THE NEW KAISERLING SECTION OF THE ROYAL ARMY MEDICAL PATHOLOGY MUSEUM.

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As a pathological museum will, I understand, form a part of the new college; I venture to bring before the readers of the Journal the new (Kaiserling) method of preserving natural colours in museum specimens, with the hope that interesting pathological specimens may be preserved by this method, and ultimately added to the collection.

A CORNER OF THE NEW KAISERLING MUSEUM.
(Photograph by Captain Crisp, R.A.M.C.).

If this suggestion be carried out, such specimens, along with the three hundred or four hundred which may be collected at Netley by the time the college is opened, will enable its museum to start with a good pathological collection, and one which could be made unique, if only (Kaiserling) coloured specimens were mounted in it.
The Kaiserling section of the museum (temporarily at Netley) was commenced with the advice and assistance of Colonel James, the Commandant of the College, and it is owing to his help that I have been able to mount as many as one hundred specimens during the last nine months.

The process by which these specimens have been prepared and mounted was first started in Germany some six or seven years ago, with a view of preserving indefinitely in pathological tissues the appearance and colour they presented when first seen in the post-mortem room. The success attending the use of the process has enabled curators of museums to dispense, in nearly all cases, with the older method of preserving specimens in spirit, and enables the student to find in a Kaiserling museum what he never saw in the older museums, viz., every detail in shade and colour of pathological tissue change. The basis of the process is the use of formalin in the first bath (which has the power of changing the haemoglobin of fresh tissues into methæmoglobin), and of spirit in a second bath, which converts the brown methæmoglobin into a red pigment, identical in colour with haemoglobin, and insoluble in the medium in which the specimens are finally preserved (glycerine and water).

There are three stages in the preparation of pathological tissues by the Kaiserling method.

1. The conversion of the haemoglobin of the fresh tissue to methæmoglobin by the use of formalin and certain salts.

2. The conversion of this methæmoglobin into a red pigment by the use of spirit.

3. The preservation of the specimen in a special medium of glycerine, acetate of potassium and water.

The details are as follows:—

The tissue which it is desired to preserve is cut or dissected out, and placed in a solution of the following composition:—

<table>
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<tr>
<th>Formalin</th>
<th>Nitrate of potassium</th>
<th>Acetate of potassium</th>
<th>Water</th>
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<td>200 cc.</td>
<td>15 grammes.</td>
<td>80 grammes.</td>
<td>1,000 cc.</td>
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This constitutes the first or Kaiserling bath, and specimens should be left in it from thirty-six to forty-eight hours or even longer.

Several modifications of the first bath have been devised. In the Malniko-Raswedenkov method, a bath containing formalin 10 per
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cent., sodium acetate 5 per cent., and potassium chlorate 0.05 per cent.,
in distilled water, is employed, while Muir, of Glasgow, uses a solution
containing 3 per cent. of formalin, 0.4 per cent. sodium chloride, and
1.2 per cent. of sodium sulphate in water. The original Kaiserling
method has, however, yielded the best results in my hands.

A section of a solid organ, such as the spleen or liver, can be safely
placed in a dish containing this fluid, but when dealing with more
compressible tissue, such as that of the lungs, it is advisable to wrap the
specimen loosely in cotton wool before placing it in the dish, and to give
it plenty of room when immersed, in order to avoid the flattening and
distortion which would follow if compressible tissue were placed in a
confined space or in any way subjected to pressure.

If an entire organ is intended for preservation, it is advisable to
inject it through the blood-vessels with the Kaiserling fluid as well as
immersing it. The organ so treated not only retains its shape better,
but the haemoglobin in the blood-vessels and interior of the organ is
more completely converted, and does not, as may otherwise occur,
afterwards leak into and colour the preserving fluid in which the specimen
is finally mounted.

All cavities in tissues, such as those found in large abscesses, encysted
pleurisy, &c., and the interiors of hollow organs, should be lightly stuffed
with tow before being immersed in the Kaiserling fluid, in order to
preserve their shape, as the formalin in the fluid tends to contract
tissue.

