eclampsia by means of the chloral or the veratrum or both. The morphin is open to the well-known objection that it diminishes the secretions, but we often are obliged to resort to it when we are not able to control the convulsions by chloroform. Then, I believe that nothing less than one-half a grain should be given and frequently repeated if necessary.

The necessity of examining the urine beforehand can not be too strongly dwelt upon, but I believe that you can not absolutely rely upon albuminuria as a danger signal. I had a case recently in which the urine was examined every day without any albumin being found present. Immediately after the first few convulsions the urine was again examined and still no albumin. Dr. Davis, of Philadelphia, has emphasized the necessity of watching the urea. I think that is valuable in conjunction with other things. I have examined many specimens of urine of pregnant women which contained no albumin but had a very low percentage of urea a great part of the time before the confinement. Therefore, it seems to me that a small amount of urea is not necessarily dangerous. That it is only in cases where you have albumin and a small amount of urea, in conjunction with symptoms such as headache, indigestion, etc., that we are justified in inducing labor. In any case where the urea is persistently low, the urine diminished in amount, down to one pint or less, and with albumin or edema, that is the case where we should not hesitate to induce labor.

DR. B. F. CRUMMER, Omaha, Neb.—I think it is the duty of physicians to dispel the illusion of the laity that the conditions of pregnancy and labor are always physiological, and may be trusted largely to nature. It is undoubtedly this belief that renders legislation governing obstetric practice so difficult to secure. The average legislator thinks of the easy, natural birth, and then makes a large concession to the ignorant midwife. The fact is that in no class of medical practice is the responsibility of the attendant greater. Even with the closest observation we may meet with a severe emergency, such as eclampsia, or antepartum hemorrhage. In threatened eclampsia the question of rapid delivery is extremely important, and medicinal measures occupy only a secondary place. I recently saw with two other physicians a young German woman at the beginning of the eighth month of pregnancy who was so waterlogged that a digital examination could scarcely be made, and the patient could hardly sit upright; yet one of the attendants had held out against interference. I strongly advised the induction of labor, which came on six hours after the introduction of a bougie into the uterus and she was safely delivered. Should eclampsia occur the attendant should have a definite plan of procedure outlined in his mind: Chloroform first, and then as rapid a delivery as is possible with safety to the patient. I distinctly remember a case in my early practice in which after a 12-mile drive I found a woman in her ninth convulsion. With no assistance at hand I first chloroformed her and then applied the high forceps, and not another spasm occurred, although the patient remained comatose for four days, and blind for a much longer period. The medicinal measures such as the exhibition of veratrum, chloral, etc., must vary with the case. Referring to etiology I believe that skin affections have a positive effect in the production of eclampsia. I have attended a lady of 28 who suffered from a rather extensive lichen planus during her pregnancy. Urinary insufficiency was marked, and the tendency in the last weeks was to secrete only 9 to 16 ounces of urine, with a marked reduction of urea. It was only by the persistent use of eliminants and diluents that I was able to deliver her without the threatened eclampsia.

DR. M. ROSENTHAL, Fort Wayne, Ind.—I know of no more frightful condition than that of puerperal convulsions and none that gives the physician more trouble. I have a case in mind that I was called to see one night when she was about four months pregnant. When I reached the house she was unconscious. I was informed that she had had a spasm. I warned them of the danger of convulsions and asked them to measure the urine and send it to me regularly. She passed about 1500 c.c. daily from that time on until the seventh month. On the day on which she had passed 1500 c.c.,

with no albumin, I was suddenly called and on my arrival at the house the patient had already died from a convulsion. I made a postmortem and the cause of death was evidently an acute congestion of the kidneys. They were hemorrhagic. There were ecchymotic spots in the mesentery, in the liver and lung. The right auricle was distended. In this case a venous section would have been of great service if the patient had been seen in time. I think acute venous congestion plays a great rôle in the pathology of this condition. In this case the urine had been examined regularly, the skin kept active, large quantities of water were given and yet there was a sudden acute congestion of the kidney, the patient dying in a few minutes. I think that chronic eczema is frequently an indication of renal trouble and that which produces the eczema also produces the puerperal convulsions. I do not believe that the eczema itself is responsible for the eclampsia.

