Chapter 5

Future Fertility

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Infertility research clearly shows that abortion can lead to problems for women who later wish to conceive and carry a pregnancy to full term. This is especially true for women who had no successful pregnancy prior to one or more abortions. Lax coding systems in hospitals and lack of follow up by abortion clinics have delayed our recognition of the magnitude of the link between induced abortion and hysterectomy, pelvic inflammatory disease (PID), ectopic pregnancy, miscarriage, and premature birth of a non-surviving baby. Many years may elapse between an induced abortion and the woman's later difficulty in having a child. This long interval may obscure the link between the two experiences.

Future Fertility

Some post-abortive *sequelae* that affect future fertility are not apparent until the woman attempts to conceive a child and seeks a medical explanation of her inability to do so. These may include *pelvic inflammatory disease; Chlamydia trachomatis*; uterine perforation; *Asherman's Syndrome*; *endometrial ossification; endometrial adhesions*; and *ectopic pregnancy*.

By the term "infertility" we mean problems with conceiving naturally and giving birth to at least one full-term, live infant. Infertility problems do not rule out the possibility that repeated attempts using fertility drugs or high-tech fertility treatment, such as *in vitro fertilization*, might succeed.

It should be noted, however, that the women who can afford the costs of infertility treatment do not make up the total population of infertile women who want to conceive. Some women who wish to have a child cannot afford in vitro fertilization as it is not covered by government or private health plans; others view technological approaches to conception as incompatible with their present belief or value system.

It is also important to separate infertility as a medical condition from the desire to conceive children. Most subjects for infertility studies are recruited from infertility clinic populations. Women who do not seek to have further children after having an abortion may never know about their infertility. They may believe that a method of contraception they are using is effective. As a result, they will not be included in research studies on infertility following abortion. (They may, however, appear in studies citing effective contraception following abortion.) Given these limitations, the figures in the post-abortion literature should be understood as representing the minimum of women who are infertile following abortion rather than the total percentage.

The term "sterility" refers to occurrences that seem to rule out future pregnancies altogether, for example, a complete *hysterectomy*. Complications of abortion can produce sterility if they require the removal of reproductive organs.

Immediate Complications Producing Sterility

The immediate medical complications of induced abortion may on rare occasions necessitate a hysterectomy.[1] Castadot notes that pelvic infection with at least three days fever at 38ºC, bleeding requiring transfusion, and a second surgery due to problems from the first represent 88 per cent of all major complications. He says, "Sometimes a hysterectomy is the only alternative."[2] Without this surgery the patient will die from hemorrhage or peritonitis. With this surgery the patient is rendered sterile.

It is not clear from the present research how often outcomes that produce sterility occur. Numerous occurrences are reported from patient records identified in a 1996 survey of official medical and legal files.[3] But Ferris and colleagues removed hysterectomy from their study because there was only one case.[4] If the removal of such cases is common research practice it is difficult to pinpoint the actual numbers of women who experience this complication.

Likewise, the coding system of hospitals may make it difficult to determine any link between a hysterectomy and a recent induced abortion. Just such a case is identified in Chapter 17, Section A.3.e, where a physician reports that the final code entered in the patient records did not show that the hysterectomy was the complication of an induced abortion performed three weeks earlier.

Hysterectomy may be an immediate consequence of an abortion when lacerations or abrasions to the uterus occur, or when bleeding from a severed uterine artery can be stopped only by removing the entire uterus. Such incidents have also been documented when damage occurs to the bowel or small intestine.

How often does this happen? A major unknown factor in assessing the number of emergency hysterectomies that are required is whether a patient who experienced severe bleeding after discharge from a day patient abortion clinic would return to the clinic. It is the policy of most private day clinics to instruct the patient to go to a hospital if complications arise. In such cases, the problems she experiences may not enter the abortion statistics.

