained. The methods of animal analysis are greatly improved since Margueron published. It is matter of no small interest to consider how far the results of peculiar mechanical conditions are modified by variations in the character of lubricating fluids. Knowing as we do that while the ventricles of the brain, subject to agitation only, contain no albumen in their lubricating fluid, the liquor of the pericardium contains that principle in abundance, and that in the Synovial fluid adapted to the lubrication of the joints we have in addition to albumen not only a considerable proportion of phosphate of lime but probably fibrin also as a necessary constituent."

In the three analyses given above Albumen
is mentioned as one of the Constituents of Synovia and to such an extent as fully to explain the opalescence and deposit obtained with certain reagents.

In the diagrams of the microscopic appearance of Synovia we see:—

I. Oil Globules.
II. Epithelial Scales.
III. Blood Discs.
IV. Molecular Matter.
V. Secreting Cells.

The small amount of albumen or albuminoid structures accounts for the slight change effected by the addition of Strong Acetic Acid.

It does not Coagulate spontaneously.
Pathology of Synovial Membranes.

Though highly endowed with nervous power we scarcely know of their presence until such times as pathological or diseased conditions manifest themselves and then the pain becomes excruciating.

Excessive friction and protracted pressure, Mercurial, Syphilitic, Mercuris-Syphilitic, Rheumatic and Gouty affections are the most frequent causes of pathological changes. It may be dependant on Gonorrhoea or Pyaemia, making seven or eight varieties of disease in one membrane.

They are peculiar to no period of life. Both sexes are equally affected.

One bursa communicating with a neighbouring bursa or articulation is often seen. Imperfect development, disease or friction, may lead to it. Pain and inflammatory mischief may or may not be the consequence.
"Miller's Principles of Surgery p. 542."
Every time the humerus and femur are dislocated, the capsular ligament is pressed upon, stretched or lacerated. Mows believed laceration resulted every time the femur bone was luxated. Still the amount of suffering is often inconsiderable.

Undue pressure much or habitually applied sometimes leads to the formation of Adventitious or Abnormal Burse which now previously existed. As examples may be mentioned those which form "on the knees of housemaids and shopkeepers; over the patella in carpenters and javiers; over the elbows of miners and students; on the backs of porters and foot-soldiers; on the feet of ladies who wear tight and fashionable shoes; on the acromion of those who carry heavy weights; on the chine or sternum of joiners who rest their centre bits on these parts; on the hump of hunchbacks; on the outer malleoli of sailors; and on the prominent points of club-feet especially talipes varus."
Coulton on Diseases of Burlees. Lancet
May 1858.
Inflammation is the most frequent affection of bursae. Synovitis may be either Acute or Chronic. Suppuration, hydrocele articularis or bursae; and permanent enlargement or atrophy may follow. It may commence in the bursa and extend to the joint or vice versa.

In the first stage the natural secretion is arrested and the synovia becomes thinner. On moving the part a crackling sensation is produced which the French have called "painful effusion of the tendons." The fluid becomes increased in quantity and may become serous. It has often a reddish brown colour from admixture of blood. The interior exhibits the ordinary signs of chronic inflammation. It is thickened and the smooth surface is converted into a dull-looking uneven tissue from which shreds of vascular fringes in various stages of development, project."
Acute Bursitis. Occur most frequently in adults. Rheumatism and gout are often predisposing causes and exposure to cold or wet the exciting. Inflammation goes on until the synovia becomes purulent. The synovial membrane is congested and blood is extravasated. The part becomes very painful when touched. There is great heat, redness and swelling, around the part affected. If unabated ulceration and suppuration ensue. Irreparable injury sometimes results in a very short time. A short time suffices for its incubation, and may disappear as quickly. Erysipelas commonly attains the surface of the part.

Suppuration of deep bursa near joints have been mistaken for abscess, aneurism, arthritis and tumours. Yet have been amputated from supposed disease of the ankle-joint and the bursal affection not discovered until after the operation.
Lancet. March 1850.
Mr. Gordon Bailey mentions a case which occurred in a child seven months old, during diphtheria. The left knee was the part affected. Nitric acid and iodide of potassium were given internally. The fluid continued to collect in the joint. Symptoms of "pointing" appeared at one part. After poulticing for two days an incision was made and two ounces of pus escaped. The limb was put in a moulded gutta-percha splint. Water dressing was applied and the Oleum Ecoris Acelli given internally. In a week the discharge had ceased. Gradually the knee acquired its normal healthy character without any stiffness or difficulty of movement.