C. LESTER HALL, Kansas City, Mo.—The lamentable thing in connection with this discussion is our lack of knowledge of the etiology of this condition. The literature on the subject gives us no definite or entirely satisfactory indication as to the cause of the trouble. Only one gentleman has alluded to the time-honored remedy, that of blood-letting. I think that blood-letting is of vital importance and this condition followed by saline transfusion, seems to accomplish a great deal of good. I have seen the most marvelous results follow blood-letting. If we get these cases early, which is rare, there is a remedy which can be used as a stimulant to the kidneys with the best of results. It is a remedy which is supposed to be purely a diaphoretic and is never recognized as a diuretic. I refer to pilocarpin. I have given it for years, not as a diaphoretic, but as a diuretic in one-twelfth to one-twentieth grain doses three times a day. My attention was called to this drug by accident. I had a case in which I had given the large doses of veratrum suggested by Dr. Bonifield, and yet my patient seemed doomed. I gave pilocarpin hypodermically and much to my surprise it produced a decided diuretic effect without affecting the skin. I then began to use the remedy in suspected cases, giving small doses with much water and the result justifies me in recommending the drug to you.

DR. BEATTIE, in reply—There is one important fact to be remembered and that is that each case is an individual one and must be treated according to the symptoms that have developed. Dr. Bonifield has mentioned that there are cases where veratrum should not be used; I agree with him. Dr. Hall uses pilocarpin and I agree with him. I had a case of eclampsia which Dr. Hall saw with me and we used pilocarpin with good results. The only case I ever lost was one where I did not keep myself posted on the condition of the urine and where I resorted to blood-letting. My experience was not as satisfactory in that case as I expected. I believe that each case must be treated in an individual way, and that no one remedy is a specific for them all.

CESAREAN SECTION AS A METHOD OF TREATMENT FOR PLACENTA PREVIA.*

WILLIAM J. GILLETTE, M.D.

Professor of Abdominal Surgery and Gynecology, Toledo Medical College, Surgeon to Robinwood Hospital.
TOLEDO, OHIO.

During the past ten or twelve years, the question of Cesarean section in the treatment of placenta previa has been from time to time brought to the attention of the profession. Those discussing it have strongly opposed or advocated it; but the probabilities are, like all new departures in medicine, it has not escaped the fate of being judged either too harshly or with too much favor. Lawson Tait¹ was one of its strong advocates, and a short time before his death, in an article on "The

* Read at the Fifty-second Annual Meeting of the American Medical Association, in the Section on Obstetrics and Diseases of Women, and approved for publication by the Executive Committee of the Section: Drs. A. H. Cordier, W. E. B. Davis and Henry P. Newman.

1. The Lancet, Feb. 11, 1899.

Treatment of Unavoidable Hemorrhage by Removal of the Uterus," he took the ground that the only safe treatment for placenta previa is the operation of Porro-Cesarean section. The profession has been slow in accepting this doctrine, and probably never will; for it is the experience of all, that where the placenta is laterally attached, and the cervix easily dilatable, delivery may be conducted with comparative safety; but on the other hand, given a central implantation and a rigid os from any cause whatever, then no more serious or fatal condition can confront the obstetrician; and there are those who believe cases of this character demand the Porro or the classical Cesarean section in the interests of both lives at stake.

The discussion of the subject began with an able article by Hutson Ford,² of St. Louis, recommending the operation on theoretical grounds, though the only instance in which it had been performed at that time terminated unfavorably. Drs. Dudley of New York and Boyd of Philadelphia have also written valuable papers advocating this operation from this same theoretical standpoint. Grandin and Jarmin, in their work on "Obstetrics" (edition of 1898), make the following statement: "The elective emptying of the uterus enables us to save nearly 90 per cent. of the children, instead of losing that number, as was the record of the past; and the chances of saving the woman's life may be placed at about 98 per cent.; but these statements apply strictly to cases where there is no temporizing with tampons, or worse than all, ergot." Now, if the conditions here enumerated were invariably present and a skilled attendant at hand when the abnormality first makes its presence apparent; if these cases were only met in well-conducted maternity institutions, and it were possible always to obtain the low death rate mentioned, then every argument in favor of Cesarean section would fall to the ground. I have been unable, however, to find any other authority that places the fetal death rate in placenta previa under any circumstances at this low figure. It must be the exception then, rather than the rule, when the conditions which make it possible are met. On the other hand, Reynolds says: "Even induced labor shows an immediate fetal death rate of 33 1-3 per cent., with an ultimate mortality of from 50 to 75 per cent.;" and the danger to the mother, all agree, is very great.

As is well known, the older statistics show placenta previa to have a very high mortality for both mother and child. Without regard to variety of implantation, in those of Muller the maternal mortality is 23 per cent., and the fetal 64 per cent.; while King's give a maternal mortality of 22.5 per cent., and a fetal of 57.5 per cent. This high maternal death rate has, during late years, most certainly been lowered; not so, however, with that of the child. Here statistics show but little improvement.

