

Contraception and Abortion in the Greco-Roman World

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Summary

The author discusses the validity of the claim that, in Antiquity, effective contraceptives and abortifacients were available, were widely used, and their use was responsible for the decline of population in certain periods. After reviewing the maneuvers and drugs used for those purposes, the author concludes that ancient physicians did not have at their disposal effective contraceptives and abortifacients other than those that acted mechanically. In view of the danger associated with the mechanical induction of abortion, the ineffectiveness of pharmacological agents, and the limitations of mechanical contraceptives, it is concluded that drugs and other means of inducing abortion and contraception had a very limited impact on population in Antiquity.

Résumé

L'auteur revient sur l'affirmation selon laquelle, tout au long de l'Antiquité, il existait des moyens contraceptifs et abortifs largement utilisés qui pouvaient expliquer la diminution de la natalité à certaines périodes. Après avoir passé en revue les techniques et les substances utilisées, l'auteur conclut qu'hormis les techniques mécaniques, les anciens médecins n'avaient pas à leur disposition d'autre moyen anti-conceptionnel ou abortif efficace. Vu les complications survenant lorsqu'on déclenchait un avortement et l'inefficacité des thérapeutiques, l'auteur conclut que l'avortement et la contraception n'ont vraisemblablement eu qu'un impact très limité sur la densité de population durant l'Antiquité.

It would appear that in the classical world there were periods during which population declined and legislators tried to take measures to reverse the trend (1). In the second century B.C., Polybius decried the decline of the population of Greece (2), and in Rome the censor Quintus Metellus (late second century B.C.) wanted to make marriage obligatory to encourage the generation of offspring; later, Augustus introduced legislation designed to increase the number of children (3).

Sexual restraint, delayed marriages, coitus interruptus, infanticide, and child abandonment have all been considered as possible reasons for the decline in population, but it has been held that there is not enough historical evidence to justify the conclusion that such factors were significant (4) although, in the case of infanticide, some disagree (5). The contraceptive effect of lactation was unknown to ancient physicians (6) and it is therefore unlikely that it was purposefully used by women to avoid conception.

Contraception and abortion could have been responsible for the population decline but before we can conclude they were causative factors we must decide if effective agents for those purposes were available at the time.

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Ancient medical literature often refers to mechanical and pharmacological means for abortion and contraception. Abortifacients are mentioned in more or less detail in the surviving works of Aetius, Aristotle, Caelius Aurelianus, Celsus, Dioscorides, Galen, Hippocrates (that is, the Hippocratic Corpus), Mustio (or Moschion), Oribasius, Paulus Aegineta, Pliny, S. Placitus Payriensis, Ps. Apuleius Platonicus, Soranus, Theodorus Priscianus. With the exception of Celsus, Mustio, and Theodorus Priscianus, the same authors also discuss contraceptives (7).

It has been said that, because modern pharmacology has shown that some of the plants used in Antiquity for this purpose contain active abortifacients, "the findings of modern medical science... enable us to believe the testimony of historical documents concerning the use of plant substances for birth control," and that indeed women had at their disposal effective contraceptive drugs" [from Antiquity] right up to the twentieth century" (8).

We believe that such a conclusion is unjustified. Although there is no question that many contraceptives and abortifacients are mentioned in ancient medical literature (9), some passages suggest that they were not always effective. In the case of abortifacients, for example, we find in Ovid an example of failure to produce an abortion with herbs and medications :

What herbs and what medicines did my nurse not bring to me and put them underneath with bold hand so that the growing burden could be driven out from deep in my bosom... Ah, too full of life, the baby resisted all attempts and was saved from his hidden enemy (10).

And a passage of Procopius says :
Now she had chanced to conceive a child by one of her lovers while she was still on the stage, and being late about discovering her misfortune she did everything to accomplish, in her usual way, an abortion, but she was unsuccessful, by all the means employed, in

killing the untimely infant, for by now it lacked but little of its human shape. Consequently, since she met with no success, she gave up trying and was compelled to bear the child (11).

This passage suggests that the lady (who was to become, as wife of Justinian, the Empress Theodora) previously had abortions but could not find an effective abortifacient for a more advanced pregnancy.

