is a good one, as no doubt there is considerable physiologic variation. My work has been done at an elevation of 1,000 feet. I have made about 800 differential counts on some 600 patients. I have not been sufficiently impressed with any particular variation from the normal in lymphocyte percentage to attempt to establish a rule, aside from the increased percentage in the early stages of the disease and a decrease, often, in serious cases. From the data presented by Dr. Watkins the question naturally arises as to what the value of altitude might be in establishing immunity. Sufficient work has already been done to show that the lymphocyte is probably more active in increasing the resistance of the individual in tuberculous disease than we had formerly supposed, but since this same increase in lymphocytes is to be seen in normal people at an altitude, we are obliged to consider that such increase in diseased persons must be in part physiologic and cannot be considered as a favorable reaction against the disease process.

As the technic employed in making counts is very important, I wish to ask Dr. Watkins what technic was employed in making his computations.

DR. W. W. WATKINS, Phoenix, Ariz.: I will say, first, that my chief object in presenting this paper was that I thought the criticisms which would be offered would be of value to me in future work along the same line. As to the criticism regarding conclusions based on only 100 patients, of course, conclusions of value cannot be drawn from 100 examinations, in any condition, if that were all; but as there were thousands of cases reported in literature, I felt justified in drawing conclusions which simply confirmed the work of other men.

As to the technic of the smears, I used both the method recommended by Ehrlich with cover-slips and the method recommended by DaCosta with slides. The one I chiefly used is that of taking the ordinary slide, properly cleaned and prepared, putting on the drop of blood, bringing the end of another slide up to the drop and then pulling it away, the blood following the slide. In these smears, the drop was kept in the central portion of the slide. I take three or four, never less than two. The smears, when the leukocytes are bunched at the terminus of the smear, cannot be depended on. The leukocytes must be distributed evenly throughout the smear to be of value. The stain used was Wright's.

PROLAPSE OF THE UTERUS COMPLICATING PREGNANCY *

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Of the malpositions of the uterus, descensus is most often encountered. This applies as well to the early pregnant uterus in descensus of moderate degree. It is well known that a moderate degree of descensus uteri is not incompatible with pregnancy and with normal delivery, but complete prolapse of the gravid uterus is rarely seen and has never been observed at full term. A number of cases have been so recorded, but it is believed that in these cases the edematous, elongated cervix and inverted vaginal walls have been mistaken for the uterus in its entirety (Braun-Fernwald¹). In Plasse's case the patient went to the seventh month of gestation. No other reported case has developed to this degree. In this instance the fetus was macerated.

The first noteworthy contribution to the subject was by Hüter² in 1860; the next by Franke,³ who brought the total of reported cases to 124. Seitz⁴ followed with

a noteworthy contribution on the subject published in 1902.

With the aid of Dr. Heaney of Chicago I have collected, in all, 140 cases in the literature to which I will add one of my own and two as yet unreported cases.

We seldom find prolapsus of the gravid uterus in a primipara. The displacement is usually the result of pregnancy, hence a condition common to multiparæ. As to the time of occurrence, we find in the majority of case-records that the procidentia was not manifest until one or more children were born; that there had pre-existed a descensus of the uterus to a greater or lesser degree, and that the descensus had increased in the subsequent pregnancy. In other words prolapsus uteri in pregnancy is but an exaggeration of a preexisting condition.

Tracon⁵ reported two cases in which the prolapse occurred during pregnancy, one in the fourth month due to a severe strain and the other when at stool. Stamm⁶ also reported two cases, and Verre, Webb and Rosano each a case in which the prolapse occurred in pregnancy.

In the case reported by Kidd,⁷ the prolapsus was first in evidence at the time of labor, though in his case the woman had given birth to three children and had had five abortions, making it probable that the uterine supports had been weakened prior to the last labor in which the prolapse occurred.