Lusk says: "Nearly two out of every three children are born dead, and more than half of those born living die within the first ten days." In a recent paper by Dr. Chas. P. Noble upon the subject of placenta previa, read before the Philadelphia County Medical Society, he placed the maternal mortality at 5 per cent. and the fetal at 50 per cent.; at the same meeting Dr. Barton Cook Hirst placed the maternal mortality as low as 1 per cent., and the fetal at 50 per cent. He does not, however, consider an operation that promises to save most of these fifty lives now lost, with but little, if any,

increase of danger to the mother, as worthy of consideration.

The better results reported by these gentlemen, at least as far as the mother is concerned, can not by any means be considered as the death rate in general. They can only apply to cases in the hands of experts under favorable surroundings.

As regards the most fatal form of implantation, placenta previa centralis, Dorland's late work yet places the maternal mortality at from 30 to 40 per cent., and the fetal at from 75 to 80 per cent. The ideas suggested by our statistics are of so conflicting a nature regarding this condition, that in order to arrive independently at some definite conclusions, I recently sent blanks to 1000 leading physicians and maternity institutions of this country, asking their experience with it. I have received replies from many of them, so enabling me to present statistics, which I have every confidence at least approximate the truth.

The total number of cases of obstetrics so reported were 105,935, with 216 cases of placenta previa, or an average of one in 481 births. Of these 216 cases, 34 mothers were lost, or a death rate of 15 1-3 per cent.; and 96 children, a death rate for them of 44 1-3 per cent. As to the variety of implantation, there were 88 cases of centralis, and 20 of the mothers were lost, or a death rate of 22 8-11 per cent.; while 66 of the children were lost, a death rate of 70.5 per cent. Of the two other forms of implantation (partialis and marginalis), 128 were reported with 14 deaths for the mothers, a death rate of 11 per cent., and 41 of the children, or a death rate of 31.5 per cent. It may not be without interest to say that none of the mothers died prior to the seventh month, which corresponds to the statistics of Muller, in which, of the 128 deaths noted by him, not one died before the seventh month, and one-third reached the end of gestation. Then, why recommend induction of labor before the child is viable?

While the foregoing statistics show the maternal death rate to be greatly reduced over that of former times, no doubt due to our better methods of treatment, viz., the Braxton-Hicks, version and forceps, bipolar version, etc., yet practically nothing has been done toward lowering the fearful fetal mortality; and surely no one will deny that the child has rights that should be respected. As is well known the Roman Catholic church places the life of the mother second to that of the child; but whether this doctrine be admitted as correct or not certainly the mother should rightfully be held responsible for its welfare, though her own danger be thereby in some measure increased.

In 1893, Dr. August C. Bernays of St. Louis, so far as I know, performed the first successful Cesarean section for placenta previa, saving the mother; the child died in ten hours after the operation from asphyxia. In a recent personal letter to me, he says this operation should be considered as terminating favorably, as the death of the child was in no wise due to it. In his report of the case he mentions two others as having been done prior to his, both of which, however, had proved fatal. Up to the present time there have been reported in this country, as far as I am aware, five cases of placenta previa treated by the classical Cesarean section, and one in Italy. In the latter, which was done by Dr. Matolli, both mother and child were saved. Of the five American cases, the only successful one, aside from that of Dr. Bernays above mentioned, was done by Dr. Frances P. Donnoghue of Boston, in December,

2. American Gynecol. Journal, September, 1892.

1900. In addition to these six reported, making seven in all, Dr. P. D. Covington, of Bellefontaine, Ohio, on April 17, 1901, performed Cesarean section for placenta previa centralis, complicated by contracted pelvis. No report of his case has as yet been published and I am indebted to him for the following short and incomplete account of it:

"In two previous pregnancies embryotomy had been done for the patient, and in the third a dead child had been instrumentally delivered. Following the first embryotomy there had been puerperal mania. It is said that these three children weighed, respectively, 15, 18 and 12 pounds. In the fourth pregnancy a severe hemorrhage occurred at the end of the seventh month. The second hemorrhage necessitated immediate action; and a Cesarean section was done. The patient was bleeding furiously at the time and continued to do so till after the placenta was removed. The hemorrhage was controlled after removing the placenta, by pressure around the cervix and on the broad ligaments, and by the introduction of a deep row of interrupted silk sutures including the muscular wall of the uterus, but not its peritoneal coat. The uterine peritoneum was closed with interrupted silk, and the parietal with continuous catgut. The abdominal wound was closed with silkworm gut and catgut. The mother made a good recovery; the child is well and healthy at date."