In addition, an evaluation of the many alleged contraceptive and abortive agents found in ancient literature leads to the conclusion that most of them were ineffective. We have chosen the following as representative samples from ancient literature (12) :

Contraceptive agents

a) Mechanical (locally acting)

Smearing "that part of the uterus on which the seed falls", i.e., the cervix, with cedar oil or cosmetic white or frankincense (13); intravaginal application of axe-weed and honey (14); alum (15); cabbage (after coition) (16); coronilla (17); pepper (after coition) (18); wool plugs (19).

b) Systemic

Administration (by mouth) of asplenon (a plant also called hemionion) (20); fern (21); rue (22); mint (23); *thelypteris* (*pteris aquilina*, a fern) with honey and wine (24); eating the small worms supposedly bred by parsley (25); willow leaves (26); drinking fern root or flowers and leaves of willow in wine (27); ingestion of copper salts (28).

c) Others

Letting the semen come out of the vagina after coitus (29); sneezing after sexual intercourse (30); smearing cedar oil over the penis before coition (31). Preparations that decrease sexual desire could be considered as indirect contraceptives. According to Pliny, the ashes of

the nails and of the hide of the lynx, taken in drink by men, decrease their libido and the same result is observed when those ashes are sprinkled on women (32). Goats, ticks and bulls can be used for the same purpose :

... if the loins of a woman are rubbed thoroughly with the blood of a tick from a black wild-bull, she will be disgusted with sexual intercourse, and also with her love if she drinks the urine of a he-goat, nard being added to disguise the foul taste (33).

Similarly, men's libido can be decreased by the ingestion of the parts of certain plants, such as *condrion (condrilla)* (34). Some contraceptive agents took the form of amulets :

There is also a third kind of phalangium, a hairy spider with an enormous head. When this is cut open, there are said to be found inside two little worms, which, tied in deer skin as an amulet on women before sunrise, act as a contraceptive, as Caecilius has told us in his Commentarii. They retain this property for a year. Of all such preventives this only would it be right for me to mention, to help those women who are so prolific that they stand in need of such a respite (35). Wear the liver of a cat in a tube on the left foot ... or else wear part of the womb of a lioness in a tube of ivory. This is very effective (36). [Asparagus] being hanged about [as an amulet], and the decoction of it drunk, it makes one barren, and not fit for generation (37).

It was also believed that contraception could be achieved by smearing the penis with green mint before copulation (38), or by the smearing of the body of the woman with menstrual blood or by her stepping over it (39).

Abortives

a) Mechanical

By mechanical abortive agents it is meant sharp-edged instruments and shafts introduced

into the pregnant uterus (40). Most of the evidence that abortion was produced by such means comes from Ovid (41) although Soranus also mentions them (see below).

b) Systemic

Administration, by mouth, of fern (42); rue (43); *thelypteris (pteris aquilina, a kind of fern)* with honey and wine (44); seeds of wallflower with wine (45); beaver's testicles (46); goat's fung with aromatic herbs (47); a decoction of clinopodium (48).

c) Others

The smell of lamps being put out (49); alum intravaginal (50); various pessaries (made with cabbage (51); savin, myrrh, lupine, centaury, etc.) (52) (53).

The following passage from Soranus includes contraceptives and abortifacients of most of the categories just mentioned (54) :

For if it is much more advantageous not to conceive than to destroy the embryo, one must consequently beware of having sexual intercourse at those periods which we said were suitable for conception (55). And during the sexual act, at the critical moment of coitus when the man is about to discharge the seed, the woman must hold her breath and draw herself away a little, so that the seed may not be hurled too deep into the cavity of the uterus. And getting up immediately and squatting down, she should induce sneezing and carefully wipe the vagina all round; she might even drink something cold. It also aids in preventing conception to smear the orifice of the uterus all over before with old olive oil or honey or cedar resin or juice of the balsam tree, alone or together with white lead; or with a moist cerate containing myrtle oil and white lead; or before the act with moist alum, or with galbanum together with wine; or to put a lock of fine wool into the orifice of the uterus; or, before sexual relations to use vaginal

suppositories which have the power to contract and to condense. For such of these things as are styptic, clogging, and cooling cause the orifice of the uterus to shut before the time of coitus and do not let the seed pass into its fundus. [Such, however, as are hot] and irritating, not only do not allow the seed of the man to remain in the cavity of the uterus, but draw forth as well another fluid from it.

And we shall make specific mention of some. Pine bark, tanning sumach, equal quantities of each, rub with wine and apply in due measure before coitus after wool has been wrapped around; and after two or three hours she may remove it and have intercourse.

Another: Of Cimolian earth, root of panax, equal quantities, rub with water separately and together, and when sticky apply in like manner. Or : Grind the inside of fresh pomegranate peel with water, and apply. Or. Grind two parts of pomegranate peel and one part of oak galls, from small suppositories and insert after the cessation of menstruation. Or: Moist alum, the inside of pomegranate rind, mix with water, and apply with wool. Or: Of unripe oak galls, of the inside of pomegranate peel, of ginger, of each 2 drachms, mould it with wine to the size of vetch peas and dry indoors and give before coitus, to be applied as a vaginal suppository. Or: Grind the flesh of dried figs and apply together with natron. Or: Apply pomegranate peel with an equal amount of gum and an equal amount of oil of roses.