"I have seen post-TA [therapeutic abortion] bleeds in ER [Emergency Room] and they are not readily identified."
Survey of Canadian Physicians on Women's Health after Induced Abortion

General Studies of Post-Abortion Infertility

Abortion of a first pregnancy may have an effect on future fertility according to a large study in the United Kingdom undertaken by Frank and colleagues for the Royal College of Physicians and Surgeons. Using both prospective and retrospective approaches, they studied two groups of women: one group, who form the prospective cohort, were women who had an unplanned pregnancy followed by a planned pregnancy, or an attempt to conceive; the second group, the retrospective cohort, was made up of women with a planned pregnancy. These women were interviewed regarding their reproductive histories.[5]

This Royal College paper is widely regarded as the seminal study of fertility following abortion. Using the "Planning Time" construct as the basis for between group comparisons, it found that the abortion group experienced six per cent lower fertility than the non-abortion group, but concluded that induced abortion does not have "an important effect" on future fertility. "Similarly there was no significant relationship between a history of previous induced abortion and the planning time of women attending ante-natal clinics." Yet its conclusions continued, "one potentially important association was found which has not been reported previously. *Primigravid* women [women who are pregnant for the first time] who had an abortion had a lowered fertility when compared with primigravid whose first pregnancy had a

natural conclusion."

This finding is confirmed by European research which concludes, "When a woman has not previously given birth, her risk of contracting post-abortal complication is found to be significantly greater than in women with one or more births...post-abortal PID (*pelvic inflammatory disease*) significantly increased rates of subsequent infertility and spontaneous abortion."[6] Women whose first pregnancies end in abortion are susceptible to uterine perforations, to uterine adhesions or to retained fetal fragments, and infections that lead to PID, all of which can negatively affect their ability to conceive and bear children in the future. Likewise, these women are not going to benefit from the protective effect that a first full-term pregnancy imparts. Recent *epidemiological* studies have also identified childbirth as protective against later onset cancers[7] (see Chapter 3 on induced abortion and other cancers).

Pelvic Inflammatory Disease and Chlamydia Trachomatis

According to the Canadian Pelvic Inflammatory Disease Society, pelvic inflammatory disease (PID) is epidemic in Canada and much of the world. Almost 100,000 Canadian women contract PID each year. The Society estimated that one in four North-American women would have had PID by the year 2000. They noted that pelvic inflammatory disease can also be caused by "any procedure which dilates a woman's cervix or introduces bacteria into the pelvic organs." They also commented that "Researchers estimate that 30 to 50 per cent of PID is not diagnosed."[8] PID has grave implications for a woman's future fertility. Writing in *The Lancet*, Blackwell and colleagues note that "at least ten per cent of women who have a single episode of pelvic infection will become subfertile."[9]

Pelvic inflammatory disease triggered by the presence of Chlamydia trachomatis, apart from any immediate health consequences, is probably the largest single inhibitor of women's future fertility. It can also be the underlying cause of a later ectopic pregnancy which reduces or ends fertility. Where PID is triggered by an abortion, a chain of events links abortion and later ectopic pregnancy, though it may not be pointed out in the literature as such.[10]

The relationship between induced abortion and episodes of PID is well established. For example, Levallois and colleagues report that "Pelvic infection is the most common complication of curettage abortion. Although the rate of postabortal infections is low, it is of public concern for two reasons: First, abortion is a procedure commonly performed on young women; second, pelvic infection can lead to serious sequelae."[11] Sorensen and colleagues conclude that "Pelvic inflammatory disease is the most frequent complication after induced abortion...." Contradicting Lavallois and colleagues, they refer to "*...the high incidence of postabortal PID*, [emphasis added] with potential long-term risks of chronic pelvic pain, *dyspareunia*, subfertililty and ectopic pregnancy".[12]

The abortion procedure can trigger an episode of PID in any woman, but those post-abortion women who already have Chlamydia are at far higher risk of PID than women who do not carry the organism. Women can be asymptomatic and still harbor Chlamydia trachomatis in the lower genital tract. If the abortion clinic does not test for this and prescribe the appropriate antibiotic regime, the woman may only discover the Chlamydia while being treated for post-abortion PID. By then it may be too late to avoid later fertility problems.

Much of the research on the relationship between abortion and pelvic inflammatory disease has been carried out in Europe, particularly in Scandinavia, and the United Kingdom. The research confirms a prospective incidence rate range of six to 30 per cent for post-abortion infection. Even more worrying, the large Danish study by Nielsen and colleagues found that even administering the antibiotic ofloxacin before the abortion "[did] not significantly decrease the rate of post-abortal PID, neither among women with a history of PID nor among those without previous PID".[13]

These findings contrast with an American study, which found that "the incidence [of postabortal upper genital tract infection] may be as low as 0.5 per cent."[14]

Jonsson and colleagues established a *seroprevalence* rate for Chlamydia of 24.7 per cent among sexually active women in Sweden. They also found that the number of sexual partners, age at first coitus, history of induced abortion, and previous PID were "independently correlated with seropositivity [a positive blood test for an organism causing PID]".[15] Women with a history of induced abortion were an astoundingly *3.15 times more likely to be seropositive than women without a history of induced abortion*. To put it another way, 45.8 per cent of aborting women were later shown to be seropositive.