Lawson Tait, on December 21, 1898, saved a mother and child by the Porro operation; and in January of the present year, a case in the writer's hands by the same operation was equally successful, a report of which was presented at the last meeting of the Ohio State Medical Society. So far as I know, up to the present time, no other Porro operations have been done for placenta previa. In Lawson Tait's case, though an emergency one, the mother made an easy recovery; but the child unfortunately died a month later of a prevailing bronchitis. In the writer's case, recovery was uneventful, though at the time of operation the pulse was 130, and the woman almost bloodless from repeated hemorrhages. The child, though artificially nourished, is at date growing finely. Theoretically, Cesarean section should have no fetal death rate; and practically, even for placenta previa, it should be exceedingly low, in all probability not more than 10 per cent. There can be no reason for a higher rate than this, and it would likely be much lower than 10 per cent. if the cases were operated before hemorrhage had continued to such an extent that the child's life was endangered by it. Granting that this opinion is not far from correct, will not the saving of from forty to fifty human lives out of one hundred, which we now lose in spite of our best efforts, constitute a strong argument in favor of this new departure in obstetrics?

In the hands of skilful abdominal surgeons the maternal death rate for Cesarean section is far below the 22 8-11 per cent. which my statistics show to be the death rate in placenta previa centralis, and even below the 15 1-3 per cent., speaking without regard to variety of implantation; and if it can be shown that its present low mortality for other conditions is not increased when done for placenta previa, then argument in its favor, in the interests of the mother as well as the child, can hardly be controverted; and I am sure that this will prove to be the case.

It is well known that one of the grave dangers encountered where there has been great loss of blood in the parturient woman, is the failure of the uterus to

contract, as a result of her bloodless condition; and, consequently, further hemorrhage ensues. This failure likewise predisposes to sepsis, and in so great degree that in 273 of Mueller's recorded cases, 79 became septic and 54 of them died, or about 20 per cent. The reason for this is perfectly apparent; the uterus, not contracting properly, allows the retention of blood clots and debris, which constitute a most excellent field for the propagation of germs. The unknown quantity, shock, is also an important factor to be dealt with. Recognizing these principal dangers, we may deduce some useful conclusions as to operating.

We may divide cases of placenta previa into cases of emergency, and those which may be kept under careful observation for some length of time. Thus far, it is only in the field of placenta previa emergency cases that Cesarean section has found recognition. The cases of emergency are those in which, when first seen, a large quantity of blood has been lost; and, as a consequence, these are the ones most likely to have further hemorrhage, followed by sepsis and shock. These are the patients, if we are to save them at all, with whom the procedure must be adopted that reduces these factors of danger (hemorrhage, shock and sepsis) to a minimum; and I am sure you will agree with me that the Porro operation does this as no other course of treatment yet devised can. Inasmuch as it can be done with great rapidity, and does away absolutely with all danger of further hemorrhage, shock is thereby materially reduced; and if sepsis follows, it is the fault of the operator, and not the operation.

For these reasons, in cases of emergency, when the uterus fails to firmly contract, I have no doubt the Porro operation will in time prove the preferable method of treatment, and will be done, even though at the cost of the uterus.

In the writer's case the classical Cesarean section would most certainly have proved fatal; for the uterus would not contract after the removal of the placenta sufficiently to control hemorrhage from its site, though at least ten minutes were spent in vain attempts to induce it to do so. Every time the rubber cord, tied about the uterine neck, was loosened, blood would ooze from about the cervix, and it was necessary to tighten it at once. Finally, the uterus was amputated with the happiest results.

In the cases of emergency where there has been but little hemorrhage and the patient is yet in good condition, then the dangers above mentioned would only in a slight degree obtain and the Porro operation would be a needless mutilation; though it may be argued that a woman, once the subject of placenta previa, would live a life of greater safety if the uterus be removed. For it is a well-established fact that, once the subject of placenta previa, her future pregnancies are likely to be complicated by it.

The question as to whether Cesarean section should be used in the class of cases which may be kept under careful observation for a length of time, must be left for future discussion. In my opinion, however, the time will come when some of these at least will be treated by it.

In conclusion: The cases operated are as yet so few in number that no accurate deductions can be drawn from them, but I think it must be granted that Cesarean section, if generally adopted for placenta previa, will reduce the fearful fetal mortality which we now have to at most 10 per cent.; and when 93 consecutive

Cesarean sections in the hands of three men (Reynolds, Leopold and Evarks), can be done without the loss of a mother or child, we certainly have reason for our faith that it can be done without any increased danger to the mother, over what she must incur by any of the older methods of treatment, and must therefore be considered a correct procedure. The classical section can be adopted where the uterus contracts firmly, where there is no probability of infection, and where the patient is in a condition to withstand the shock necessitated by prolonged operation; but on the other hand, where the uterus does not contract firmly, thus rendering further hemorrhage and sepsis probable, or the patient is unable to withstand additional shock, then the Porro-Cesarean section is, in my opinion, the only procedure warranted.