The case is noteworthy as an instance of acute synovitis in one so young. Yet we believe was the principal thing in the treatment.
Prophecy of the bursa or joint (hydrops articularis) without any structural change may be the only result of inflammation. It is stimulating treatment locally will generally cause its absorption. Should there be any predisposing Constitutional diathesis the tendency is to run on to something worse and not so easily remedied.

The bursa most prone to derangement are those over the olecranon, patella, and base of big toe. The bursa over the trochanter major frequently results in obtrusive sinuses.

Should it go on to suppuration and burst the pus may find its way into the cellular tissue. Many abscesses undoubtedly own such an origin. The source is never made out. The bursa are never suspected. As an illustration we may mention the numerous "pointings" around the knee-joint.
Cited by Coulson in Lancet. May 1848.
It is remarkable that adhesions do not more frequently occur from the plastic exudation thrown out. The cause is unknown. It may be owing to activity of the cell growth (Coulston) or depend upon the presence of a viscous synovial secretion in their interior (Todd and Bowman). Small trabeculae or threads do however form occasionally and lead ultimately to the obliteration of its cavity. This we shall consider further on.

In one case examined by Volkuntsky the bursa contained a quantity of thick dark fluid through which was disseminated a number of small white crystalline earthy masses hanging from the inner membrane of the sac. On examination they were found to consist of organic matter containing sixty five per cent of Phosphate of Lime and eighteen per cent of the Carbonate with some traces of Magnesia.
Lancet. June 1853.
In the Lancet for 1849 two cases of Acute Scarlatinal Synovitis are recorded. They were simply accidental therefore we need allude to them no further.

Synovitis in the Superior Tibio-fibular Articulation must be looked upon with suspicion on all occasions. The mischief usually extends to the knee-joint with which we have previously seen it generally communicates. In a case recorded by Messrs. Hawkins and Hewett suppuration and disintegration set in. Amputation was called for and performed. On the twenty fourth day after the patient succumbed. At the autopsy there was abundant evidence of pyemia or sepsis in the inferior vena cava, left iliacs, femoral veins, and in all the lesser ones around the part.
Cited by Coulton Launcel Gov 1850.
Chronic Bursitis or Synovitis.

Comes on gradually and slowly. The same causes long and habitually operating will give rise to Chronic as we have just been led to Acute Bursitis. The inflammation is not so violent, nor destruction of tissue so great as in the Acute. It seldom goes on to ulceration and suppuration. Pain, heat, redness and swelling are not so well marked or severe.

The synovial membrane becomes thickened and indurated. All the structures (fibrous) implicated gradually swell out or enlarge. If deep seated, it may be difficult to diagnose them accurately. It is in this form of affection that the greatest tendency to the formation of stone bodies exist.

Hynhe examined some fluid from a carpal bursa of a gelatinous nature. It consisted of a transparent, viscous, semi-fluid substance through which were scattered round and ovoid cells.
containing granular matter and having one or two transparent nuclei attached to their inner surface.

Fusiform growths have been met with springing from the lining membrane of an enlarged cursea.

On opening cursea we sometimes meet with fine threads or trabecula stretched across. They are evidently of morbid origin and tend to the obliteration of its cavity. Sometimes they are congenital and have a cellular or choloar structure. Their number and position varies in different individuals. Some dip into the cavity like the dura mater in the brain as it forms the false or tentorium cerebri.
Treatment.

Acute Synovitis. Blisters, Rest, Injection of Iodine, Lecithis, Stimulating Lotions or Ointments, Bandages, Fomentations, and Injecting Iodine, all hot fomentations may be all used with beneficial results.

Blisters stand first in importance. Applied once or twice a week will of themselves in any uncomplicated case prove sufficient.

Rest is very necessary. The part affected must be kept immovably quiet.

Hot fomentations to which a little Opium has been added will be found of great use when there is much pain.

As a local application for the alleviation of pain Mr. Coulson recommends Chlorinated Hydrochloric Ether. Twenty to forty drops are to be sprinkled on a piece of lint.

The ordinary Chloroform and Opium Liniment of the Pharmacopoeia will
answer equally well.
A splint and bandages are of great service. Or a piece of Gutta Percha softened in warm water and applied to the part to as to take an exact cast or impression. Then cool, remove it and pad well with cotton, tow, lint, or anything soft. This should be kept on so long as inflammation shows itself.
Our treatment must be early and active. It must also have reference to the constitutional taint if there be any. Calomel and Opium are macOSly and recklessly given. A simple saline is all that is needed. Such a mixture as the following:

ıy Lignonis Ammoniae Acetatis 3\⅛
Mistura Camphora 3\⅛
Vini Antimoniae Potassii Tartari 3\⅛
Spiritus Aetheris Nitrii 3\⅛
Aqua Pura ad 3 trīx.