Dufour⁸ records a case in which the pregnant uterus was prolapsed to the level of the knees. The woman had borne three children and was in the sixth month of gestation. The cervix protruded from the vulva throughout the six months of pregnancy. With the first pain incident to premature labor, the membranes ruptured and the entire gravid uterus protruded to the level of the knees. The protruding uterus and vaginal walls became deeply congested and for fear of gangrene the uterus was promptly emptied by first incising the cervix. Boissard⁹ recorded a similar experience in a pregnancy of three months. Wagner,¹⁰ Harvey and Plasse also reported cases in which the gravid uterus hung to the knees. The first case of acute prolapsus occurring in labor was reported by Mauriceau. Similar cases have been reported by Gristock, Kauffman, Wagner, Stein, Poetal, Meralini, Chemin, Smelli, etc.

The likelihood of pregnancy occurring in a prolapsed uterus is in inverse ratio to the length of the cervix, the degree of prolapsus of the uterus and vaginal walls and to the tissue changes resident in the uterus and its appendages. Where the cervix protrudes from the vulvar outlet, pregnancy will rarely supervene. In prolapsus of long standing the usual anatomic findings are eversion and erosion of the lips of the cervix, hypertrophy of the endometrium and uterine musculature and cystic degeneration of the ovaries. Such a combination of lesions, irrespective of the position of the uterus, will greatly lessen the chances of pregnancy. Add to these lesions the possible fixation of the uterus and its appendages by pelvic adhesions and the chances of pregnancy are almost *nil*, with practically no chance of maturing the pregnancy. Winckel reported two cases in which the anterior lip of the cervix attained the size of a man's fist and caused ischuria. The swelling of the anterior lips of the cervix has been observed in a number of cases

* Read in the Section on Obstetrics and Gynecology of the American Medical Association, at the Sixty-Second Annual Session, held at Los Angeles, June, 1911.

1. Braun-Fernwald: Winckel, Handbuch der Geburtsh., ii.
2. Hüter: Monatschr. f. Geburtsk. u. Frauenkr., Berl., 1860, xvi, 176.

3. Franke: Inaugural Thesis, Jena, 1892.

4. Seitz: Beitr. z. Geburtsk. u. Gynäk., 1902, vi, 250.

5. Tracon: Arch. de toc., 1891, xvii.

6. Stamm: Diss. Würzburg, 1898.

7. Kidd, F.: Centrabl. f. Gynäk., 1890, No. 35, p. 627

8. Dufour: Monatschr. f. Geburtsk., xvi.

9. Boissard: Nouv. Ann. clin. de Montpellier.

10. Wagner: Martin, Atlas, Tab. 47, Figure 5.

and is ascribed to edema. This edema rapidly disappears after delivery.

In several reported cases cohabitation was accomplished through the gaping cervix (Spancken¹¹); Chopart, cited by Franke, and Harvey, cited by Winckel.

In the fourth month of gestation the uterus rises out of the pelvis and in this manner an uncomplicated descent of moderate degree is corrected for the remaining months of gestation, to return in the early weeks of the puerperium. In prolapsus of an advanced degree and in cases in which the uterus is adherent or incarcerated, a spontaneous reposition of the uterus cannot be effected. Bimanual manipulations or operative interference must be instituted if the pregnancy is to proceed.

Where the uterus is completely prolapsed, pregnancy is usually terminated spontaneously in the early weeks of gestation. Wimmer's case, which went to the sixth month, and Plasse's case, which was interrupted at the seventh month of gestation, are notable exceptions to the rule that in extreme prolapsus abortion occurs in the first month of gestation as a result of circulatory and mechanical disturbances. These abortions are incomplete in the majority of cases because of ineffectual contractions of the uterus. In the 124 cases, reports of which were collected by Franke, there were twenty abortions.

In the event of labor or abortion certain serious complications may ensue. Postabortive and puerperal infections occur in a relatively large proportion of cases because of the ineffectual emptying of the uterus and the occasional presence of ulcers of the cervix.