DISCUSSION.

DR. JOSEPH EASTMAN, Indianapolis—I endorse every word of the paper. At the same time I will call attention to a few points of interest. When we compare the Porro operation with the removal of a large fibroid from the abdominal cavity, conditions are more favorable. Instead of the broad ligaments being large, we find them quite normal. The uterus is also in better shape than in operations for fibroma. Consequently we ought to have less mortality after the Porro operation than following operations for large fibromata. It is essential, as in many other operations, that we get these cases early. Many of them have lost the blood which will carry them through a successful Porro operation before the surgeon is called to see the case. Professor Lusk said that the resources of surgery are rarely successful when practiced on the dying. That is certainly true. The woman may have flowed to such an extent that interference is not indicated, but I believe that even in extreme cases the Porro operation is justifiable. It is, however, not an operation to be undertaken by everybody, nor under all circumstances. The Doctor speaks truly when he says that if the patient dies from sepsis, it is the fault of the operator and not the operation. Only the few are masters of aseptic surgery and not the many.

DR. A. C. BERNAYS, St. Louis, Mo.—I will never forget the Sunday afternoon when I was called by Dr. Thomas O'Reilly. He was, until his death, doing the largest general practice in St. Louis. That day he had a case of placenta previa, the fortieth he had seen in 34 years. I had spoken with him and with others in St. Louis about doing a Cesarean section in these cases. In fact, Dr. Hudson Ford had written a paper strongly advocating, on theoretical grounds, the substitution of the Cesarean section or Porro operation in all cases of placenta previa. Dr. Ford was one of the many who had most unfortunate results with the school treatment of placenta previa.

The first and most important point is to determine the mortality following the treatment of placenta previa according to the school method, and Dr. Gillette has adopted the only means by which we can get at this fact. It seems that he sent out a question sheet to the medical directors of maternity hospitals and that he received replies giving him the record of 106,000 obstetric cases; 260 of them were cases of placenta previa with a mortality of 22.5 per cent. That seems to be a fair way of getting at the mortality in maternity hospitals. Unfortunately, we can not get the mortality in private practice, but I believe it is twice that. When I was in obstetrical practice with my father I know the worst results were those in cases of placenta previa. He had been a professor in a St. Louis medical college and was considered an expert obstetrician. I saw him lose case after case. Of course, this was in pre-antiseptic times. We know that the mortality of placenta previa is very much higher than the mortality of Cesarean section. We have the absolutely correct statistics from German maternity hospitals and also from hospitals in this country. We know that Leopold lost only 2 cases of Cesarean section out of 50 reported the first

time, and 3 out of the second 50. Of course, he operates under the most perfect condition in a government hospital where antiseptics and asepsis are carried out to the fullest possible extent. I admit that it is impossible to perform Cesarean section in private houses with a mortality as low as that.

I think Dr. Eastman did not exactly understand the condition when he said he would advocate the Porro operation in placenta previa. I believe it is indicated when there is a narrow pelvis and in cases where it is desirable that the woman should not become pregnant again, but I can see no reason why a woman who has placenta previa should be deprived of her genital organs. She may not have a placenta previa at her next pregnancy. As a routine treatment in this condition, I believe we should always recommend a Cesarean section. It seems to me that the method described by Howard Kelly is so simple and easy that any gynecologist, fairly well skilled in abdominal work, would have a mortality of less than 10 per cent. In the case I saw, the woman had had two gushes of blood. I was extremely careful as to asepsis as I wished to establish the fact that we in America could do the operation successfully. I felt certain that it would become the school treatment for placenta previa. Feeling and sentiment should not enter into this question. It is a cool scientific proposition, to be answered on the basis of carefully collected statistics. If the mortality of Cesarean section in placenta previa is lower than that of the other methods of delivery it will be adopted no matter whether anyone shakes the flag of conservatism or not. Flag shaking and appeals to passion can have no recognition in a scientific body even if brought out by men who have at one time in their lives been looked up to as authorities. The days of authority in science are rapidly passing away. We will respect no authority but demand demonstration.

DR. W. O. HENRY, Omaha—It seems to me that we ought not to be too premature in the matter of the Porro operation. A woman should not be deprived of the maternal function too rashly and without good causes. It is not always necessary to perform a Cesarean operation in these cases. There is a class of cases in which it may be wise or necessary, but there is also a class in which it is not. Perhaps it is impossible at present to say just where the division line is. I saw a case about three years ago of a woman seven months pregnant. The physician in charge was a very competent man; we decided to tide the woman over until the eighth month. The hemorrhage became so severe that we did not dare delay any longer. We performed a premature labor and both the mother and child survived. The mother has since borne a living child and is in better health to-day than she ever was. This was a case of placenta previa centralis, but it was not necessary to do a Cesarean section. These cases usually give sufficient warning by the first hemorrhage, so that they can be taken to the hospital where they can be properly treated. I do not believe that the Porro operation is ever indicated merely because the woman has a placenta previa.

