claw was found failed to reveal any sign of injury. It was impossible to identify the toe from which the claw had dropped. This strikes the writer as fair proof that the shedding of claws is a normal phenomenon. The claws of the rear feet are possibly lost as they become loosened, or they may be pulled out by the animal with his teeth. Cats are frequently seen to pull at their hind claws in a manner suggesting this.

The shedding of claws is most likely seasonal, as are the related phenomena in other animals. Why then should the cat carry on the scratching movements throughout the year? It is possible that a further function of the scratching may be that of keeping the claws from curving too much, consequently growing into and irritating the paw. The irritation caused by claws which are curved too much or by the itching or other annoyance of loose claws may be the stimulus that starts the scratching movements. In this connection a colleague, a zoologist, has called attention to a reaction of badgers. These animals frequently drop out of an intense fight, roll over on their backs and scrape the claws of their front paws by rapidly drawing the paws across each other, pads facing. In accounting for the continuation of the scratching activity throughout the year, however, the likelihood of this being a habit reaction must not be overlooked.

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RECENT PUBLICATIONS OF THE NATIONAL RESEARCH COUNCIL

TWO recent publications in the National Research Council's *Bulletin* Series should be of rather wide interest among scientific men. One (Bulletin 58) is entitled "Handbook of Scientific and Technical Societies and Institutions of the United States and Canada." The American section of this bulletin was compiled by Clarence J. West and Callie Hull, and the Canadian section by the National Research Council of Canada. The other (Bulletin 60) is entitled "Industrial Research Laboratories of the United States, including Consulting Research Laboratories, Third Edition." This bulletin was compiled by Clarence J. West and Ervye L. Risher. Both bulletins are the output of the National Research Council's Research Information Service, of which Dr. West is director.

The purpose of publication of the handbook is to present a ready guide to those scientific and technical societies, associations and institutions of the United States and Canada which contribute to scientific knowledge or further research through their activities, publications or funds. Only those government institutions are included which administer private funds. Organizations directly controlled by universities or colleges have been omitted because it is expected that they will be covered by the forthcoming publication, "American Universities and Colleges," to be issued by the American Council on Education. Seven hundred and nine American organizations and seventy-four Canadian organizations are listed in the bulletin. The address of the secretary, the date of organization, the major object of the institution, the character of membership and amount of dues, time of meetings and information concerning publications are given for each institution.

The bulletin on Industrial Research Laboratories lists 999 such laboratories in the country, giving for each laboratory the name and address of the supporting industrial or commercial concern, the makeup of the research staff, and a list of special subjects to which the research activities of the laboratory are devoted. The first edition of this bulletin was published in 1920 and listed about 300 laboratories; a second edition (first revised edition) was issued in 1921 and listed about 600 laboratories. The present edition (1927) is the second revision of the bulletin.

The difficulties of compilation in connection with both of these publications make it inevitable that some errors, both of commission and omission, have been made by the compilers. The director of Research Information Service (National Research Council, Washington, D. C.) will be glad to have his attention called to any such errors noted by any who may have occasion to examine the bulletins.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

PREPARATIONS OF STAINED DECALCIFIED BONE WHICH RIVAL GROUND SECTIONS

GROUND sections of bone, besides being difficult to prepare, are often unsatisfactory for student use either on account of their thickness or due to the fact that they have been mounted in thin xylol-balsam, resulting in the displacement of the air from the lacunar and canalicular spaces of the tissue. It is, however, possible to prepare decalcified bone in such a way that all the advantages of canalicular detail are obtained. Two methods by Schmorl,[1] the picro-thionin and the thionin-phosphotungstic acid

[1] 1909. Schmorl, G. "Die pathologisch-histologischen Untersuchungenmethoden." Vogel, Leipzig.