The elongated, rigid cervix offers a serious impediment to the progress of labor. We find labor prolonged by the resisting cervix and the enfeebled uterine musculature. It is no exception for labor to be prolonged two to three days and in some instances five to seven days. So great may be the resisting power of a rigid, elongated cervix that the lower uterine segment and body of the uterus may rupture spontaneously in labor and gangrene of the cervix is known to ensue. Not only does the resistance offered by the cervix prolong labor, but, if not relieved by incision, the lower uterine segment may stretch to the point of rupture as in the case of Dougall.¹² This case proved fatal as a result of a rupture which extended from the cervix to the fundus. Miller also reported a case of rupture of the lower uterine segment as the result of a resisting cervix. Kohl asserts that there is little or no bag of waters in advance of the presenting part and believes this to be a factor in the slow dilatation of the cervix.

My own case is as follows:

Patient.—Mrs. A., aged 36, quartipara, was in the third month of gestation. Since her last pregnancy the vaginal walls and cervix had protruded beyond the vulvar outlet. From the onset of her present pregnancy the prolapsus steadily increased until she was scarcely able to walk about.

Examination.—I found the vaginal walls completely everted and by making traction on the cervix, I was able to deliver the entire uterus beyond the vulvar outlet. The body of the uterus was a little larger than a man's fist, the cervix about 4 inches in length. The pelvic floor was torn and relaxed to the extent of affording little support to the pelvic organs.

Treatment.—Relief was imperative. My first advice was to confine her in bed with the hips elevated for the greater part of two to three months. The conditions were not favorable to the wearing of a pessary. A sick, 2-year-old child and three other small children at home on a ranch and no help other than that of the mother and father made it imperative to pro-

vide relief in the shortest possible time. Accordingly, I emptied the uterus of a three months' fetus, and under the same anesthetic I amputated the cervix and performed an anterior colporrhaphy and posterior colpoperineorrhaphy. The results were satisfactory and the patient left the hospital for her home in sixteen days.

In the management of these cases, the following propositions are presented:

1. Pregnancy with a moderate degree of prolapse, and in the absence of any considerable elongation and rigidity of the cervix, will usually proceed to term and delivery will be effected without serious embarrassment. If, in the early months of pregnancy, the patient complains of a bearing-down sensation and of bladder and rectal disturbances chargeable to the descended uterus, a suitable pessary may be worn with safety, and removed at the end of the fourth month. Hüter asserts that no case is recorded in the literature in which the wearing of a pessary has brought about a miscarriage. In addition to the wearing of a pessary, and in cases in which for one reason or another a pessary cannot be worn, rest in bed should be enjoined for several hours daily, all unusual exertion forsworn and the clothing so adjusted as to prevent traction and constriction at the waist line. In acute prolapsus, occurring in the course of pregnancy, there is great liability to miscarriage, hence the urgent indication to replace the uterus and to provide a suitable support in the form of a pessary. Rosano records a case in which a woman, 26 years of age, had given birth to five children and was again pregnant, when through violence the uterus was caused to descend, protruding from the vulvar outlet to a length of 27 cm. The uterus was replaced and the pregnancy progressed to term.

To replace a prolapsed pregnant uterus the patient should be in the knee-chest or dorsal position, the bladder and rectum empty and all constricting clothing removed from the abdomen. With the thumb and fingers the uterus is gently but forcibly pushed back in line with the long axis of the pelvis. Following the replacement, rest in bed should be enjoined and a suitable pessary adjusted. If the head is engaged in the pelvic inlet no effort at replacement should be attempted.

2. Where the labor is retarded by an elongated, rigid cervix the acknowledged method of procedure is to make a bilateral incision of the cervix (Dührssen) and to apply forceps or perform version. Under such conditions there is a relatively large proportion of breech presentations and the presence of a rigid cervix renders the delivery particularly hazardous to the child. Here the bilateral incisions of Dührssen are of special advantage. Seitz found it necessary to incise the cervix in 38 per cent. of the ninety-one cases collected by himself and Franke. We are admonished not to make an anterior incision of the cervix for fear of wounding the bladder and rectum. A reasonable degree of caution and experience should obviate the objection, and certainly in advanced pregnancy this incision affords a more ready method of delivery than do the bilateral incisions of Dührssen. In pregnancy at term, an abdominal Cesarean section may be made in selected cases.