DR. GEORGE J. ENGLEMAN, Boston—There is a fascination in the brilliant results of modern surgery which is liable to lead up too far in that direction. I think that the expressions made here this morning, going out to the profession at large, are dangerous. It has been said that this will be the school treatment for placenta previa. That is a dangerous statement to make. I know what some of these cases are. They are cases which were not emergency operations and which might have been delivered in another way. Women in the hospitals are carefully prepared and the operation is done under the best conditions. That is where you get these brilliant successes of Cesarean section. Not one of them is an emergency operation. What is the result of Cesarean section in placenta previa when the patient is exsanguinated and it is an emergency operation? Who are the men who do these successful sections? They are surgeons skilled in that particular work and they can do it with success in any case. Some men have gone so far as to say that women will prefer Cesarean section because they can be spared the pain of labor. That has been said jokingly, but it is the tendency of the present.

The men who handle most of these cases of placenta previa are the general practitioners in the city and country and they are called in because of a hemorrhage. Frequently the patient is in a desperate condition and they must act at once. What would be the result of Cesarean section? They have some simple methods at their command—the tampon, whether natural or artificial, whether it is put into the uterine cavity or vagina, or whether the leg of the child is pulled down by the Braxton-Hicks' method thus forming the tampon. I am sorry that Dr. Fry is not here. He reported 14 cases with no maternal death and 15 per cent. fetal mortality.

I have recently heard a method advocated in Chicago which is the Barnes' bag introduced into the cervix. I did that 15 years ago. I had no bag, but I used the condom. I had two tubes, one to poke it in and the other to hold it. In that way you get pressure on the placenta and pressure into the uterine cavity, thus holding the bag in place. A vaginal tampon is likely to fill, although that is a routine treatment which I have seen successfully used time and again in Berlin. If it is properly packed, the pains will come on slowly, until finally the tampon is expelled and the child will follow. These are the methods which we must teach and which must be used by the general practitioner and by most of us. Those who have skill can do a Cesarean section, but I do not believe it justifiable in every case. By no means should it be considered as the school treatment.

DR. DUGAN—I would like to ask the Doctor whether he would advise Cesarean section in a case of placenta previa when the hemorrhage comes on at the fourth or fifth month? I should consider the tampon more dangerous than Cesarean section, because with the tampon the bleeding goes on just the same and the patient is extremely liable to die.

DR. P. H. OYLER, Mt. Pulaski, Ill.—I have a large rural obstetric practice, and I made up my mind long ago as to what I would do if I were to meet such a case. I have heard so many reports of tamponing, but the cases all died. Two months ago it was my privilege to be in one of the maternity hospitals of one of our large medical centers. They had a case of placenta previa, and the chief ordered tamponing where the attendants were quite positive that a Cesarean section would have been the proper thing for that case, because of the apparent difficulty in dilating the os. The section was recommended, but tamponing had to be done, and as a result the woman died from internal hemorrhage shortly afterward. That was in an institution where Cesarean section could have been safely performed. It has been my good fortune to meet only one case of this kind in my practice. After the first alarming hemorrhage I did not wait to tampon, but I anesthetized, and gradually bored up and delivered the child in about an hour and a half. The child died five hours later, but the mother made an uneventful recovery. I think the trouble, in a large percentage of cases, is in not taking proper action soon enough. If I could not do anything, I should certainly send for a well-known and recognized expert. I would not subject my patient to any risk whatever on the account of the sentimental ideas so often expressed in behalf of the offspring. Prompt decision to act or abandon the case is my motto.

DR. C. L. BONIFIELD, Cincinnati—I thoroughly agree with Dr. Engelmann that this paper and this discussion should not go out before the world, advocating Cesarean section as the school treatment for placenta previa, without a protest. The statistics quoted are those of men who are experts in abdominal surgery. Those who have quoted statistics from the obstetric standpoint, have quoted statistics of men who are not expert in this work. One man reported 14 successful cases treated from the obstetric standpoint. Another man reported 25 cases. I do not remember the child mortality, but it is certainly an excellent record from the maternal standpoint. As some one has truly said, these are emergency cases and we certainly can not expect to have a low mortality. Before an expert can be gotten the patient will be exsanguinated and the patient's resistance to operation will be materially lowered.

