Birth Control in an Era of Natural Fertility: The Heritage of Dioscorides

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Critics of the natural fertility concept can be broadly divided into two categories. In the first category are those who believe that marital fertility was always subject to rational choice, and that couples have always more or less born the number of children they wanted. In this school we find Angus McLaren (1990:6), the author of a history of contraception:

> In fact there is abundant evidence of a vast variety of fertility-control practices having been employed in past times. Indeed the abstinence, abortion, withdrawal and extended nursing which were used by the ancient Greeks were to remain the basic forms of family limitation employed by the mass of the population until well into the twentieth century.

On the contrary, I believe that there is plenty of evidence that new methods were constantly added to the list, particularly from the seventeenth century on when there is statistical evidence that some groups were limiting their marital fertility. (Incidentally, there is no evidence that the Greeks practiced withdrawal or used extended breastfeeding for the purpose of spacing their births. Below, I discuss the evidence about Greek abortion.)

In the second category of critics of the natural fertility concept are those who specifically address the time when statistics become available, and criticize methods of measurement used to identify family limitation. I have no quarrel with this second group, and start from the notion that the marital fertility of populations of the past, if we go back far enough in time, was close to unregulated, or natural, even among the upper classes. My use of the Greek example is guided by the fact that Greek writers have left more evidence than those of other past civilizations. Furthermore, I accept one of Coale's pre-conditions of a fertility transition that is often played down, namely that means of fertility control must be available for family limitation to be practiced. For much of human history, I argue, there were no obvious means by which a couple could effectively prevent a steady succession of births throughout their fecund married life.

Finally I will limit my investigation to the use of methods (contraception of abortion) for the purpose of limiting marital fertility. Late marriage and widowhood are effective reducers of overall fertility. Some methods are more specifically designed for spacing: postpartum abstinence and extended breastfeeding. These factors are not usually

affecting natural fertility as conventionally defined, but they limit the number of marital births.

Leaving alone the issue of their effectiveness, what are the potential candidates as means of family limitation used in the past?

For contraception:

- Charms and amulets
- Positions and movements, e.g. coitus interruptus
- Abstinence, either extensive (e.g. post partum), periodic or episodic
- Barriers, either vaginal plugs of some kind, or condoms
- Vaginal suppositories
- Chemical or herbal "potions of sterility".

For abortion:

- Movements, violence, massage, bleeding
- Piercing instruments
- Vaginal suppositories
- Chemical or herbal "potions of sterility".

What are our sources of knowledge on these methods of fertility control in the pre-statistical past? It is almost impossible to pierce the veil of ignorance about actual behavior, but there are some sources documenting it indirectly. Religious sources (for example the penitentials of the high Middle Ages) record mostly interdictions. Are stop signs an index of traffic, as McLaren claims somewhere? Judicial sources deal with deviant behavior, mostly out of wedlock. Literary sources can be used with great caution, since they claim to narrate situations that would be understood by their readers. For what they are worth, literary sources seem to assume the existence of poorly described or completely unspecified "secrets" available from experts that are used, ineffectively, mostly outside of marriage (van de Walle 2001). The "experts" in question are either older seducers, or medical professionals, physicians or pharmacists. Medical sources, finally deserves special mention, as they probably yield the largest quantity of materials and are the least condemnatory. They also offer the best chances to be rational and predicated on efficacy. The content of medical or pharmacological sources should reflect the best science of the time. Medical texts present their own problems, however, and this paper discusses such problems in the light of the work of Dioscorides.

Dioscorides

Pedanius Dioscorides of Anazarbus occupies an important place in the history of science. He is the author of *De Materia Medica*, written in Greek around the year 77 of our era, a book that remained the essential collection of pharmacological lore and botanical knowledge until the sixteenth century. The book describes multiple medical applications for almost 1000 plants and vegetable, animal or mineral substances.

Almost nothing is known about Dioscorides' biography. In the introduction to his work, he mentions that he had widely traveled with the Roman legions around the Mediterranean, and that gave him an opportunity to study plants and collect information about their properties. Riddle (1985) believes he was a military physician. The work is a dry, encyclopedic list, and its organizing principle is unclear beyond very broad headings. For example, aromatics are in Book 1, vines, spirits, stone and metals in Book V. The oldest surviving manuscript, a richly illustrated sixth-century version discovered in Constantinople, classifies the substances in alphabetical order, as does the first surviving non-illustrated sixth-century Latin translation. Between the original writing and the sixth century, new information and comments had probably been added. Riddle (1980), who gives these details, has inventoried the numerous translations. The work was diffused widely in the Greek version, and was translated and adapted into Latin, Arabic and Syrian. In the process, it was considerably transformed. Truncated versions appear in various libraries of monasteries or private physicians throughout the Middle Ages. A free Latin translation in verse, limited to 77 plants common in western Europe appeared ca. 1000 under the name of Macer Floridus's *De Viribus Herbarum* (Choulant 1832); there exists an old English version of this text (Frisk 1949). Multiple beautifully illuminated versions of a *Pseudo-Dioscoridis De Herbis Feminis* also helped transmit plant-lore based on his work; here too, the presentation was limited to a small number of plants common in Western Europe. Most other herbals from the Middle Ages and the Renaissance borrowed heavily from him.