Where the uterus is adherent the usual rule of procedure is to empty the uterus of its fetal contents and if the pregnancy is not advanced beyond the fourth to the sixth week the necessary abdominal and plastic work may be done to correct permanently the displacement and associated lesions.

3. Following delivery the uterus, which prior to pregnancy was but partially prolapsed, may become completely so. Foster had one such case, the result of

11. Spancken: Arch. f. Gynäk., 1881, xvii, 128.

12. Dougall: Glasgow Med. Jour., July, 1881, p. 28.

forcible traction on the cord. Bernard records a case in which a complete prolapse followed on forcible expression of the placenta. Such an organ should be replaced by taxis, the patient retained in bed with the hips elevated until the end of the second or third week of the puerperium, when the necessary operative procedures may be applied to correct the displacement permanently. A colpeurynter or gauze pack should not be used to retain the uterus in place because of the stoppage of drainage of lochia. If the cervix presents at the vulvar outlet during the puerperium an antiseptic dressing should be applied to the vulva to prevent infection of the uterus.

4. When the prolapse of the gravid uterus exists to a degree that renders the patient uncomfortable or incapable of enduring the existing conditions, relief may be found in various ways. In prolapse of a moderate degree, the pessary, worn for the first four months of gestation, will usually afford the desired relief. Most authors advise against the performance of plastic operations on the pelvic floor during pregnancy because such operations are excessively bloody, the trauma of the operation is liable to induce abortion and the restored pelvic floor is almost certain to give way in a subsequent delivery. However, there are a number of successful cases on record in which the cervix has been amputated and the pelvic floor restored without interrupting the course of pregnancy. E. Haussou amputated the cervix in the fourth month of gestation. Four weeks before the estimated date of confinement the bag of waters ruptured and labor followed. The child was fully developed and living. Boni amputated the cervix in the fifth month of gestation; the pregnancy continued to full term.

Schroeder¹³ and Mittermaier¹⁴ each amputated the elongated cervix of a prolapsed pregnant uterus without interrupting pregnancy. Schroeder's patient was in the third month and Mittermaier's patient was in the tenth week of gestation. Morral amputated the cervix and repaired the pelvic floor in two cases, one in the third, the other in the fifth month of gestation, both cases going to full term. In view of his results in these two cases and of his experience with one in which death occurred on the eighth day of the puerperium following sloughing of the cervix, Morral vigorously endorses the practice of amputating the cervix and restoring the pelvic floor in the course of pregnancy.

Had I been familiar with the work of Morral and others when the case above reported was referred to me by Dr. A. F. Jonas of Omaha, I would have followed their example in the effort to save the child.

Dr. Ralph G. Mills, medical missionary to Kangkai, Korea, writes me that in the past year he had delivered two cases in which the native Chinese doctors had saturated the protruding portion of the cervix with kerosene oil and set fire to it. In both cases there was dense scar tissue in the cervix. One woman was in labor seven days, the other four days. Both required multiple incisions in the cervix to deliver the child with forceps. One child lived, the other died.

The necessity for operative interference in so large a percentage of cases has obviously added to the maternal and fetal mortality. V. Hüter reckoned the fetal mortality at 31.4 per cent.

In twenty-nine out of ninety-one cases the forceps was used with seven fetal deaths. There were six versions with two fetal deaths and in ten instances the head was

perforated; 28.5 per cent. were still-born or died shortly after delivery. Abnormal presentations were relatively frequent.

Winckel says that breech presentation occurs two or three times more frequently in a prolapsed than in a non-prolapsed uterus. There were five maternal deaths, four due to sepsis and one to rupture of the uterus.