\* Mist. Sign. Sumat, echor. ampla due tur in dies.
"Brodie "On Diseases of Joints."
Chronic Synovitis. Requires the removal of the exciting cause, rest and simple disinfentants. Scott's plan of binding the limb with plasters answers well in some instances. Blisters should be tried at the outset. The fluid may be off and a small quantity of mixture of iodine thrown in. Great care must be taken in doing this when the bursa is near an articulation as it may communicate with it or the inflammation excited in the former may extend to the latter.

Brodie saw a case where the bursa between the scapula and latissimus dorsi attained the size of a man's head. It was punctured and a jetow passed through its cavity. Great constitutional disturbance resulted and caused death. A mild stimulating injection would have been better than the jetow. The cavity being too large greater caution was needed.
Lanct 1855. p. 485.
Mr. Birchton has recorded cases in which he used the actual cautery with benefit. It has not however been tried by other surgeons.

Mr. Coulborn's plan is to puncture the bursa with a grooved needle such as is used for exploring tumours and swellings of doubtful character. After the evacuation of the contents pressure is applied by means of soap-plaster and bandage. This is renewed from time to time and puncture of the sac also repeated if necessary. A permanent cure generally results.

Mr. Barwell prefers a solution of Alum to injection of Iodine as an injection. My own opinion however is in favour of the latter.

If the diseased bursa be superficial and it be thought necessary there is no great objection to its entire removal by the knife. Nature after a time produces
Practical Surgery p. 454.

Lancet, November 1856.
another in its place. Or an underlying bursa becomes developed and takes its place.

Ferguson mentions a case where Mr. Partridge dissected away the bursa situated over the trochanter major. It had become enormously distended with a granular cauliflower-looking growth from its inner surface. Another case is recorded by Mr. Johnson where an adventitious bursa was successfully removed and a cure established.
Loose Bodies.

Are met with oftener in the three-joint but seen also occasionally in bursae and tissues. They are identical in structure. The former has a firmer consistency than the latter generally. Their size varies much. They may be terete or pedunculated. They may cause insufferable pain and annoyance or for years remain quiet and peaceful. Different pathological conditions give rise to them.

Histology. They are surrounded by a fibro-cellular membrane which is smooth and glistening externally but closely adherent internally to the body itself. On making a section through one of them it seems to consist of a semitransparent fibro-cartilaginous substance. The Centre
"Histology of Loose Cartilages" by George Hainey et al.

W. Woodham Weir, M.D. Lecturer on Histology at Middlesex Hospital.
appears opaque and white like bone. The former seen under the microscope presents the usual appearance of fibro-cartilage.

The latter resembles in its minute structure those bones which consist of only one osseous plate placed between two folds of membrane, as the thin plates of the ethmoid bone in the nose. Like other bones they possess lacunae but no well marked canaliculi only a delicate arrangement of earthy matter around them."

Dr. Webb has recorded the result of his examination of a cartilaginous body taken from the knee of an elderly gentleman.

On the surface there was a condensed layer of fibrous tissue which swelled up and became gelatinous on the addition of Aetic Acid. It gradually lost its fibril-losus character and merged into a
hyaline matter in which were scattered numerous flattened and elongated nuclei closely applied to each other and arranged in strata towards the exterior. The formation of all spaces could now be distinguished around the isolated nuclei.

Among the fully formed cells the usual tendency to multiplication by division showed itself. In some parts might be seen parallel and perpendicular rows of cells arranged in a linear direction as in ossifying cartilage having but a small amount of intervening matter. Some of the more perfect cells had hitherto appeared to contain clear and fluid contents but now opaque granular matter began to be seen. The end to end cells also coalesced and became short, regular tubules closely packed together in groups. The tubules soon became filled with an amorphous saline deposit to such an extent that all traces
of cell wall were concealed and the mass appeared one uniform solid block.

Dilute Caustic Soda caused the expansion of the intercellular matrix and disclosed the whole series of tubules and isolated the casts about which the cell walls were accurately moulded.

Hydrochloric Acid dissolved the concretions with effervescence and left exposed the cell walls retaining their perfect contour, with the nuclei still adhering in their natural position and integrity.