The effect of this first bath will have been to change the flesh­
colour of the specimen to a brown; a change due, as has already been
stated, to the conversion of the haemoglobin into methaemoglobin. It is
stated that if specimens are kept too long in this first bath, the second
bath, consisting of spirit, is unable to bring back the flesh colour (metha­
emoglobin into red pigment), but certainly up to a week the change can be
brought about.

The specimen is now placed in the second bath, which consists of
spirit. In the original Kaiserling method the spirit bath was graduated,
the specimen being placed first in 60 per cent. spirit, then in 80 per cent.,
and finally in 90 per cent. spirit; but, as a matter of fact, equally good
results appear to be obtained by placing the specimen directly into
90 per cent. spirit. The length of time necessary for this bath must be
determined by the appearance of the specimen; it should be removed
from the spirit bath when it has regained the appearance it presented
at the post-mortem room, i.e., its flesh tint. From twenty-four to thirty­
six hours is usually sufficient.

The remarks on injecting large specimens and preserving the shape
of cavities and compressible tissues, made when describing the first
bath, apply equally well here. The specimen may now receive its final
dissection and trimming; but the knife should not be used too freely, as
the deeper tissues are not as thoroughly affected as the more superficial. It is often useful at this stage to shave off the superficial layer of the specimen, in order to get a clearer section, as the surfaces of the tissue are often smeared by blood which has been converted into red pigment and obscures detail. The specimen is now ready to be mounted and placed in its preserving fluid.

The method adopted by Mr. Carter (the museum assistant) and myself for mounting specimens is to make frames by bending thin solid glass rods to a shape and size suitable to the specimen. The specimen is then placed in the frame and attached to it in three or four places by thin pieces of silk.

This system of framing is especially suitable to sections of intestine. The framed specimen is now placed in a glass jar containing the following preserving fluid:

- Glycerine: 200 grammes.
- Acetate of potassium: 100 grammes.
- Water: 1,000 cc.
- A few drops of carbolic acid or a crystal or two of thymol are now placed in the jar to prevent the growth of moulds, which otherwise thrive in this glycerinated medium.

If the specimen, when placed in the preserving fluid in the jar, does not colour it, it may be sealed down, but it is usually advisable to allow the specimen to clean itself in a first portion of preserving fluid for a few days before finally putting it up and sealing it.

The method of sealing specimens used in this museum is that invented by Mr. Carter, my assistant, and is certainly as good as, if not better than, any I have seen elsewhere. It consists in cutting out from a plate of tin foil a piece of the shape, but slightly larger than the size, of the mouth of the jar; large enough, in short, to grip the lip of the mouth of the jar when applied to it. An air hole is now made with a needle in this cap of tin foil, the lip of the jar is covered with glue and the cap firmly applied to it, the edges of the tin foil being bent round over the lip so as to grip it. This grip is secured, and the cap made to look neat by rubbing the tin foil where it bends over the lip of the jar with a hard flat stick. The centre of the cap is now depressed, a result only rendered possible by the presence of the air hole, the air hole is sealed with glue, and when this glue has set the cap is painted over with two coats of black enamel. The process is simple though it requires practice to do it well, and the result is a neat and efficient cap.

A catalogue containing descriptions of the macroscopic and microscopic pathology, along with the clinical history and post-mortem examination in each case, has been prepared.

Beside the Kaiserling specimens there are some 3,000 wet and dry preparations in the pathological museum. The wet specimens are unfortunately all spirit preparations, and consequently show nothing but
the shape of the original tissue, all colour having been removed by the spirit. The records of the museum show that nearly 4,000 specimens have been collected at various periods, but the fire which occurred in the museum in 1880 destroyed several, while many more have been condemned and got rid of as worthless subsequently.

Of the 3,000 which remain, 1,300 were arranged and catalogued by the late Sir William Aitken, in 1891. These specimens have been recently remounted, and a short printed description of each specimen placed on the jar containing it. This arrangement has been found to facilitate the study of specimens by those visiting the museum.

The remaining 1,700 specimens are being examined and arranged, and a catalogue prepared. They include some 300 specimens which were recently recovered from cupboards and store rooms, and most of which can be saved. Of these 300 some 200 represent beautifully injected and dissected anatomical specimens, the remaining 100 are a series showing the effects of experimental injuries of bones, joints and tendons in animals.

These two series of anatomical and experimental sections are worthy of a place in any museum.