While claiming that rates of infection following abortion are low, Sawaya and colleagues report, from a *meta-analysis* of articles, that "Long-term sequelae of post-abortal infection include chronic pelvic pain, dyspareunia and infertility."[16]

Delay in the onset of symptoms is a critical factor when considering PID caused by Chlamydia following abortion. Blackwell and colleagues found from their patient records that women continued to develop symptoms at eleven weeks, 24 weeks, and 36 weeks post-abortion.[17] Osser and Persson found it to be variable: If the woman was positive for Chlamydia before the abortion, the time of onset for *salpingitis* (infection of the fallopian tubes) was 14.1 days and for *endometritis* (infection of the uterus) 8.2 days. As they report, "chlamydia-associated infections were diagnosed on the average three to ten days later than cases without chlamydia."[18] Such complications would not be identified by abortion clinics as immediate sequelae, or coded as being related to an abortion at all.

Because most women undergoing curettage abortion in the United States are young, unmarried, and have never had a child, upper genital tract infections and subsequent infertility can be devastating. Moreover, "the financial costs associated with treating pelvic infection and its sequelae are substantial".[19]

Tables 5-1 and 5-2 show that the percentage of women who test positive for Chlamydia trachomatis at the time of abortion has increased steadily over the past fifteen years.

But it should be remembered that these numbers are from well-regulated hospital clinics associated with research facilities. Private abortion clinics might not conduct these tests.

Table 5-1
Percentage of aborting women testing positive for Chlamydia at the time of their abortion[20]

author/date	*% women positive*
Westergaard 1982	10
Qvigstad 1983	12.6
Osser and Persson 1984	6.3
Barbacci 1986	17.6
Sorensen 1992	8
Blackwell 1993	8
Jonsson 1995	2.7

Table 5-2
Percentage of women who develop pelvic inflammatory disease following abortion, by Chlamydia status[21]

author/date	*% chlamydia negative*	*% chlamydia positive*
Westergaard 1982	10	28
Qvigstad 1983	1.6	20
Osser and Persson 1984	6.3	37.7
Sorensen 1992	13	43
Blackwell 1993	-	63
Nielsen 1993	11.9	17
Sorensen 1994	-	72
Oakeshott 1994	5	19

The research findings noted above show just how pervasive and international is the problem of PID following abortion. Giertz and colleagues found that Chlamydia is a major cause of post-abortion PID, particularly in young women in Scandinavia.[22] Their research confirmed the early finding of Westergaard and colleagues and Qvigstad and colleagues.[23] Induced abortion is a trigger that can often move the infection into the uterine cavity and produce effects that Chlamydia by itself might not cause.

Barbacci found that 17.6 per cent of patients presenting for abortion at the Johns Hopkins Hospital tested positive for

Chlamydia. The doctors found "A significant correlation between the isolation of *C[hlamydia] trachomatis* from the endocervical canal of patients undergoing therapeutic abortion and subsequent development of endometritis within two weeks of the [abortion]".[24] Many of these women were asymptomatic before the abortion. Sorensen and colleagues found that *untreated women with Chlamydia infection at the time of abortion had a cumulative risk of 72 per cent of developing early and/or late PID* if observed for 24 months. The risk was reduced to eight per cent if the infection was treated at the time of the abortion. They conclude that these women run the "risk of serious sequelae such as ectopic pregnancy".[25]

In the general population of women in the childbearing years who develop pelvic inflammatory disease, Washington and colleagues report that 30 to 50 per cent of all PID is caused by Chlamydia trachomatis representing 402,200 episodes of Chlamydia PID each year in the United States.[26] If one uses the conservative estimates in Tables 3-1 and 3-2 above, about six to ten per cent of aborting women are positive for Chlamydia. With over 1,300,000 abortions each year in North America, roughly 100,000 of these women probably carry this *sexually transmitted disease (STD*). If abortion clinics are not pretesting and treating STD with *prophylactic antibiotics*, then seventeen to 63 per cent of these women go on to develop PID. Again, using conservative estimates, somewhere in the range of 15,000–65,000 cases of PID may occur each year to Chlamydia-positive women who undergo induced abortion. Chlamydia often goes undetected. But even if every woman infected with it were treated at the time of her abortion, over 10,000 would still contract PID as a result of the abortion.

