Jurgelunas¹⁹ injected measles blood subcutaneously and intravenously into monkeys; he brought monkeys in contact with measles patients, and he rubbed measles mucus on the healthy as well as scarified lining of the mouth and pharynx of monkeys; but all remained well except one ("Pavian"), injected intravenously with 5 c.c. of defibrinated blood drawn the day before eruption. On the tenth day this animal was sick, the pharynx was red, and there were some small red spots on the face, abdomen and thighs, but there was no fever; death took place on the twelfth day, and the organs were found to be sterile. The eruption did not clearly resemble that of measles, and Jurgelunas regards this experiment as having given a doubtful result.

Marzinowsky¹⁶ experimented without result on one rhesus monkey.²⁷

SUMMARY

We may conclude from the results of human experiments that the cause of measles is present in the nasal secretions, scrapings of the skin (epithelial debris and blood), and the blood, during the earlier part of the eruptive stage. Attempts to produce by inoculation a mild, modified or localized form of measles have not yet given conclusive results.

The only animal proved susceptible to measles so far is the monkey, but the susceptibility is not marked and seems subject to variation. The disease in the monkey is mild and takes the form after an incubation of several days of a brief fever, with which may be associated more or less typical skin changes, respiratory symptoms, Koplik spots, and the characteristic measles leukopenia. The results in monkeys show that the cause of measles is present in the nasopharyngeal secretions and the blood at least twenty-four hours before the rash, as well as for a day or two afterward.

CHANCRE OF THE FINGERS

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Physicians, especially gynecologists and obstetricians, are particularly liable to syphilitic infection of the fingers. Nurses, one would think, are in almost the same danger in their professional work; but in them we have seen fewer instances of this unfortunate accident. Case 1 is a typical and instructive instance:

CHANCRE OF THE FINGERS SIMULATING PARONYCHIA

CASE 1.—June 19, 1913, a professional nurse was referred to us for a continuance of her treatment. Toward the end of the previous February she acquired what appeared to be a pyogenic infection under the edge of the right thumb nail. Shortly afterward a similar infection showed itself under the free edge of the nail of the left index finger, presumably following a wound with a safety pin. Both nails were evulsed, May 7. In both, therefore, the suppurative process had lasted considerably more than two months. A characteristic papular eruption, and mucous patches in the mouth, appeared, May 26. When we first saw the patient, June 19, there was just an indication of a fading roseola of the palms.

27. A. F. Hess (German Measles [Rubella]: An Experimental Study, *Arch. Int. Med.* 13: 913 [June] 1914) inoculated a rhesus monkey intraperitoneally with 3.8 c.c. of blood from patients with rubella, but the results were negative.

No other mode of entrance of the syphilitic virus than by the fingers could be ascertained by either the physician in charge of the case or by the nurse herself. The paronychias were particularly slow in healing, and the syphilitic eruption appeared at a time corresponding to the appearance of the paronychias as primary sores. That there should be two paronychias, both of which were probably chancres, was interesting and rare.

A paronychia-like chancre is peculiarly difficult to recognize, as it does not in any way resemble an initial lesion. The nail and the nail fold completely obliterate all its characteristics. An obstinate, long enduring and exceedingly painful panaritium, occurring in a physician or nurse, should excite our suspicions, and should lead to repeated examinations for spirochetes. After five weeks the blood might be examined for the Wassermann reaction. An indolent bubo at the epitrochlea or in the axilla has a diagnostic value. Any suppurative lesion of the finger, however, might give rise to such a swelling.

CHANCRE ON THE WEB OF THE FINGERS

Any sore lasting longer than an ordinary infection and situated on the dorsal surface of the web between the thumb and the index finger, or on that between the index and the middle finger in a gynecologist or an obstetrician, should give rise to the gravest suspicion of its syphilitic nature. These two localities come against the entrance of the vagina during examinations, and the skin is put on the stretch, so that any wound accidentally there is apt to be opened to its utmost, allowing an easy entrance for the virus from syphilitic lesions of the vulva or vagina. Case 2 is an excellent example of this kind of accident:

CASE 2.—A physician, aged 47, consulted us, March 23, 1909, for a sore that had appeared on the back of the web between the left thumb and index finger four weeks previously. He said that it had appeared as a bleb. There was now present an ulcer with a gray floor and soft, heavily infiltrated, blue base. The patient noticed swelling of the lymphatic nodule in the left axilla four or five days after the appearance of the lesion. There was no swelling at any time of the epitrochlear lymphatic gland. Two weeks after the appearance of the sore, there manifested itself on the abdomen a bright, evenly distributed rash, like that of scarlatina, which vanished in a day or two. In still another week the patient suffered from chills and fever. The eruption for which he consulted us had appeared two weeks previously. There was present, when we saw him, a deep red papular syphilid with much infiltration, scattered over the trunk, and to a less extent on the limbs. The only lymphatic enlargements demonstrable were in the left axilla and in the groins. His temperature was 99 F. in the morning and from 100.5 to 101 in the evening, and was associated with chills without a distinct rigor. Two small faintly stained spirochetes were found in a smear from the initial lesion. None were found in smears from a papule on the arm.

In this history the time given for the appearance of the chancre was undoubtedly incorrect. It was too close to the appearance of the eruption.

One must not allow absence of enlargement of the epitrochlear lymphatic nodule to influence one unduly in arriving at a negative conclusion in chancre of the hand, as some of its lymphatic vessels pass through the nodules of the epitrochlear region, while others go direct by to the axilla. Therefore, if the chancre is in a district drained by vessels that pass directly to the axilla, the nodules at the elbow may not be swollen or indurated.