The very centre of the mass consisted of numerous shell-like groups of these elongated spaces with cutaneous contents, round the aggregate of which the perpendicular rows of cells are arranged undergoing the process of fusion and filling up.
There was no indication of nerve, blood vessel, bone corpuscle or other structure which might warrant the classification among the osteophytes. Beyond a certain depth from the surface all the changes were those of retrograde metamorphosis.

The description follows the appearance as seen in passing the eye over a thin section from the circumference to the centre, with a power of 220 diameters.

By the older writers the central dense portion was looked upon as true bone. They talked of ossification, calcification, and calcification but were only vague terms and conveyed no true idea of their histological structure.

Much pain attends the presence of these bodies at times. The person may be walking... suddenly he feels a jerk: something gives way accompanied by intense pain in the heart.

"Diseases of Joints"
and frequently he falls down.

There may be only one or as many as fifty and possessed of every conceivable shape and consistency. To the almost-sighted eye, they appear laminated, the laminae being arranged concentrically. Should they be detached from their pedicle, they float about and remain of the same size. Its source of nourishment cut off, it cannot grow so rapidly. The colour is yellowish-brown.

Arzneimittel has clearly shown the extra synovial origin and development of some of these bodies. As they enlarge, the synovial membrane is pushed inwards and constitutes the peduncle. Effusions resulting from violence, and irregularly formed cartilage may give rise to them.

Brodie says "in long standing cases the coagulable lymph first forms into small triangular masses which by pressure of the surrounding parts are still further reduced into smaller and
and harder portions. At length they become of former consistence and definite form as flat, oval, brownish, smooth bodies and float about in the bursa or articulation.

Sir Everard Home records a case where upwards of forty loose bodies were found floating, in the cavity of a false joint. They appear to have been mechanically detached from a number of projecting portions of cartilage which studded the broken ends of the bones.

The synovial membrane, therefore, cannot be considered necessary to their production.

There is a difference of opinion among surgeons and physiologists as to the mode of nourishment of these bodies. They (the floating bodies) are isolated from the blood vessels. If they grow at all it is but slowly. Still they don't undergo a histolytic change and disappear. We are therefore shut up to the conclusion that the synovial fluid

"Cited by Darwell "On the relation between Synovitis and ulceration of Articular Cartilage."
affords them nutriment. The only alternative is the supposition that occasionally they come in contact with the wall of the cavity remain there a sufficient time to allow additions to their substance to take place. What they do increase in bulk was noticed by Hyrtl.

He supposes that the synovial fluid is the sapubum from which they derive the materials essential to their permanence, growth, or alteration. The composition of synovia as compared with their own are sufficiently identical to warrant such a conclusion.

Bidder conjectures that their development may be due to the precipitation of synovia around an epithelial cell; the gigantic enlargement of a cell or what approximates to this their hydatid nature."

As bearing on this subject we may mention that M. Richet tells us in his Annals of Surgery for 1843 that on one occasion he passed a narrow knife into a joint and cut off a piece of
articulate cartilage. After two or three months the animal was killed. The
piece was found loose in the cavity and the hole left perfectly of the
same size and shape as though it had only just been made."

Maybe Richet did exactly what he says, and witnessed what he says he
did but we have our doubts. We
denounce the result. It amounts to
taking that there is never any increase
or addition to; or that the amount of
articulate cartilage we were ever to have in this life was given us at birth.
Or that there is no such thing as
waste and reproduction of articulate
cartilage; or so imperceptible as not
to be recognisable at the end of three
months. The same must hold good in
regard to them as regulates the accretions
of and subtraction from bone bodies
generally. Consequently the same effects
will naturally follow.

Mons" figures several of these
loose bodies which he removed from ep
ovial cavities.
Some are pedunculated by which they
attach themselves to the side of the
sac. Others again are quite smooth.

In one case he met with fifty in
the bursa behind the tendon of the
flexor longus pollicis. A patient was
seen by him complaining of violent
pain at times in the gluteal region.
On examination a flat moveable body
was found within the bursa of the
gluteus maximus. The bursal sheaths
of the flexor tendons of the fingers
are very subject to them. The sub-
ocutaneous bursae over the patella and
acromion frequently contain them.

Dissentences exist in the writings.
of various observers as to the minute structure of these bodies but more especially the centre. Some say they are cartilaginous only; others osseo-cartilaginous. These differences we think may be explained by reference to their respective ages. If the pedicle breaks and frees the young localized growth it will float about in the cavity and perhaps all further development be held in abeyance. Such a body will never attain anything higher than chondrus tissue. But anyone can easily understand that if circumstances are favourable to their retention in situ for a sufficiently long time other changes will set in. The cartilage cells will give place to bone cells and ossification go on. So that both opinions are correct.
Treatment.