Prevention of Pelvic Inflammatory Disease and Chlamydia

There has been a growing literature discussing the efficacy of pre-abortion testing and treatment for Chlamydia. Sawaya and colleagues report that, based on their meta-analysis, there is "a substantial protective effect of antibiotics in all subgroups of women undergoing therapeutic abortion, even women in low-risk groups."[27] At the same time, the

European research suggests that a single antibiotic dose before abortion has little protective effect and may not decrease post-abortion PID. Because the onset can occur anywhere from one to 36 weeks (nine months) following the procedure, pretesting and aggressive antibiotic therapy for those infected is necessary to prevent development. Blackwell and colleagues utilize a ten-day regime of antibiotics, but recognize the limitation discussed by Brewer and problems with post-abortion compliance: "...although all were given a five-day course of prophylactic oxytetracycline (antibiotic), many left their tablets behind. Most women feel well after abortion. Others may not want to be reminded of it."[28]

Sorensen and colleagues report that erythromycin given prophylactically is effective against PID. But they found that when post-abortion PID was not associated with Chlamydia, "erythromycin prophylaxis did not have any effect on these women, nor did it have an effect on nulliparous women or in those with no previous pregnancies." Similarly, Nielsen and colleagues found that "A single oral dose of ofloxacin (400 mg) did not reduce the incidence of Postabortive PID…."[29]

Risk Factors for Abortion-Related PID

Heisterberg and colleagues provided evidence for an increased rate of complications in women who had never borne a child. Nielsen has identified the risk factors for PID as: previous PID incident, no previously borne children, a previous induced abortion. Levallois and colleagues found that in a sample of Quebec women attending for abortion at Laval University Hospital those patients who were repeat abortion seekers and who "...were nulliparous with multiple sex partners developed pelvic infection nearly three times more frequently than others not having these characteristics".[30]

The evidence suggests that single, sexually active, never-previously-pregnant young women are the most likely to suffer from PID following an induced abortion. An incident of PID in adolescence may mean that the woman will never achieve a successful pregnancy.

Uterine Perforation

Leibner notes that "Although uterine perforation with intra-abdominal injury is a well-described complication of vacuum aspiration termination of pregnancy, most post-abortion perforations go undetected".[31] Women may remain asymptomatic or may develop abdominal discomfort many weeks after the abortion, which may signal damage to surrounding organs such as the small bowel.

Kaali and colleagues discovered this to be true during a study of 6408 first-trimester abortions.[32] They found that the resulting true uterine perforation rate was actually about seven times higher than the practitioner typically suspected. Practitioners suspected a rate of 2.8 per 1000 procedures when "the instrument was passed beyond the expected distance." However, Kaali also checked the number of perforations found in patients whose abortions were performed along with *laparoscopic sterilization*. The total showed a detected perforation rate of 19.6 per 1000 procedures, "*sevenfold higher* than the perforation rate recognized with traditional methods" (i.e., surgeon's suspicion) [emphasis added]. They also note that "…most traumatic uterine perforations during first-trimester abortions are unreported or even unsuspected".[33] The presence of such injuries is only detected later when scarring prevents implantation of a subsequent pregnancy or when women have difficulty conceiving or carrying a pregnancy to term.

This raises the question of what happens to women who have an abortion without sterilization by laparoscopy? It may be assumed that their rate of undetected perforation is also seven times higher. But, insofar as they were not also sterilized, they would not likely know about it and would not know that this event could affect their future fertility. Untreated uterine perforations may produce scar tissue that can affect the implantation of an embryo in a future pregnancy.