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ABSTRACT OF DISCUSSION

DR. ARTHUR E. HERTZLER, Kansas City: I have recently had a case of this sort that has many elements of interest. The patient at the time of observation was 20 years old and gave this history: Between 16 and 17 she began to notice the protrusion of the cervix; between 17 and 18 the prolapse was complete. She married shortly after 18 and became pregnant a few years later. When I first saw the patient the uterus was entirely prolapsed. I was asked to see her because the combined efforts of the patient and the family physician could not restore the uterus to the pelvis. By rest in bed and manipulation the uterus was easily replaced and the patient was kept in bed for a couple of months. The patient was delivered spontaneously at term after a labor lasting eight hours. She was attended by her family physician and the labor was said to have been without notable difficulty. Four months after delivery the patient was given the choice of a complete operation which would sterilize her or a partial operation which would give her a chance of pregnancy under difficulties which could not be estimated. She selected the former and I amputated about 2 inches of the cervix, removed a considerable portion of the anterior vaginal wall, separated the fascia and did a plication. A firm perineum was built up and the uterus placed sufficiently high to apparently bring the organs into the most favorable situation. What was not needed of the fundus was cut off and sutured to the rectus fascia. The patient made an uneventful recovery. When I saw the title of Dr. Findley's paper I asked the patient for permission to examine the field of operation and I found everything in satisfactory condition.

DR. W. B. DORSETT, St. Louis: A case occurred in my practice some time ago. When I first saw the patient she was in much the same condition as that described by Dr. Hertzler. When she was standing the uterus would hang down and could not be kept in position by any kind of pessary; there was not enough perineum to hold the pessary. It could be held up only by keeping the woman in bed with the hips elevated. She was kept in bed for six months after I first saw her. At the seventh month of pregnancy, labor set in and she was delivered of a seven-months child, which lived only a short time. I subsequently did a perineorrhaphy, repairing the cervix, and also an anterior colporrhaphy and a Gilliam operation, explaining to her that she could not become pregnant but would be relieved of her symptoms. The question came up as to whether or not I should remove the ovary. As I made rather a solid pelvic floor I did not remove the ovary. I cannot say anything more than what has been said regarding the treatment given by Dr. Findley.

DR. F. T. ANDREWS, Chicago: I never have seen a patient of this kind pregnant, but had a patient on whom I made an extra-vaginal hysterectomy, in whom the uterus was hanging out almost to the knees, and the patient told me that she had had this condition for many years; that having this condition she became pregnant and that the physician replaced and held the uterus within the canal. She had an uninterrupted pregnancy and delivery. When she came to me she had passed the menopause and I removed the uterus. I made an elaborate research in the matter of hernias of the uterus, pregnant and non-pregnant, and found a very large number of cases of hernia in which the uterus was pregnant in different situations. I found some cases of hernia of the uterus tabulated as such which were purely prolapse. Therefore, it would be possible in making research to miss those cases because the word "prolapse" was not used but "hernia" used instead.

13. Schroeders: Lehrbuch der Geburtshilfe, bearbeitet von Olschhausen u. Velt.

14. Mittermaier: Centralbl. f. Gynäk., 1896, xx, 135.

DR. PALMER FINDLEY, Omaha: The question might come up, "Shall we sterilize the woman?" I trust I have not given such an impression regarding a pregnant uterus prolapsed but otherwise normal. I would not raise the question at all of the advisability of sterilizing the woman to prevent further pregnancies.

GENERAL PARESIS, TABES AND SYPHILIS OF THE NERVOUS SYSTEM *

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ETIOLOGY

In all three conditions mentioned in the title we have as the primary cause syphilis. In general paresis and tabes there are no active elements of the primary infection present; that is, no spirochetes are found in the diseased tissues. We have rather the results which manifest themselves by inducing fibrosis of the nerve-tissues and blood-vessels. Probably 5 or 10 per cent. of those acquiring syphilis are affected with general paresis and tabes, and a like proportion with syphilis of the nervous system.

We should divide these diseases into two classes, (a) general paresis and tabes being parasyphilitic, and (b) syphilis of the nervous system being directly due to infiltration of syphilitic material into the nerve-structures and vessels, with evidence of spirochetes. An important point is also the time between the infection of the primary disease and the appearance of the disease of the nervous system.