Our remarks under this head will refer chiefly to the loose bodies in joints and bursae. Those which have received distinct names we shall reserve for special consideration when we come to speak of them under their separate heads.

In the treatment of bursal or articular loose bodies there is great difference in the mode of procedure. Almost every surgeon of note has his own way and thinks it the best.

M. Syme has at different times proposed means for the cure of these affections. As long since as 1841 he said him suggesting a new plan of operation for removing loose cartilages from joints. It consisted in making a subcutaneous incision: merely puncturing the skin but laying open the synovial membrane freely.
In this way the cartilage escaped; then gently pressing it was pushed into the sub-synovial areolar tissue where it was left to become adherent, undergo absorption or occasion an abscess beneath the skin. Mr. Syme mentions a case in illustration.

Mr. H. at 34, Cabinet Master. For the last two or three years he had suffered more or less pain in consequence of a movable body in the knee-joint. The operation was performed on Feb 1st. The cartilage was dislodged and conveyed about an inch towards the patella. A compress of lint and bandage were then applied. On Feb 3rd he had a slight rigor, swelling and redness appeared over the seat of the cartilage. He gradually became worse until the 8th. Elevation being then quite evident over the body a free incision was made which allowed a quantity of matter to escape. On the 11th the discharge continuing copious the cartilage was extracted by means of a sharp
foot. It was of an oval flattened form upwards of an inch in length. The discharge of matter continued for some time copious, but appeared to proceed entirely from the subcutaneous cellular tissue. The joint was never in the slightest degree red, swollen, or tender. He ultimately recovered.

A month after (April 1841) M. Coyrand sent a case to the Medical Journals treated in the same way as the above. The idea must have occurred to both about the same time.

The difficulty experienced in effecting the extrusion of the cartilage through the subcutaneous aperture soon led to its abandonment.

M. Linton then proposed to make a double incision. It partially removed the difficulty, but the complicated procedure sacrificed every advantage the operation possessed.

Thrusting over a more effectual
plan Mr. Smyth had on the following.

He says 'on examination I found
(in a separate case) that the body lay
over the external condyle. I learnt
that although previously very trouble-
some it had occasioned no uneasiness
since it occupied this position. I
ordered a plaster to be applied over
it from time to time. Some months
after the patient informed me that
the cartilage kept its place, had de-
creased in size and gave him no
uneasiness whatever.

Mr. Smyth next tried the plan of
thrusting pins and needles through the
cartilaginous bodies from the outside.
This was done to keep them immobile
in the hope that they might lodge
and stick in some place out of the
way during movement of the past. It
failed however. For no sooner were
the pins or needles removed than the
bodies floated about just as before.

Again another plan was suggest-
ed and tried.
"Loose cartilages in the elbow joint removed successfully" by T. Polly, F.R.S.,
Senior Assistant Surgeon at St. Thomas Hospital.
The cartilaginous body was pressed to the outer and anterior part (tip of the humerus joint). A tenotomy knife was then introduced obliquely into the joint and the foreign body removed. A compress and bandage were applied and space left for the application of a blister. Adhesion was obtained and their size slightly diminished and occasioned no further trouble. Two other bodies in the same joint received similar treatment with equally good results.

Mr. Solly has recorded a case where he successfully removed eight loose cartilages from the same elbow joint and at the same time. He made a direct incision into the articulation. Palliative antiphlogistic remedies had been long and perseveringly tried but without the slightest amelioration. At the end of a week he was able to use it without causing pain.
Lancet October 1860
The method by subcutaneous incision described at page appears from statistics to be as successful as any. Professor Hilton of Guy's Hospital has performed this operation with success.

Professor Ferguson 5 has done it on several occasions without any bad consequences whatever.

We are still compelled to say that a simple, easy, safe, and successful mode of operation is yet a desideratum.

M. Hippolyte Larrey has recently communicated a paper to the Society of Surgery in Paris containing some interesting statistics relative to the success of the various operations for extraction of loose bodies in or about the Knee-joint. He commences at Ambrose Paris and comes down to our own day. M. Larrey's original object in collecting these cases was to aid an American surgeon in his defence
against a charge of malpractice. A patient was operated upon by the surgeon and an ankylosed knee-joint was the result. It was an action for damages. The results of Mr. Larrey's researches were as follows:

Out of 168 cases of extraction, 129 were by direct incision and 39 by the subcutaneous method.