Asherman's Syndrome

The diagnosis of Asherman's Syndrome (intrauterine adhesions or IUA, also known as *synechia uteri*), typically

occurs in the context of menstrual difficulties or infertility. Schenker looked for the causes of this disorder and concluded that all evidence suggests that it is the result of trauma to the pregnant uterus, mostly through abortions: "Gestational changes bring about the softening of the uterus; consequently, the traumatizing effect of eventual curettage is more intense". Therefore it is possible that the depth of curettage may cause "denudation of the basal layer, the regenerative reservoir of the endometrium."[34] Of the IUA cases reported as connected to pregnancy, 66.7 per cent, occurred after curettage for abortion while 21.5 per cent happened after post-partum curettage and two per cent followed cesarian section. Abortion was by far the leading factor. Schenker suggests that because Asherman's will not necessarily occur immediately but may do so after a delay, physicians should be suspicious when *amenorrhea* or *hypomenorrhea* (absent or scanty menstrual periods), habitual spontaneous abortion, and infertility develop in a patient following mechanical trauma to a pregnant uterus.

Schenker goes on to graph the outcome for untreated intrauterine adhesions: Of the 133 patients, 78 conceived a total of 165 times, but only 50 of these pregnancies progressed to term delivery while 38 had premature deliveries and 66 miscarried. The remaining pregnancies experienced other obstetrical complications which resulted in loss. Even if treated, the success rate varied with the severity of the adhesions. In cases of mild adhesions, 95 per cent pregnancy was achieved with a fifteen per cent spontaneous abortion (miscarriage) rate, while with severe adhesions the pregnancy rate was only 60 per cent with a spontaneous abortion rate of 50 per cent.

A recent French study headed by Sylvie Capella-Allouc confirms that "The most common cause [of Asherman's Syndrome] is dilatation and curettage (D&C) of a recently pregnant uterus", whether the pregnancy was ended by spontaneous or induced abortion, or by live birth. The incidence of intrauterine adhesions after one D&C was found to be sixteen per cent; after two and three procedures the incidences were fourteen and 32 per cent respectively, of which more than 50 per cent were severe adhesions.[35]

At present we do not know how common Asherman's Syndrome is following induced abortion, but uterine adhesions are present in "68 per cent of women with secondary infertility who have a past history of two or more uterine curettages [D&C]."[36] What is most pernicious about Asherman's Syndrome is that women may appear asymptomatic while at the same time reporting a variety of ill-defined disorders such as menstrual irregularity or ongoing infertility.[37]

Endometrial Ossification (Retained Fetal Bones)

Documentation of future infertility as a result of endometrial ossification (retained fetal bones) is seldom found in the abortion literature.[38] But it often occurs in clinical studies in gynecology or emergency medicine. Chan discusses the circumstances around this type of infertility and reports other presenting symptoms such as *dysmenorrhoea* (pain or discomfort before a menstrual period) or *menorrhagia* (heavy menstrual flow). Chan concludes that "Some bony fragments may be embedded in the endometrium or myometrium [the muscular wall of the uterus] and may not be identified at curettage." For this reason he suggests, "Retained fetal bones should be considered in all patients with infertility, dysfunctional uterine bleeding, dysmenorrhoea or other symptoms dating from a pregnancy or pregnancy termination."[39]

Ruiz-Velasco and colleagues found that the presence of bone fragments in the endometrium, brought on by ossification around fetal remains, can cause infertility over a number of years, and comment that these problems "are not very rare, that is to say that they are more frequent than thought"[40] Torne and colleagues conclude that in endometrial ossification "the common feature in most reported cases is a previous history of abortion, and the result can be secondary infertility."[41]

Moon and colleagues describes eleven cases of uterine calcification and infertility after *all eleven* had undergone "operative termination of mid-trimester pregnancy. Dilation and curettage or *hysteroscopy* confirmed residual fetal bony

fragments." These cases came to light as the women were treated for secondary infertility.[42]

Marcus and colleagues identified secondary infertility and endometrial ossification in two women who had undergone induced mid-trimester abortions four and twelve years earlier and they conclude that this condition should always be considered in any infertility patients, particularly those who have undergone previous induced abortions. They state flatly that "a history of previous abortion is usually present" in cases of endometrial ossification.[43]

Zoricic and colleagues found a 22 mm long fetal bone lodged in the uterine cavity of an infertile patient who had had an induced abortion nineteen years earlier. The authors report that these findings *"strengthen once again the association between abortion and infertility"* [emphasis added].[44] Once again, non-North-American researchers more readily acknowledge the negative consequences of abortion.