Then one should always follow with a drink of honey water. But one should beware of things which are very pungent, because of the ulcerations arising from them. And we use all these things after the end of menstruation.

Moreover to some people it seems advisable: once during the month to drink Cyrenaic balm to the amount of a chick-pea in two cyaths of water for the purpose of inducing

menstruation. Or : of panax balm and Cyrenaic balm and rue seed, of each two obols, [grind] and coat with wax and give to swallow; then follow with a drink of diluted wine or let it be drunk in diluted wine. [Or:] Of wallflower seed and myrtle, of each three obols, of myrrh a drachm, of white pepper two seeds; give to drink with wine for three days. Or: of rocket seed one obol, of cow parsnip one-half obol; drink with oxymel.

However, these things not only prevent conception, but also destroy any already existing. In our opinion, moreover, the evil from these things is too great, since they damage and upset the stomach, and besides cause congestion of the head and induce sympathetic reactions. Others, however, have even made use of amulets which on grounds of antipathy they believe to have great effect; such are uteri of mules and the dirt in their ears and more things of this kind which according to the outcome reveal themselves as falsehoods.

Yet if conception has taken place..., for 30 days, ...in order that the embryo be separated, the woman should have [more violent exercise], walking about energetically and being shaken by means of draught animals; she should also leap energetically and carry things which are heavy beyond her strength. She should use diuretic concoctions which also have the power to bring on menstruation, and empty and purge the abdomen with relatively pungent clysters; sometimes using warm and sweet olive oil as injections, sometimes anointing the whole body thoroughly therewith and rubbing it vigorously, especially around the pubes, the abdomen, and the loins, bathing daily in sweet water which is not too hot, lingering in the baths and drinking first a little wine and living on pungent food. If this is without effect, one must also treat locally by having her sit in a bath of a decoction of linseed, fenugreek, mallow, marsh mallow, and wormwood. She must also use poultices of the same substances

and have injections of old oil, alone or together with rue juice or maybe with honey, or of iris oil, or of absinthium together with honey, or of panax balm or else of spelt together with rue and honey, or of Syrian unguent. And if the situation remains the same she must no longer apply the common poultices, but those made of meal of lupine together with ox bile and absinthium, [and she must use] plasters of a similar kind.

For a woman who intends to have an abortion, it is necessary for two or even three days beforehand to take protracted baths, little food and to use softening vaginal suppositories; also to abstain from wine; then to be bled and a relatively great quantity taken away. For the dictum of Hippocrates in the "Aphorisms", even if not true in a case of constriction, is yet true of a healthy woman: "A pregnant woman if bled, miscarries". For just as sweat, urine or faeces are excreted if the parts containing these substances slacken very much, so the fetus falls out after the uterus dilates. Following the venesection one must shake her by means of draught animals (for now the shaking is more effective on the parts which previously have been relaxed) and one must use softening vaginal suppositories. But if a woman reacts unfavorably to venesection and is languid, one must first relax the parts by means of sitz baths, full baths, softening vaginal suppositories, by keeping her on water and limited food, and by means of aperients and the application of a softening clyster; afterwards one must apply an abortive vaginal suppository. Of the latter one should choose those which are not too pungent, that they may not cause too great a sympathetic reaction and heat. And of the more gentle ones there exist for instance: of myrtle, wallflower seed, bitter lupines equal quantities, by means of water, mould troches the size of a bean. Or : of rue leaves 3 drachms, of myrtle 2 drachms and the same of sweet bay, mix with wine in the same way,

and give her a drink. Another vaginal suppository which produces abortion with relatively little danger : of wallflower, cardamom, brimstone, absinthium, myrrh, equal quantities, mould with water. And she who intends to apply these things should be bathed beforehand or made to relax by sitz baths; and if after some time she brings forth nothing, she should again be relaxed by sitz baths and for the second time a suppository should be applied. In addition, many different things have been mentioned by others; one must, however, beware of things that are too powerful and of separating the embryo by means of something sharp-edged, for danger arises that some of the adjacent parts be wounded. After the abortion one must treat as for inflammation (56).

Discussion

It is evident that an intravaginal foreign body mechanically obstructing the *ostium* uter/would be an effective contraceptive and that the dilatation of the *ostium* produced by the introduction of an instrument or foreign body during pregnancy would indeed cause abortion.

As for the efficacy of non-mechanical means of contraception and abortion, a perusal of the examples given above indicates that some of the plants and maneuvers used were obviously ineffective (wearing amulets, smearing the penis with mint, drinking urine of she-goat, sneezing after coition, etc.). What about the others ?