Dioscorides was enormously influential and his authority was invoked through adulterated sources during the middles ages. Dante's *Divine Comedy* lists him among the great scientists of antiquity, "il buono accoglitor del quale" (the good collector or virtues [of plants]). Medieval pharmacology, however, became increasingly dissatisfied with ancient sources, particularly those written in Greek, a language that was not widely read any more, and full of terminological difficulties. Western physicians had problems identifying Mediterranean plants, and pharmacology evolved away from simples to compounds with multiple ingredients. This changed again at the Renaissance, when a new breed of scholars and physicians preached the return to ancient sources and the use of simple natural substances invested with God-given virtues. In 1544, a doctor from Sienna, Pietro Andrea Mattioli (a name Latinized as Matthiolus), published an authoritative and abundantly illustrated Latin translation with comments in Italian, and a few years later translated the comments into Latin. The book is an impressive example of early printing, with some 400 woodcut illustrations.

Mattioli's version was subsequently retranslated from Latin into many European languages (although not in English.) A French version was published in Lyons in 1572. Andrés de Laguna produced his own translation from Greek into Castilian in 1555, with his own marginal comments and illustrations plagiarized from Mattioli. The 1655 translation from Greek into English by the botanist John Goodyer was only published in 1934, and remains the reference edition in English (Gunther 1959). The critical Greek edition by Wellman in 1904 (reissued in 1958) was translated in German a few years later, but there exist no modern editions in European languages, and linguistically as well as medically, the book retains little interest today. The enduring fame of Dioscorides

resides almost entirely in the field of botany, because of his early description of some 600 plants, many of which are still known by the name listed in his work.

As a result, there exist many different versions of Dioscorides, some of which are mostly apocryphal or consist of medieval additions. The uses given for the various simples or herbal substance are not uniform in the different versions. The various readings are interesting in them selves, and show the many layers through which the text has gone through the ages. This is particularly true if we try to assess the description of contraceptive or abortive substances in relation to the practices of antiquity or the medieval period. Of course, birth control is not a primary concern of the work, and the recipes are given incidentally, among the multiple properties of particular plants.

In this paper, we are only interested in assessing the contribution of Dioscorides to birth control. The *Materia Medica* list, as we shall see, many contraceptive and abortive recipes, lost among recipes and usages for a large variety of other purposes. Norman E. Himes (1936, p. 99) in his *Medical History of Contraception* concluded: "In view of the large irrational element, Dioscorides's place in contraceptive medicine is a modest one." Hopkins (1965, p. 132), in a classical discussion of Roman contraception, was similarly dismissive. In a footnote, he called the prescriptions "cautionary… magical … ineffective." Of twenty prescriptions for childlessness, according to Hopkins, "only the last four are possibly effective." This is where the evaluation of scholars would have stood, were it not for Riddle's (1992) spirited defense of abortion and contraception in Dioscorides. The basis of Riddle's argument was that the plants cited by Dioscorides have often been recognized by modern science as containing active ingredients that could affect fertility. He believed that the *Materia Medica* represented knowledge amassed by generations of people living in close connection with nature, who had empirical knowledge of the hidden virtues of plants. In the case of birth control, Dioscorides's recipes reflected the experience of a living chain of women passing information from mother to daughter and from midwife to patient. My own position is the opposite: Greek medicine is an intellectual construct, based on a logical interpretation premised on a mistaken view of human physiology, and transmitted in written form from learned doctor to learned doctor.

A typical article begins with a list of names in various languages and a description of the plant; then a list of the plant's virtues follows. I take the case of Pennyroyal, a kind of mint that has retained a reputation as an abortifacient into the twentieth century. (The magazine Newsweek of May 14, 1996, for example, mentions the death of a young woman after taking pennyroyal oil for an abortion.) I cite the seventeenth century version of Goodyer (Gunther 1959: 270-1) in modernized spelling:

> Pulegium [the Latin name derived from *pulex,* flea, because of its use as an insecticide] is an herb well known, extenuating, warming, digesting. But being drunk it expels the menstrua, and the seconds [placenta], and the Embrya. It brings up also the stuff out of the lungs being drunk with salt and honey, and it helps the convulsed. It assuages also the nauseousness and gnawings of the stomach being drunk with Posca [a mixture of water and vinegar]. It drives out