Sometimes the outcome of sterility and infertility occur together in the literature. For example, an Italian study, Coccia and colleagues report that cases of *"osseous metaplasia of the endometrium,"* were often the result of the presence of bone within the uterus.[45] The bone prevents the implantation of any fertilized ova while also producing *endometritis* in the patient.

Shimizu and Nakayama diagnosed endometrial ossification in a woman following histological examination of endometrial tissue following curettage. The pathological sample contained a "mature bone." The authors urge caution in diagnosis to avoid a "misdiagnosis of malignant mixed *mullerian tumor."* It is their contention that the symptoms of retained foreign [fetal] bone, particularly vaginal discharge, may present as a tumor and may be difficult to identify if an accurate reproductive history is not available and careful diagnosis not undertaken.[46]

So far these problems are rare, but how many more go simply unreported? It is hard to know because, as we have

seen, some cases of infertility, including those mentioned here, were only detected when the patients went to a clinic for fertility treatment or in vitro fertilization. Fertility treatments are quite expensive and are not covered by most health plans. The patients are typically those able to afford private clinics. They are not a random sample of all those who may suffer from the condition.

There are various theories as to how endometrial ossification leads to infertility. They include the following possibilities: retained bone prevents implantation; retained bone causes early abortion; changes in the uterine cavity and an increase in the production of prostaglandins act as a natural contraceptive or abortifacient. What is interesting, however, is the length of time that is reported to have elapsed between the abortion and the identification of the condition: four and twelve years as reported by Marcus and colleagues, and nineteen years as reported by Zoricic and colleagues.

Table 5-3
Length of time between abortion and identification of endometrial ossification[47]

Marcus	1993	4, 12 years
Zoricic	1994	19 years
Ruiz-Velasco	1997	4-18 years
Torne	1996	1-4 months
Shimizu and colleagues	1997	No time given but patient was 62 years old.

Ectopic Pregnancy

Although we have dealt with the increased risk of ectopic pregnancy following abortion, primarily in terms of its threat to life (see Chapter 4), ectopic pregnancy also impairs fertility. Tuomivaara used a prospective rather than retrospective approach and determined that "the present study confirmed that an ectopic pregnancy dramatically increases the risk of secondary infertility." The study also found that patients with ectopic pregnancy "had more legal abortions" than the control group.[48] Contrast this with the claim by Holt and colleagues that abortion "has little or no

influence on a woman's risk of ectopic pregnancy." These researchers dismiss their own finding of twenty per cent greater likelihood of ectopic pregnany (i.e., 1.2 relative risk) after two induced abortions, as possibly occurring by chance.[49] They make this conclusion even though several other studies point in the same direction of increased risk:

Daling and colleagues:
- 40 per cent after one induced abortion and 80 per cent after two or more;

Levin and colleagues:
- 30 per cent after one induced abortion and 160 per cent two or more;

Chung:
- 20 per cent after abortion(s) in general.[50]

When all these studies are considered together, a clear interconnection emerges between abortion, ectopic pregnancy, and infertility.

Conclusion

It is apparent from the research cited here that women who have abortions, especially single young women who have never carried a baby to term, risk experiencing greater difficulty in conceiving and carrying future pregnancies to term. Because very little follow up is done in abortion clinics concerning the negative sequelae of an abortion (such as Chlamydia trachomatis, PID, perforations of the uterus, ectopic pregnancy, endometrial ossification), many women do not even know that they are at risk or should be seeking medical treatment. Long-term effects of these medical problems are complications in future pregnancies and in the most serious cases, inability to have children.

Key Points Chapter 5

- No previous births and an earlier abortion put a woman at significant risk of post-abortion complications leading to possible infertility.

- Coding systems at hospitals often make it difficult to link abortion with medical sequelae.

- Much larger numbers of women than previously suspected are negatively affected by induced abortion with PID and ectopic pregnancies at much higher levels than ever before in North America and Europe.

- Other serious sequelae also on the rise are uterine perforations, endometriosis, Chlamydia trachomatis, endometrial ossification (bone fragments left in the uterus), all of which compromise future fertility.

- Many of these medical problems go undetected at the time of abortion and are only discovered years later when women are treated for infertility.

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