The number of pharmacological agents used in ancient medicine is very large (in the Hippocratic corpus the medicinal plants number in the hundreds (57) and there are about 900 entries in the herbal of Dioscorides (58)); it is evident that some of them must have had pharmacological properties. Of the hundreds used as contraceptives or abortifacients (59), a handful have been found, in fact, to have contraceptive and abortifacient properties (60), although they are

not used as such in contemporary medicine. Even assuming, however, that those agents were effective and safe, it must be underlined that, as a general rule, the finding that among the many plants used for a particular purpose some have the pharmacological capacity of producing the desired effect does not allow us to conclude that the ancient physician used them because he knew that they possessed such a capacity (61). Three conditions have to be fulfilled before we can draw such a conclusion : 1) that those plants were used more than others in the particular clinical situation; 2) that the doses were sufficient to produce the effect; 3) that the preparation was appropriate and used properly.

Often we find that in ancient therapeutics one or more of these conditions were not met. Usually, the effective plants were not used more often than the ineffective ones and, in such cases, one cannot avoid concluding that the effective plant was included in the therapeutic regimen by chance.

If, for example, we try to determine whether, in the *Corpus Hippocraticum*, *papaver somniferum* was employed for the control of pain, we find that the plant was used often, it is true, but usually with other plants and for such disparate conditions as empyema (62), "phthisis" (63), "typhus" (64), leucorrhoea (65), habitual abortion (66), "dropsy of the uterus" (67), metrorrhagia (68), and "displacement of the uterus" (69). In all these cases there is no mention of pain. On only three occasions is the relief of pain mentioned, and, in two of these, poppy is used as one ingredient in a mixture with other drugs (thirty in one case (70), four-burned for fumigation - in another (71)) and in the one other case it is given with just one other drug (72). Therefore, the mere fact that the Hippocratic physician used poppy does not warrant concluding that it was used for the purpose of controlling pain.

In addition, in antiquity, the doses of contraceptives and abortifacients either were not

indicated or were similar to those used for other medications, and modern observations concerning the ingestion of large quantities of a given agent by animals are not applicable to medications taken by women in antiquity. For example, in the 1940s it was found that, in Australia, sheep grazing on a particular type of clover showed sharply reduced fertility. The explanation was found to be that the clover contained substances (isoflavonoids) that reduce fertility (73). Were we to find that the same type of clover was used in Antiquity as a contraceptive (74), would we be justified in assuming that the ancients had identified a plant that effectively interfered with conception ? Of course not, because the Australian sheep were eating quantities of clover, in relation to their body weight, much greater than the quantities that women could have ingested.

Moreover, it was necessary that an effective medication be used properly, it is evident that if cedar oil applied intravaginally in sufficient quantity could have prevented, mechanically, the entrance of the sperm into the uterus, the smearing of the penis with the same substance would have no effect. Similarly, cabbage introduced into the vagina before coition could have been an effective contraceptive (for the same mechanical reasons) but evidently not when inserted after. We have seen above that both these inappropriate means were used. Among the large number of agents applied intravaginally as contraceptives, the possibility that some may have created a chemical milieu unsuitable for the spermatozoa cannot be excluded. In this case they would have had a contraceptive action independent of their capacity to obstruct the *ostium uteri*. As the physician was not aware of such chemical properties, however, the use of such drugs would have been random. This being the case, it is unlikely that these drugs could have had a significant effect on the decrease of fertility. As for the systemically administered abortifacients used in antiquity, the possibility that they could

have been effective is even more remote. In fact, no plant or simple agent readily available in nature seems to have the capacity of inducing abortion safely. The development of chemicals capable of so doing (prostaglandins (75), mifepristone (76), is a very recent development of contemporary pharmacology and while such chemicals are now being used in other countries, they are still being evaluated in the United States. Attempting to produce spontaneously occurring biological events (e.g., healing, contraception, conception, abortion) with means that are ineffective leads to the erroneous belief that the ineffective means are responsible for the event, and therefore effective. Spontaneous abortion and sterile coition are not unusual, of course, and if the patient has taken medication with the purpose of obtaining such an outcome she will be tempted to conclude that the result was caused by the medication.

This would explain why, in ancient literature, references to drugs that are obviously ineffective are so frequent. Ineffective medications have, in fact, been used in medicine for millennia because their lack of efficacy was masked by the spontaneous occurrence of the desired outcome (in the case of healing, by the *vis medicatrix naturae*). The belief that abortion and contraception could be brought about by magic utterances and the administration of ineffective drugs is found in practically all cultures. In ancient India, for example, it was believed that suppression of the emission of semen for contraceptive purposes could be achieved by, at the moment of emission, contracting the anal sphincter while meditating upon the mystic word "OM", or thinking of "a very unsteady ape who is moving on the branches of a tree", or "smearing the soles of the feet (or the umbilicus with various substances" (77). The Egyptians believed that "to make a woman cease to become pregnant for one year, two years or three years", it was sufficient to insert in her vagina a mixture of acacia, dates, honey and seedwool (78).

