age by the Bartonella organism can be seen from some of our experiments, which show that if Bartonella carrier injected rats are splenectomized on the twentieth day of treatment, those which have developed the largest ovaries die within a few days, evidence of the disease being very readily revealed in the blood during this time and, in most cases, in histological sections of the excised spleen. Autopsy of these animals shows only a slight compensatory hyperplasia of the lymph and hemolymph tissue. We have had a few Bartonella carrier treated animals which did not succumb after splenectomy performed on the twentieth day of injection, but these rats are almost invariably those which have developed smaller ovaries in response to the treatment. They survive and produce the inhibitory substance to some extent, due most likely to the marked hyperplasia of the remainder of the reticulo-endothelial system, noted as an increase in the numbers and size of the lymph and hemolymph glands at autopsy of these animals sacrificed a few days after the operation.

(2) Nearly all our immature Bartonella carrier rats, if splenectomized at an early stage, are capable of surviving for at least a month. Daily doses of 10 R.U. pregnancy urine extract cause such animals to go into a condition of constant estrus. The ovaries of such animals after 20 to 25 days of injection are, in many cases, even smaller than those of the non-operated treated Bartonella free rats. Histological sections of these ovaries show large follicles and relatively few and smaller corpora lutea. Removal of the spleen serves as a stimulus for increased development and activity of the remaining reticulo-endothelial elements. Our results show that in the treated infected animals, removal of the spleen, coupled with the presence of the Bartonella organism, has evoked much greater reticulo-endothelial compensation, and in a shorter time, than in the injected splenectomized uninfected animals. The injected splenectomized Bartonella carrier immature rat, because of this vigorous rapid compensation, may therefore produce as much or even greater quantities of the inhibitory principle than similarly treated Bartonella free control rats. This would explain the constant estrus condition in such animals.

This work has theoretical importance because (1) it demonstrates a connection between reticulo-endothelial activity and the development of refractoriness to heterozoic endocrine extracts. This strongly supports the contention that the antagonistic substances produced in response to chronic treatment with such extracts are antibody-like in nature. Experiments dealing with a comparison of the neutralizing effects of serum from injected splenectomized, "reticulo-endothelial blocked" and normal animals are now being conducted. (2) It suggests that, by depressing reticulo-endothelial activity either by excision of portions or experimental blockade, it may be possible to evoke from endocrine organs physiological responses of greater magnitude than ever before. (3) It points to the necessity of taking into account the factor of latent infection prevalent in laboratory animals, in interpreting the responses from the endocrine organs. This factor may possibly account, to some extent, for the sometimes exceedingly variable results obtained with prolonged injections of endocrine principles.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A NEW TYPE OF RELIEF MAP

IN many fields maps are absolutely indispensable in recording, understanding and demonstrating the lay of a land. Relief maps, too, have their special purpose, and contractors, architects and engineers are using them more and more the better to understand the problems depending on terrain. Even with the specialist himself, contour lines alone do not make the picture stand out in its full meaning.

It is easy to think of a contour line as the edge of a terrace or of a horizontal board; indeed, it is common practice to cut out cardboard to represent contour lines, and these are piled one on another to give actual relief features. Even without smoothing the "terrace" edges to give a uniform slope the original map may be drawn in place to represent the geographic units—roads, streams, cities and such.

Now we offer a plan of map making by which all the features may be brought into relief as if stamped out of sheet metal, and with it the streams, roads, etc., may be retained in their correct positions. This makes for accuracy and for ease in construction, since it is purely a mechanical reproduction of the original.

The procedure may be as follows. Take the regular government topographic map and have it enlarged, perhaps to four inches per mile. Secure the cardboard that happens to give the desired vertical elevation, and lay the map on a piece of board of suitable size; place this on a jig-saw and cut along the lowest contour. (For convenience mark this board No. 2.) The piece of map thus cut out represents an area of one elevation and may be pasted upon a new board (No. 1) in its proper place and put to one side.

The rest of the map should in turn be fastened to a

new board (No. 3) with thumb tacks and the next contour line cut. Now this strip of paper, cut from between the first and second contours, is carefully pasted along the edge of board No. 2, where it fits perfectly.

Repeat the process; *i.e.*, the remaining part of the map is again fastened to a new board (No. 4) and again another contour is cut out on the jig-saw and the strip is pasted to board No. 3. This is continued until the map is used up, is cut along every contour and each strip is pasted to the previous board where it belongs. Tubes of Duco cement are most convenient in pasting the strips of map to the boards.

These odd-shaped boards, each smaller than the one preceding it and of similar shape, are then put together, using the paper strips as guides; they may eventually be glued and nailed securely. The finished block with all water and cultural features appears, especially from a point directly above, as a faithful reproduction of the original map. The vertical exaggeration depends upon the thickness of the cardboard used; for instance, the two-tenths inch Upson board in connection with a twenty-foot contour map gives an inch for each hundred feet of elevation.

Certain problems arise with respect to depressions, outlying hills and such that may be separate from the main part of the map. It should be kept in mind that the contour around any such feature should be cut at the same time and from the same board as the corresponding contour in the main map.

Moreover, in a rather simple manner one may make a model in plaster as a by-product from this process. This involves saving the "waste" or "scrap-pieces" as they are cut away from each contour; they are put together, piled up to make a mold—a negative—that gives a depression where a hill existed. One should use the positive, the relief map itself, as a guide in placing the negative pieces and it should be done before the positive is glued or nailed together. The negative must be smoothed with plastic material before the casting is attempted in order to avoid the sticking of the final plaster model as it is "pulled." While such a "plaster model" is more like the natural land surface in its smooth slopes and may have the advantage of being waterproofed, yet it lacks the details of roads, cities and streams that the cardboard relief map may have.

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STARFISH STAINS

LOOSANOFF[1] has reported that starfish stained with Nilblue sulfate are apparently uninjured and retain the blue color for as long as three months. To trace migration from two separate winter concentrations in Narragansett Bay this year, experiments were carried on for the purpose of obtaining one or more additional dyes.

The first tests were made with varying concentrations, but in all cases it was found that a concentration of 1 g per liter of solution was not toxic for a short immersion period and that such a concentration was necessary to obtain staining in a period of less than five minutes. The following results are for this strength of solution.

Janus Green and Lichtgrun, made by Dr. Gruebler and Company; du Pont Brilliant Green and Malachite Green, made by the du Pont Company, and Chrome Green C. B. and Erie Green W. T., made by National Aniline Company, were the green dyes tested. The first and third stained, but the color was not lasting. The fourth stained blue, and the others did not take.

The red dyes tested were Neutral Red, made by Dr. Gruebler and Company, and Rhodamine B, made by the du Pont Company. The latter stains well, but the color fades. Neutral Red, however, stains well and the color holds.

Other dyes tested were Basic Brown, Crystal Violet and Methyl Violet, all made by the National Aniline Company. The first stained dark red, which faded slowly, while the last two faded very rapidly.

Neutral Red was selected as the most satisfactory of these dyes, and several thousand specimens have been stained and liberated in the Mount Hope Bridge region. In control live cars, there has been so far no detectable change in Neutral Red stained starfish over a period of four weeks.

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[1] LOOSANOFF, SCIENCE, 85: 412, 1937.

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