methods, give excellent results and the detail demonstrated surpasses that observed in ground sections. With the exception of a few departments of dental histology, neither of these methods is in general use in American laboratories. I have been unable to find Schmorl's original description of his methods but they are repeated in a more recent work of 1909. An excellent discussion of the methods is also found in a paper on the structure of bone of Fasoli[2] and adequate directions for the successful use of these methods are given by Carleton[3] in his recent book on histological technique. References to Schmorl's methods may also be found in the works of Lange[4] and Fischer.[5] It seems unnecessary to completely outline the method since it can be readily obtained in English in a modern text-book on histological technique. Formol, Orth's, Müller's or Regaud's fluids may be used for fixing. Fluids containing mercuric chloride should be avoided. Best results are obtained with celloidin or frozen sections. If nuclear patterns are desired, the tissue should be first stained in alum-carmine or hemalum, as the success of the picro-thionin method depends entirely on the precipitation of the thionin in the lacunae and canaliculi. The picro-thionin method is best adapted to work with old bone, while the phosphotungstic acid method is more useful for demonstrating the histology of young bone and the process of ossification.

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SOME FIXATIVES FOR BOTH NUCLEI AND MITOCHONDRIA

A 2.5 per cent. solution of copper bichromate C. P. (Eimer and Amend) has a pH of 2.0. When root tips of Zea are fixed in it the fixation image is that of chromic acid, *i.e.*, the nucleolus appears as a spherical, darkly staining body in a hollow nucleus whose surface is composed of the chromatin reticulum. The mitochondria are either dissolved by the fixative or by the dehydrating alcohol. If, however, a slight excess of cupric oxide is added to the solution, the pH is altered to about 4.6 and the fixation image is greatly changed. There is here no hollow space around the nucleolus; the nucleus is a solid body, and in the resting stages the chromatin reticulum is much less distinct. In the dividing nucleus the spireme shows up distinctly and the chromosomes are well preserved. While the spindle fibers are not distinguishable individually, collectively they are well delineated. The mitochondria are well fixed and mordanted and can be followed through each of the mitotic stages. This fixative has the following faults: the resting nuclei show little detail, the cytoplasm is somewhat distorted and the outer layer of cells is generally over fixed. The addition of .05 per cent. acetic acid causes the resting nuclei to show more detail, though one must be cautious in the use of this acid, for a slight excess of copper acetate will dissolve the mitochondria. The most successful formula for the fixative is:

copper bichromate	5 grams
cupric oxide	1 gram
10 per cent. sol. acetic acid	1 c.c.
water	200 c.c.

The material should be left in the solution for from 36 hours to six days, and when thus fixed both chromosomes and mitochondria are well stained with Heidenhain's haematoxylin. Destaining should not proceed as far as is usual for an examination of the nuclei, for the mitochondria do not hold the stain as well as the chromosomes and can be completely decolorized before the chromosomes have started to fade.

It is very important to make up the fixative at least 24 hours before it is to be used. It must be shaken frequently in the interval and the excess copper oxide allowed to settle. If it is used too soon the fixation image will be that of chromic acid. It is best to wash out the fixative with 70 per cent. alcohol. If the dehydration is too prolonged the mitochondria will be dissolved out of the peripheral cells. A half hour in each of 70 per cent., 85 per cent. and 95 per cent. alcohol, and an hour in each of two changes of absolute, are sufficient for the dehydration.

Another solution which fixes both chromosomes and mitochondria is:

chromium trioxide	5 grams
glucinum carbonate	3 grams
water	200 c.c.

This also has a pH about 4.6. If there is no excess of glucinum carbonate a little more should be added, for otherwise the fixation image will be that of chromic acid. The fixed material should be dehydrated as described above. Material fixed in this solution appears very much like that fixed in the copper bichromate mixture; the cytoplasm is perhaps a trifle more granular and the mitochondria are thicker, otherwise the two fixatives are alike.

A third solution which fixes both chromosomes and

[2] 1905. Fasoli, G. "Ueber die feinere Struktur des Knochengewebes." *Arch. mikr. Anat.*, Bd. 66, S, 471.

[3] 1926. Carleton, H. M. "Histological Technique." Oxford University Press.

[4] 1913. Lange, W. "Histologische Technik für Zahnärzte." Springer, Berlin.

[5] 1910. Fischer, Bau und Entwicklung der Mundhöhle. höhle.