In some cases, the lack of efficacy could have been masked by the simultaneous use of efficacious mechanical means. For example, Lucretius says that a contraceptive maneuver on the part of women is to gyrate their hips during intercourse and that prostitutes do so to avoid pregnancy (79). Although Lucretius was not a physician, his statement probably reflects a belief that was common at the time. Perhaps prostitutes, along with gyrations, used other means, for example vaginal plugs, and attributed to the gyrations what was due, in fact, to the plugs. Similarly, Juvenal refers to drugs capable of inducing abortion when taken by mouth (80). It could be, however, that, in some cases, women were given drugs before abortion was induced by mechanical means with the idea that the drugs caused the abortion and the dilatation of the ostium was only ancillary (e.g., to permit the elimination of the dead fetus) (81).

The same may be said concerning contraception. Effective mechanical measures may have been associated with ineffective systemic ones and the positive result attributed to the latter as well. The fact that there were so many recipes suggests that most were not effective (82); it is likely that if there had been effective contraceptive and abortive medications readily available, many useless ones, such as amulets, would not have had reason to exist.

In view of the above, it seems justified to assume that the ancient physician did not have at his disposal effective contraceptives and abortifacients other than those that acted mechanically (83). Considering the high mortality undoubtedly associated with the use of mechanical abortifacients (that is, the intrauterine introduction of rods and scraping instruments), it is unlikely that they were used on a large scale. In addition, it is unlikely that effective contraceptive measures (vaginal plugs), lost among the large number of ineffective ones, were sufficiently known and used to have a significant effect on fertility (84). It would appear, therefore, that

drugs and maneuvers used as contraceptives and abortifacients in antiquity were not responsible for population declines and that the cause (or causes) of the phenomenon must be sought elsewhere.

Notes

1. Keith Hopkins, "Contraception in the Roman Empire", *Comparative Studies in Society and History*, VIII, 124-151, 1966; Keith Hopkins, "A Textual Emendation in a Fragment of Musonius Rufus : A Note on Contraception", *Classical Quarterly*, XV, 72-74, 1985; John M. Riddle, "Oral Contraceptives and Early-Term Abortifacients during Classical Antiquity and the Middle Ages", *Past and Present*, CXXXII, 3-32, 1991; John M. Riddle, *Contraception and Abortion from the Ancient World to the Renaissance*, Harvard University Press, 1992, pp. 1-2.
2. Polybius, *Historiae*, XXXVI, xvii, 5-12.
3. Censor Quintus Metellus (second century B.C.), "proposed that everybody should be compelled to marry for the sake of generating children. His speech is preserved and was read by Augustus before the Senate, as if it were written for these days, when he was discussing the problem of marriage in our social classes" (Livy, *Periocha*, LIX). The same speech is mentioned by Aulus Gellius (*Noctes Atticae*, I, vi), who, however, wrongly attributes it to Metellus Numidicus. Suetonius (*Divus Augustus*, xxxiv and lxxxix) mentions that Augustus enacted laws to encourage marriage and that he read to the Senate Quintus Metellus' speech. See also: Keith Hopkins, "Contraception in the Roman Empire", *Comparative Studies in Society and History*, VIII, 124-151, 1966. The Augustan laws *Lex Julia de maritandis ordinibus* (18 B.C.) and *Lex Papia Poppaea* (9 A. D.) were followed by the Alimentary Laws, which provided, between the first and third centuries A.D., payments to parents to raise children. See : John M. Riddle, "Oral Contraceptives and Early-Term Abortifacients during Classical Antiquity and the Middle Ages", *Past and Present*, CXXXII, 3-32, 1991, footnote 114.
4. John M. Riddle, "Oral Contraceptives and Early-Term Abortifacients during Classical Antiquity and the Middle Ages", *Past and Present*, CXXXII, 3-32, 1991; Donald Engels, "The Problem of Female Infanticide in the Greco-Roman World", *Classical Philology*, LXXV, 112-120, 1980.
5. William W. Harris, "The theoretical Possibility of Extensive Infanticide in the Graeco-Roman World", *Classical Quarterly*, XXXII, 114-116, 1982; Paul Carrick, *Medical Ethics in Antiquity*, Dordrecht, D. Reidel, 1985, pp. 101-102.
6. Wieslaw Suder, "Allaitement et contraception dans les textes medicaux latins et grecs antiques", in *Le latin medical. La constitution d'un langage scientifique*, Memoire X, edited by Guy Sabbath, Saint-Etienne, Publications de l'Universite de Saint-Etienne, 1991, pp. 135-141. The belief that Aristotle (*De generatione animalium*, IV, x, 777a, 13-16 and *Historia animalium*, VII, xi, 587b, 25-30) and Pseudo-Plutarch (*De liberis educandis*, 5 - Loeb Edition, p. 14) may have known the phenomenon, is based on passages of doubtful interpretation.
7. Keith Hopkins, "Contraception in the Roman Empire", *Comparative Studies in Society and History*, VIII, 124-151, 1966.
8. John M. Riddle, "Oral Contraceptives and Early-Term Abortifacients during Classical Antiquity and the Middle Ages", *Past and Present*, CXXXII, 3-32, 1991. See also : John M. Riddle, *Contraception and Abortion from the Ancient World to the Renaissance*, Harvard University Press, 1992, p. 56.
9. Keller found about two hundred alleged abortives mentioned in the ancient literature (Achim Keller, *Die Abortiva in der römischen Kaiserzeit*, Stuttgart, Deutscher Apotheker Verlag, 1988). Fontanille mentions about four hundred abortive or contraceptive preparations (Marie-Therese Fontanille, *Avortement et contraception dans la medecine greco-romaine*, Paris, Laboratoires Searle, 1977).
10. *Quas mihi non herbas, quae non medicamina nutrita tullaudacis suppositaeque manu ut penitus nostris... visceribus crescens excuteretur onus I A, nimium vivax admotis restitit infans artibus et tecto tutus ab hoste fuf* (Ovid, *Heroides*, XI, 43-44).
11. Procopius, *Secret History*, XVII, 16-17. Translation by H.B. Dewing, The Loeb Classical Library, Cambridge, Harvard University Press, 1935.
12. For comprehensive lists, see : Wolfgang Jochle, "Menses inducing Drugs : Their Role in Antique, Medieval and Renaissance Gynecology and Birth Control", *Contraception*, X, 4, 425-439, 1974. Marie-Therese Fontanille, *avortement et contra-*