Some one said that it is a well-known fact that a patient who has had placenta previa will usually have it again. If

she had it once it indicates that something was wrong with the uterus. I am inclined to believe that it was an endometritis with a dilatation of the uterine cavity. If this condition is relieved and the patient put into perfect health, the probability is that she could give birth to healthy children afterward. Even if the fetal mortality is a little higher it would at least save the mother.

As to the tampon, the last speaker said that the chief of staff ordered the patient tamponed. That was not what he should have done. He should have tamponed her himself so as to make sure that it was properly done. One gentleman spoke of the difficulty in dilating the uterus, doing it promptly and rapidly. I believe that in these cases the patient should always be sent to the hospital and the treatment be done slowly. We are tending too much to gynecology, too much to surgery, and obstetrics is being neglected, and that is the reason why we should try and arrange our program so that a whole day or two would be devoted to obstetric papers. I think one of the greatest faults in teaching obstetrics is that we teach that few vaginal examinations should be made. That is wrong. No man can be a good obstetrician unless he learns to know the mechanism of labor. If he can clean his hands for surgical cases he can also clean them for obstetrical cases. We should teach our students to examine carefully, aseptically and often, to know what they are doing. In this way they will be competent to deal properly with obstetric cases.

DR. F. D. REESE, Cortland, N. Y.—There are two things to take into consideration, the life of the mother and the life of the child. Which shall we save? If we wish to save the child I believe in doing a Cesarean section, but if we wish to save the mother I believe in doing something else. If we are called in these cases let us cleanse our hands thoroughly and introduce one hand directly into the uterus, grasp a leg, perform version and plug up the cervix at once. Then you can deliver at your ease.

DR. H. P. NEWMAN, Chicago—I can hardly recommend the last speaker's statements. The obstetrician should think of something more than the immediate welfare of the mother and child. Their future health should be considered in obstetrical work.

DR. GILLETTE, in reply—Dr. Bernays thinks Dr. Eastman wrong regarding his ideas of the Porro operation in this class of cases; but as I understand them, they are entirely in accord with those which I tried to express in my paper. There is, I am sure, a distinct field for both the classical and the Porro-Cesarean section, if this operation is finally to be recognized as a legitimate procedure for placenta previa. The Porro will probably prove the safer, in cases of emergency where much blood has already been lost, and the classical, applicable to those yet in good condition. I took the trouble to write to all the gentlemen of whom I could learn, who had performed Cesarean section for placenta previa, and asked the cause of death of their patient, if the patient had died; those who replied, and nearly all did so, invariably said: "She died of shock."

I tried to show in my paper, that in patients operated on by the Porro method, shock was reduced to a minimum and sepsis would not be so likely to occur. We know that shock is due to hemorrhage and prolonged operative procedure. In those cases in which much blood has been lost, the uterus often will not contract firmly, and is on this account extremely likely to bleed again. The Porro does away with this danger entirely. Further, a classical Cesarean section requires more time for its performance than the Porro, which entails more shock. For these reasons the Porro is in my opinion a safer operation in emergency cases.

When facing a situation of this kind the question as to whether the patient can afterwards bear children or not, can not be considered the paramount one, but instead, the present saving of the two lives entrusted to our care; and we would certainly not be doing our full duty to both, if the course adopted were not the one most likely to accomplish this. I am sure no one would advocate Cesarean section for all cases of placenta previa. Where there is partial or marginal im-

plantation, the older methods are usually successful; but the cases of the central variety, where the cervix does not easily dilate, and in which the hemorrhage is profuse and uncontrollable then Cesarean section, in my opinion, is not only a justifiable procedure but is imperatively demanded.

THE CHEMICAL AND MICROSCOPIC EXAMINATION OF BLOOD.*

W. D. KELLY, M.D.
ST. PAUL, MINN.

Until recently little has been known of the blood as a factor in the cause of disease. The microscopic morphologic changes which take place in the blood, and their cell identity, have quite definitely been fixed or determined; however, there has not been much progress made from a chemical standpoint in blood examination. Recently, Schmidt, Hoppe-Seyler, Judell and others have contributed liberally to the chemistry of the blood, and among other things they have given us chemical blood analysis, and a working foundation whereby we are enabled to forward chemical analyses of the blood with more precision. The blood in the body is enclosed, so to speak, in a sealed tube, and is unable to gain exit, except by osmosis, or through solution of continuity in the blood-vessel. The depletion of the red blood normally takes place, principally, in the spleen, and it receives its supply from the lymphatics and red bone marrow.

The blood is composed of plasma, serum and blood-plates. Intermixed in the blood, gases are found—carbonic, oxid and oxygen. Salts are also found—magnesium, calcium, potassium and sodium. To these salts are accredited, by many writers, the alkalinescence of the blood. In the blood are found red and white blood-corpuscles. The red corpuscles are composed of oxy-hemoglobin and neucloproteids, lecithin and chloesterin.