<table>
<thead>
<tr>
<th>No. of Cases</th>
<th>Cured</th>
<th>Failures</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>129</td>
<td>98</td>
<td>5</td>
<td>26</td>
</tr>
<tr>
<td>39</td>
<td>19</td>
<td>15</td>
<td>5</td>
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</tbody>
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Mr. Larrey says the former is a grave operation and the latter difficult. The dangers resulting from the presence of the foreign body are to be much less dreaded than those apprehended from the operation. Though many cures have been recorded, numerous failures have been passed by in silence.

The subsequent remarks are of very great importance and ought to guide every surgeon in his decisions as to
the propriety or feasibility of operating in the case of any loose floating cartilage.

"The operation" Larrey says "should never be performed unless the following conditions be realised:--

I. Complete mobility of the false cartilage.

II. Presence of pain, effusion into the joint, larieses, and other ill effect resulting from its presence in the cavity.

III. Failure of palliative measures.

IV. Express desire of the patient to undergo an operation after all its dangers and difficulties have been fully explained.

Palliative measures consist in keeping the part at perfect rest. Attempts to fix the floating body in such a position as will cause no further annoyance, and fortifying the patient's strength against the injurious effects of irritative fever.
It is no easy thing to get rid of loose bodies. Even when every care has been taken during and subsequent to the operation how frequently they go wrong. After lying in bed maybe for months, and a weeping discharge going on too often they narrowly escape with an anchylosed joint or perish from wasting and inanition.

Synovial membrane wherever found is a very delicate structure and suffers not the least interference with impurity. The thought naturally suggest itself that these foreign bodies would be sources of irritation, inflammation and pain; and that the moment they were removed all unpleasant symptoms would immediately cease. Such generally speaking holds good in reference to other foreign bodies. Not so however synovial membranes.

Very delicate and vascular... when they become diseased or wounded, they rapidly undergo dangerous pathological changes.
House-Maid's Knee.

The name given to a morbid condition of the bursa patella. It is subcutaneous.

The bursa becomes distended with fluid. Secretion is in excess. First serous, it rapidly becomes sero-purulent. There is great heat and pain and fullness. The integuments are very red... in some instances takes on an eruptipulous character even. Absorption is in abeyance.

Irritation caused by frequent protracted kneeling or habitual friction and pressure most generally leads to its production.

As the name implies it is very common amongst housemaids, but by no means confined to them. It is met with in painters, moulders, joiners and sailors.

The disease this bursa is subject to may be looked upon as
typical of bursal affections. It is more frequently drained than any other. They may be acute or chronic. If not resolved in the first stage the contents become purulent. If of long standing and the pus has not been let out disease of the patella itself may follow. But this is a rare occurrence.

In chronic enlargement the coats are much thickened. The contents consist of a dark coloured fluid, due to admixture of blood, which has undergone disintegration. In this float a number of smooth and oval bodies resembling mellow buds. The fluid abounds in cholesteroline and broken up blood discs and granules. The oval bodies are composed of lowly organised fibroid matter mixed with cholesteroline (Erieisen).

Treatment. Rest and simple antiphlogistics. Taken in time a blister
Laurel 900 1850
will be of great service. Seduced nasal poultices may be prescribed when there is much redness, swelling, and pain.

If the presence of pus be indicated by fluctuation an incision must be made. The opening must be free and dependent. Great care must be taken.

MT. Hilton has put on record an interesting case where Stauus was induced by incising an inflamed patellar bursa. The patient was a woman. It was clearly idiopathic and ultimately terminated fatally. The treatment was not at fault. So what we will untoward and unosted for symptoms will manifest themselves occasionally.

Sounds about the knee joint, however simple should always be considered of a dangerous nature (Guthrie).
Ganglion.

It is a morbid collection of fluid in the shea. Originally the term was applicable to sheal collections in general but has come now to be applied to those of the wrist and hand, fingers, and toes, but especially the wrist.

The contents are jelly-like and lipoidal sometimes aqueous. Pain is not a characteristic symptom. Deformity, stiffness, weakness and inability to use the hand are what the patient complains of.

The anterior annular ligament acts as a constricting band and so renders the swelling of the shape of an egg, foiling hand-liners. On pressing one segment, the fluid may be pushed into the other.

On cutting one open a number of small, white, shining bodies of a lozenge shape escape. They somewhat resemble grains of barley or those of boiled rice. They float about in the jelly synovia.