- ception dans la medecine greco-romaine*, Paris, Laboratoires Searle, 1977; Achim Keller, *Die Abortiva in der romischen Kaizerzeit*, Stuttgart, Deutscher Apotheker Verlag, 1988.
13. Aristotle, *Historia animalium*, VII (IX), iii, 583a, 22-24.
 14. *The Greek Herbal of Dioscorides*, II, 146. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
 15. *The Greek Herbal of Dioscorides*, V, 123. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
 16. Oribasius, *Euporiston*, IV, 116, in *Oeuvres d'Oribase*, edited and translated by C. Daremberg and U.C. Bussemaker, Paris, Imprimerie Nationale, 6 vols, 1851, V, pp. 777-778.
 17. Oribasius, *Euporiston*, IV, 116, in *Oeuvres d'Oribase*, edited and translated by C. Daremberg and U.C. Bussemaker, Paris, Imprimerie Nationale, 6 vols, 1851, V, pp. 777-778.
 18. *The Greek Herbal of Dioscorides*, II, 189. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
 19. See : Oribasius, *Collectiones medicae*, X, 25, in *Oeuvres d'Oribase*, edited and translated by C. Daremberg and U.C. Bussemaker, Paris, Imprimerie Nationale, 6 vols, 1851, II, p. 442. See also Soranus, quotation below.
 20. Pliny, *Natural History*, XXVII, xvii, 34.
 21. Pliny, *Natural History*, XXVII, iv, 80.
 22. Pliny, *Natural History*, XX, li, 142-143.
 23. Pliny, *Natural History*, XX, liii, 147-148.
 24. *The Greek Herbal of Dioscorides*, IV, 187. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
 25. Pliny, *Natural History*, XX, xliv, 114.
 26. *The Greek Herbal of Dioscorides*, 1, 136. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
 27. Oribasius, *Euporiston*, IV, 116, in *Oeuvres d'Oribase*, edited and translated by C. Daremberg and U.C. Bussemaker, Paris, Imprimerie Nationale, 6 vols, 1851, V, pp. 777-778.
 28. This is the only example of oral contraceptive in the Hippocratic Corpus : "If a woman does not want to become pregnant, dissolve in water a quantity the size of a bean of *misu* [a copper ore found in Cyprus], give it to her to drink, and she will not become pregnant for a year" (*On the Nature of Woman*, xcvi, Littre, VII, p. 414). The same prescription is repeated in *On Women's Diseases*, I, lxxvi, Littre, VIII, p. 170. It is of interest that, although the idea that ingestion of copper salts would make a woman sterile for one year is to be considered the result of imaginary pharmacology, it has been said of this alleged contraceptive : "There is sufficient evidence... to merit the hypothesis that the first contraceptive mentioned in Greek medicine [that is, *misu*] is based on rational observations by women who were seeking to control their fertility through contraception" (John M. Riddle, *Contraception and Abortion from the Ancient World to the Renaissance*, Cambridge, Harvard University Press, 1992, p.76).
 29. Hippocrates, *On the Seed*, v, Littre, VII, p. 476.
 30. Pliny, *Natural History*, VII, vi, 42.
 31. Pliny obviously did not believe in the power of this maneuver because he reports it as being a hearsay (*quodtradunt*) miracle (*portentum*). Pliny, *Natural History*, XXIV, xi, 18.
 32. Pliny, *Natural History*, XXVIII, xxxii, 122.
 33. Pliny, *Natural History*, XXVIII, lxxvii, 256. Translation by W.H.S. Jones, The Loeb Classical Library, Cambridge, Harvard University Press, 1956.
 34. Pliny, *Natural History*, XXII, xlv, 91.
 35. Pliny, *Natural History*, XXIX, xxvii, 85. Translation by W.H.S. Jones, The Loeb Classical Library, Cambridge, Harvard University Press, 1956.
 36. Aetius of Amida, 16, 17. Quoted by Keith Hopkins, "Contraception in the Roman Empire", *Comparative Studies in Society and History*, V111, 124-151, 1966.
 37. *The Greek Herbal of Dioscorides*, 11, 152. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
 38. Oribasius, *Euporiston*, IV, 116, in *Oeuvres d'Oribase*, edited and translated by C. Daremberg and U.C. Bussemaker, Paris, Imprimerie Nationale, 6 vols, 1851, V, pp. 777-778.
 39. *The Greek Herbal of Dioscorides*, II, 97. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).