In the leucocytes have been demonstrated fatty acids, lecithin, glycogen and salts, similar to those found in red cells. Blood-plates are regarded by Lilienfeld as belonging to the neuclo-albumins, and are supposed by him to be the remnant of the leucocytic neuclei.

The blood serum, containing serum-albumin and serum-globulin, is subject to chemical change in puerperal septicemia, and in febrile disease; serum-globulin is less subject to change than serum-albumin.

The inorganic salts of the serum are phosphates, chlorids, carbonates and sulphates. The pathologic variations in the phosphates of the serum vary in slight degree and importance. The variations in the chlorids of the serum, investigated by Schmitt, Barnicke, and Limbeck, have not been found extreme nor of notable pathologic import, although this principle is chiefly responsible for the isotonic relations of cells in serum. A high percentage of chlorid is usual in anemia. The larger the proportion of plasma, the greater is the percentage of chlorids in the blood. The alkalies, sodium and potassium, are principally combined with chlorin in the blood. Large proportions of phosphates and carbonates of sodium and potassium are found. Sodium salts are principally found in the plasma, being usually increased in the watery blood. Potassium, found in red cells, is diminished in hydremic conditions.

Sodium carbonate in the plasma is responsible for the alkalinity and the power of plasma to produce CO_2 . The iron in the blood is principally found in hemo-

globin; traces are found in plasma and neuclein. Seegen, Chaureau, Cavazanni, von Mering, Limbeck, found in normal blood traces of glucose, which is increased by a diet of carbohydrates and diminished by muscular exertions. The diastase ferment of blood is found in the red cells and serum, and is found, by Castellino, Tiegel, Plosz, and Precka, to have the power of coagulating blood. It is inhibited by the neuclein and increased by sodium sulphate and chlorid.

After a heavy meal, fat has been demonstrated in the blood, by Gunprecht. The occurrence of free fat, palmitin, stearin and olein in the blood in health and disease has repeatedly been observed. It has been found very much increased in healthy individuals after a hearty meal. Acetone is found in fevers, Jksch has demonstrated fatty acids in the blood of leukemia, acute atrophy of the liver and infectious diseases.

CHOLEMIA.

The poisonous symptoms developed in cholemia have been referred, by most authorities, to the presence of biliary acids. To the naked eye, icteric blood may appear yellowish-red in color in the serum or its foam. Small quantities of bile pigment have been readily detected by a peculiar yellowish tint. On rapid heating, the yellowish-red bilirubin changes to green biliverdin. Diminished isotonic tension and increased resistance of the red cells are peculiar characteristics of the red blood in jaundice. Limbeck found tension of the cells reduced .40, .38, and .32 per cent. sodium chlorid. The well-attested fact that in intense jaundice red cells are frequently dissolved by biliary principles, can with some difficulty be reconciled with that markedly hyper-isotonic quality of the serum. Bile acids affect the union of hemoglobin with the stroma of the red cells, rendering hemoglobin more easily soluble; this accounts for the solution of red cells in jaundice, as well as in other conditions. Other characteristics of icteric blood are increase of nitrogenous bodies, diminution of chlorids of both blood and serum, which is displaced by biliary acids, and well-marked increase in the volume of red cells. Well-marked cholemia may be detected by inspection of serum or foam on heating to 50 C. Bilirubin may be changed to biliverdin by this process.

By the intravenous injection of glacial acetic acid in the rabbit, I have been able to get an acid reaction several hours afterward by the phenol-phthalein test. It simulates that found in diabetic cases. Singular to say, I have also found that a rabbit weighing 1550 kilos can, apparently without any inconvenience, tolerate as high as a 2-gram intravenous injection of glacial acetic acid into the vein. Examination of the blood shows decrease in red cells and hemoglobin, also decreased leucocytes.

The specific gravity of the blood varies by the amount of water present and amount of salts contained. The conclusion reached by many authors has placed the specific gravity from 1.058 to 1.062 in man; 1.054 to 1.060 including both sexes. The specific gravity of the blood may be increased by sweating, lack of food, muscular exertion, and may be decreased by freely imbibing in water or fluids.

Osmosis is the force which leads to the interchange of blood through the animal membrane, until the salt in each is equal. When two fluids have equal content of salt, they are said to be isotonic. The isotonic tension of red cells is .46 per cent. sodium chlorid. Homberger finds that albumins, phosphates and chlorids behave differently after changing osmotic conditions. When a lit-

* Read at the Fifty-second Annual Meeting of the American Medical Association, in the Section on Practice of Medicine, and approved for publication by the Executive Committee of the Section: Frank Billings, George Dock and J. M. Anders.