SYPHILIS AND PARASYPHILIS

In the parasyphilitic diseases, general paresis and tabes, involvement of the nervous system rarely shows itself before ten years, and often still later; while in syphilis it usually occurs in about five years. Other causes are important factors in exciting diseases of the nervous system, as injury, strain, overexertion, exhausting diseases as typhoid, excess, alcoholism, venery, heredity, etc. Perhaps without these exciting agents no involvement of the nervous system would take place, but the converse is still more positive, that without syphilis probably there would be no general paresis or tabes.

Symptomatology.—In general paresis and tabes there are many points of resemblance and also many differences. As we have seen, they occur about the same time after the primary infection and are both parasyphilitic; they may both have a long prodromal period before the symptoms become pronounced. This is perhaps more clearly observed in tabes if carefully investigated than in general paresis, but it may be seen even in the latter, although the history of the disease before acute mental disturbance will often show that there have been some changes in character or personality months, or even years before, which were not fully appreciated. In tabes the history of pain, or anesthesia, or some slight vesical weakness, or inconstancy of gait, may have existed for a long time before the patient has consulted a physician. Probably at the time a careful examination of the pupillary reaction would have shown partial or complete Argyll Robertson pupils; I have seen

the Argyll Robertson pupil years before any other clinical manifestations. I consider, indeed, this symptom the most important or cardinal one in the diagnosis of general paresis and tabes, hesitating without its presence to make a positive diagnosis. In one case in which the diagnosis was important from the legal point of view, the diagnosis of general paresis from the mental side was positive; the absence of the Argyll Robertson reaction, however, led us to qualify the diagnosis and therefore the prognosis. The wisdom of this was shown two years later by the recovery of the patient. The importance of this symptom cannot be overstated, as its early manifestation gives us the only possibility of cure or stay of the disease by treatment.

The conditions first mentioned are the two which are common to both diseases, general paresis and tabes; the other symptoms, while in some degree resembling, are so widely apart in intensity as almost to be different in nature. Many authorities, especially Mott and Ferrier, are very positive that the two diseases are the same, their clinical differences being due only to the situation of the lesion, the nature of the pathologic changes, however, being the same. I think, however, when we take up the course and symptoms and study them individually, the differences will show themselves most markedly.

Confining ourselves to the spinal-cord lesions and the cranial nerves, we find in general paresis either spasticity and exaggerated reflexes, which certainly is not symptomatic of tabes, or loss of reflexes with ataxia of a mild degree, as a rule, rarely as extreme as that found in tabes of the typical form; or again, spastic paraplegia and ataxia, which is a combined sclerosis of the spinal cord, as is shown by the pathologic changes. This certainly is not seen in tabes. Again, in tabes the spinal symptoms are all of the sensory type as shown by pains, paresthesias, ataxia, or loss of muscular sense; but never in a motor type as paralysis or contractions; these latter conditions, when present, are caused by disuse, never by a true lesion of the spinal cord involving the motor or lateral tracts. The end-stage of tabes, the so-called "paralytic," is a misnomer; there is not true paralysis, but simply complete loss of direction of motion. The sensory side of the disease is shown by the extreme pain, not only the lightning-like, stabbing pains of the extremities and trunk, but also by rectal, vesical, cardiac or gastric crises, which are so infrequent in general paresis, even of the so-called tabetic type, as not to be classed as the essential symptoms of general paresis while they are especially so of tabes. Vesical paralysis, so common in tabes, is unusual in general paresis. We must not confuse mental weakness in which there is inattention to emptying the bladder with paralysis of that organ.

I might mention also the joint involvement and the foot ulcers, which indeed, while not common in tabes, are certainly not present in general paresis.

The cranial nerve lesions, with the exception of the Argyll Robertson, also differ in the two diseases. Optic atrophy is rare in general paresis; especially is this so of the cerebral type. Such affections of the third nerve as ptosis, ocular muscle paralysis, common to tabes, are rare in general paresis even of the tabetic type. As I have already said, the gastric, cardiac and laryngeal crises, due to pneumogastric nerve involvement, are rarely present.

No case of general paresis runs its course without spinal cord involvement, probably of both the lateral and posterior columns, but in no case is there such complete

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