I do not know anything about the subsequent history of this case, and it dates back to the time previous

to the introduction of arsphenamin and to the notable improvements in the treatment of early syphilis. Nevertheless, we now know that it would have been of inestimable advantage if the patient could have had treatment before the cutaneous eruption appeared.

CHANCER OF THE FINGER

A chancre, no matter in what situation, usually ulcerates, but it does not do so necessarily, and Case 3 is an instance in which it constituted simply an extensive infiltration:

CASE 3.—Feb. 25, 1910, a physician consulted us for an eruption which he first had noticed about four weeks previously. The eruption was a characteristic papular syphilid, not itchy, and appeared to come out suddenly on the forehead, back and chest, and scatter down sparsely over the arms. There were a few thinned out areas in the hair of the scalp posteriorly, and there was a mucous patch on the right tonsil. Four days before the appearance of the eruption the patient had a characteristic, intense, occipital headache.

Before the previous Christmas, he had noticed a painless induration, without break of the surface, situated on the radial side of the second phalanx of the left index finger. This he cut open. There was adenopathy in the left axilla, but none of the left epitrochlea, and a very small one of the right, so that the marked lymphatic enlargement in the glands, receiving the drainage from the affected district, so valuable in hunting for the seat of extragenital chancre, was of very little aid here. The dusky induration appearing before the eruption admitted, however, of no doubt as to its being the primary lesion. There was still another peculiarity, which sometimes occurs in the primary sore, an extraordinarily long enduring dusky redness. This was noted as being still present, Aug. 2, 1912, twenty months after the inception of the chancre.

As regards the acquisition of the disease, the doctor had operated on syphilitic tonsils in a Japanese, the middle of the previous November, and, as before mentioned, the induration on the finger was noticed before Christmas.

If for no other reason than to keep one on the alert in diagnosis, the subject of the primary lesion of syphilis, as it occurs extragenitally, is well worth considering. This is especially true nowadays when the results of early treatment, necessarily dependent on early recognition, are so brilliant, and the consequences of failure to recognize this disease are now known even to the laity as being so portentous. The physician, therefore, in recognizing the true nature of the disease may make a brilliant hit, or in failing to do so may achieve a failure, which from its very nature as appertaining to an eminently chronic malady may continue to approach during his entire life of practice.

The essential difficulty, however, of recognizing these lesions in these situations in their early stages is shown by the cases cited, for one instance occurred in a professional nurse working with a physician, and the other two were in physicians in active practice; yet in no case was the true nature of the disease suspected until the appearance of the eruption.

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War Training as a Postgraduate Course.—No postgraduate course can equal the actual benefits to the professional man, no clinic can complete a system of organization so thoroughly as the war training is going to show the way. It will teach a system of efficiency to the medical man that will be a great asset to him after returning to private life. This is surely worth the while. Incidentally, it will teach the people the significance of the medical profession and the rôle it fills in regard to health. It will teach the people, as the insurance companies already know, the benefit of a thorough physical examination in both health and disease, especially in health.—President's Address, Minnesota State Medical Society, 1918.

A PULSE RATE STANDARD FOR RECRUITS*

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During routine work on the cardiovascular board at Camp Lewis, many recruits were seen who complained of symptoms suggestive of circulatory disorder, although no indication of any cardiovascular defect was obtained by the methods of inspection, palpation, percussion or auscultation. In this group of cases a functional test might be expected to help in the determination of the existence and of the grade of true circulatory disability. The regulations as to the examinations of recruits provide such a test. It is based on the changes in pulse rate induced by alteration in the position of the body and by exercise. The pulse rate is taken with the subject standing. He is then directed to lie down and the rate is again counted; thereafter he hops 100 times on the left foot, and the pulse rate is counted immediately and two minutes after this exercise with the recruit in the recumbent position.

The impression, however, of those who had had most experience with this test was that no importance could safely be attached to the results obtained by it unless they showed an extreme degree of acceleration of the pulse rate on exercise and a marked delay in the return to the pre-exercise level. The great majority, therefore, of men with symptoms but without signs of circulatory disability were accepted for full military duty, though often with doubt and hesitation.

This state of uncertainty in regard to the interpretation of the results of the regulation exercise test was all the more to be regretted since Mackenzie, Lewis and others who have had a large experience in the classification of soldiers with predominantly subjective cardiac disorders have found the pulse rate reactions to the strain of physical exertion one of the most valuable of all the objective criterions that they used as aids in the disposition of such cases.

It seemed not unlikely that the difference between their opinion and ours might arise from our want of exact knowledge as to what was a normal and what an abnormal reaction to the strain of the test we used. It was with the object of obtaining this knowledge that the work here reported was begun.

METHOD USED IN DETERMINING THE LIMITS OF NORMAL VARIATION IN PULSE RATE

The limits of normal variation can be deduced from a sufficient number of observations on normal individuals by the application of statistical methods. The measure of variation here used is known as the "standard deviation." It is obtained by finding the square root of the mean of the squared deviations from the arithmetical mean of the observations. This method is the one most commonly used by statisticians and biologists for such a purpose as ours.

The usefulness of a normal standard obtained by this or any other method will largely depend on the extent to which the conditions in the group of normal individuals on whose reactions it is founded are comparable with the conditions surrounding the individuals to whom the standard is to be applied. The men

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