40. We do not consider pessaries mechanical means for inducing abortion as they could work only because of their pharmacological properties. On the other hand, we consider them mechanical contraceptives because they could act as shields preventing the entrance of the sperm into the uterus.
41. Ovid (*Fasti*, I, 623) states that abortion was produced *ictu caedo* (with a blind blow). The expression has been interpreted as meaning the introduction of an instrument into the uterus (see: Enzo Nardi, *Procurato aborto nel mondo greco-romano*, Milan, Giuffrè, 1971, p. 185, note 98). In *Amores*, we find : *suis patiuntur vulnera telis, et caecae armant... manus* ("women suffer wounds from their own weapons when they arm their hands to blindly stab (their viscera)" - II, xiv, 3-4), and *vestra quid effoditis subiectis viscera telis, et nondum natis dira venena datis ?* ("[women], why do you dig with shafts at your vitals from below and give dire poisons to your children yet unborn?" - II, xiv, 27-28). See also: Enzo Nardi, *Procurato aborto nel mondo greco-romano*, Milan, Giuffrè, 1971, pp. 185, 195, 234, 235, 239, 297.
42. Pliny, *Natural History*, XXVII, IV, 80.
43. Pliny, *Natural History*, XX, II, 142-143.
44. *The Greek Herbal of Dioscorides*, IV, 187. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
45. *The Greek Herbal of Dioscorides*, 111,138. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
46. *The Greek Herbal of Dioscorides*, II, 26. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
47. *The Greek Herbal of Dioscorides*, II, 98. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
48. *The Greek Herbal of Dioscorides*, 111,109. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
49. Pliny, *Natural History*, VII, VII, 43.
50. *The Greek Herbal of Dioscorides*, V, 123. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
51. *The Greek Herbal of Dioscorides*, II, 146. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
52. Oribasius, *Euporiston*, IV, 112, in *Oeuvres d'Oribase*, edited and translated by C. Daremberg and U.C. Bussemaker, Paris, Imprimerie Nationale, 6 vols, 1851, V, pp. 772-773.
53. An abortive pessary (*pesson phthorion*) is also mentioned in the Hippocratic Oath.
54. This is almost all that Soranus has to say on the subject and we quote him *in extenso* to give the reader a first-hand idea of what physicians knew about abortion and contraception and which agents they used.
55. "The best time for fruitful intercourse is when menstruation is ending and abating, when urge and appetite for coitus are present, when the body is neither in want nor too congested and heavy from drunkenness and indigestion, and after the body has been rubbed down and a little food been eaten and when a pleasant state exists in every respect". *Soranus' Gynecology*, I, x, 36. Translated by Owsei Temkin, Baltimore, The Johns Hopkins University Press, 1991 (reprint of 1956 edition), pp. 34-35.
56. *Soranus' Gynecology*, I, xix, 61-65. Translated by Owsei Temkin, Baltimore, The Johns Hopkins University Press, 1991 (reprint of 1956 edition), pp. 63-68. It is of interest that Soranus does not believe in amulets and recognizes the danger of mechanical abortifacients.
57. Heinrich Von Staden (*Herophilus : the Art of Medicine in Early Alexandria*, Cambridge, Cambridge University Press, 1989, p. 18) puts the number at 250; Stannard says "more than 200" (Jerry Stannard, "Hippocratic Pharmacology", *Bull. Hist. Med.*, XXXV, 497-518, 1961); Moisan estimates it at about 350 (Monique Moisan, "Les Plantes Narcotiques dans le Corpus Hippocratique", in *La maladie et les maladies dans la collection hippocratique*, Actes du Vie Colloque International Hippocratique, edited by Paul Potter et al., Quebec, Les Editions du Sphinx, 1990, pp. 381-391); Girards believes the same number to be "more than 450" (Christine Girard, "L'hellebore, panacee ou placebo ?" in *La maladie et les maladies dans la collection hippocratique*, Actes du Vie Colloque International Hippocratique, edited by Paul Potter et al., Quebec, Les Editions du Sphinx, 1990, pp. 391-405).

58. *The Greek Herbal of Dioscorides*. Translated by John Goodyer and edited by Robert T. Gunther, New York, Hafner Publishing Co., 1959 (reprint of the 1934 edition).
59. As mentioned above, Fontanille lists about four hundred preparations between abortives and contraceptives (Marie-Therese Fontanille, *Avortement et contraception dans la medecine greco-romaine*, Paris, Laboratoires Searle, 1977).
60. Riddle mentions less than ten. See : John M. Riddle, "Oral Contraceptives and Early-Term Abortifacients during Classical Antiquity and the Middle Ages", *Past and Present*, CXXXII, 3-32, 1991.
61. P. Prioreshi and D. Babin, "Ancient Use of Cannabis", *Nature*, CCCLXIV, 680, August 19, 1993. See also : J. Worth Estes, *The Medical Skills of Ancient Egypt*, Canton, Science History Publications, 1989, p. 102; P. Prioreshi, *A History of Medicine, Vol I, Primitive and Ancient Medicine*, Lewiston, The Edwin Mellen Press, 1991, pp. 67-69.
62. *On the Regimen of Acute Diseases (Appendix)*, xxx, Littre, II, p. 518.
63. *On Internal Affections*, xii, Littre, VII, p. 196.
64. *On Internal Affections*, ix, Littre, VII, p. 266.
65. *On the Nature of Woman*, xv, Littre, VII, pp. 332-334; *On Women's Diseases II*, cxvii, Littre, VIII, p. 252.
66. *On the Nature of Woman*, xxxv, Littre, VII, p. 376.
67. *On Women's Diseases I*, ix, Littre, VIM, p. 120.
68. *On Women's Diseases II*, Littre, VIII, p. 244.
69. *On Women's Diseases II*, clxix, cci, Littre, VIM, p. 324, 326, 386.
70. *On the Nature of Woman*, xxxii, Littre, VII, p.356, 358.
71. *On Women's Diseases II*, ccvi, Littre, VIII, p. 398..
72. *On Women's Diseases II*, ccvi, Littre, VIII, p. 400.
73. John M. Riddle, "Oral Contraceptives and Early-Term Abortifacients during Classical Antiquity and the Middle Ages", *Past and Present*, CXXXII, 3-32, 1991.
74. Clover was, in fact, used in antiquity as an abortive. See : Marie-Therese Fontanille, *Avortement et contraception dans la medecine greco-romaine*, Paris, Laboratoires Searle, 1977, pp. 86, 146; Achim Keller, *Die Abortiva in der romischen Kaiserzeit*, Stuttgart, Deutscher Apotheker Verlag, 1988, pp. 91, 230.
75. Goodman and Gilman's *The Pharmacological Basis of Therapeutics*, Eighth Edition, New York, McGraw-Hill, 1993, p. 949.
76. Irving M. Spitz, and C.W. Bardin, "Mifepristone (RU 486) - A Modulator of Progestin and Glucocorticoid Action", *N. Engl. J. Med.*, CCCXXIX, 6, 404-412, Aug. 5, 1993.
77. N.H. Keswani, "Contraception in Ancient India", in *Neuroendocrine Regulation of Fertility*, edited by Anand Kumar, Basel, Karger, 1976, pp. 2-7.
78. *The Papyrus Ebers*, translation of B. Ebbell, Copenhagen, Levin and Munksgaard, 1937, p. 108. The mixture could have been effective if it occluded the *ostium*, but then any other mixture of similar consistency would also have been.
79. Lucretius, *De rerum natura*, IV, 1267-1275.
80. Juvenal, *Saturae*, VI, 595-598.
81. A concomitant use of abortifacients and mechanical means may be implied in the passage of Ovid's *Amores* quoted above (II, xiv, 27-28).
82. Marie-Therese Fontanille, *Avortement et contraception dans la medecine greco-romaine*, Paris, Laboratoires Searle, 1977, p. 76.
83. Paul Carrick, *Medical Ethics in Antiquity*, Dordrecht, D. Reidel, 1985, pp. 105-106.
84. Norman E. Himes, *Medical History of Contraception*, New York, Schocken Books, 1970 (reprint of the 1936 edition), pp. 97, 100.

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