> also melancholy matter through the belly; being drunk also with wine it helps the bitten by serpents. It does restore also such as faint being applied with acetum to the nostrils. It strengthens the gums being dry-pounded and burnt. But being anointed with Polenta, it assuages all inflammation. But by itself it is good for the gouty (being laid on) till the appearance of redness. But with Ceratum [horn] it does extinguish the Varos [?]. It is good for the Splenicall, being applied with salt. But the decoction thereof assuages itching being washed on, and by way of Insession [sitzbath] it is good for inflations, and the hardnesses and the conversions of the womb…

I cite this excerpt to show how gynecological uses are lost in a jumble of applications. At face value, there is no reason to assume that pennyroyal would be more effective in expelling the embryo than, say, curing snake bites or convulsions. The *Materia Medica* is comparable to a pharmacy filled with a multitude of products of unproven efficacy at the disposal of a possible user. The text appears to reflect the popular reputation of various substances, and makes no claims about their effectiveness, although occasionally the author may express his own skepticism by interjecting "they say that…" or "it is thought that…" The medical content could not be farther removed from the empirical approach that characterizes Greek medicine. It is hard to believe that Dioscorides was a physician.

The point is obvious when we compare Dioscorides the pharmacist with his near-contemporary the physician Soranus, who incarnates the best medical logic of antiquity – even though the effectiveness of his treatments is doubtful. Soranus defines the circumstances under which fertility control might be practiced (when parturition would be dangerous for the mother) and expresses a clear preferences for contraception over abortion. He has a clear progression of methods to be used: to prevent conception, to expel the embryo during the first month after conception, at a later stage, and finally to kill the fetus. For contraception, he recommends among other techniques, a series of herbal remedy that will contract the opening of the womb, and thus prevent the passage of the sperm. His method of choice for abortion is venesection, but he lists a number of herbs with a reputation as emmenagogues (i.e. drugs to provoke the menses), and others substances to expel or kill the fetus when used mostly as sitzbaths or vaginal suppositories. He recommends avoiding excessively potent substances or sharp-edged instruments, and is skeptical about charms and magic. It is remarkable, however, that most of the recipes he gives involve substances listed in Dioscorides for similar ends. Thus, the *Materia Medica* appear to propose substances that serious doctors might use; in addition, however, they report on a number of herbs that would be more suited to a magician or a quack.

Contraceptive techniques in Dioscorides.

The herbal techniques of contraception listed in the volume may be classified into four broad categories: Magic or amulets; contraceptive suppositories; drugs to be administered orally; and anaphrodisiacs to reduce the male's sexual drive.

Four recipes involve carrying substances on the body as amulets. For example (in the Goodyer translation):

> Asplenion. Ceterach. It is thought to be a causer of barrenness of itself, or being hung about one with the spleen of a mule, but they say that this to cause barrenness, must be digged up when the night is moonless.

In three of the recipes, reservations are expressed as in the above example ("it is thought… they say that…").

The logic behind the five contraceptive suppositories listed in the *Materia Medica* is made clear by Soranus. The effect is not that of a spermicide. They involve styptic or contracting substances ("binding" substances in Goodyer's vocabulary), and the goal is to close the mouth of the uterus so that the sperm cannot penetrate. The substances are to be applied *before* intercourse in four instances, and only once (the substance being pepper) immediately after intercourse. In two of the cases, (and probably in a third as well, where the text is incomprehensible) it must be used just after menstruation has ended. The logic is consistent with Greek physiological understanding of the fecund period in women, i.e. when the womb is open to release the accumulated menstrual blood. Soranus also recommend using "contracting substances," often those in the *Materia Medica*, for the period just after menstruation.

The third type of contraception is taken orally. Nine substances are listed, including willow leaves, rennet of hare, ivy, and iron rust; in four cases, it is explicitly stated that the substance should be ingested right after menstruation, i.e. when the woman is thought to be fecund. Soranus includes contraceptives to be taken orally (none from Dioscorides's list), but specifies that "these things not only prevent conception, but also destroy any already existing" (pp.65-66). He advises against them.

Finally, the last category involves products either ingested (including agnos castos, dill, cannabis, water lily and lettuce) or applied to the male genitals to reduce the sex drive or dry up the seed. This category is balanced by an almost equivalent number of aphrodisiacs that are intended to produce seed or incite to venery, and might therefore be proceptive in nature..

The issue of contraceptive effectiveness would appear to be relatively easy to settle. The magical and anaphrodisiac substances would probably have at most a placebo effect (the latter for example might provide psychological support for a man wanting to avoid intercourse). Even if the contracting effect of the suppositories was real, the time recommended for their application would coincide with a period of minimal fecundity of the woman. Herbal contraception for both Dioscorides and Soranos is probably very ineffective.

Abortive techniques in Dioscorides

The identification of abortifacients in the *Materia Medica* is trickier. Soranus made a fundamental distinction between two types of abortifacients, which he called *phtorion* (that is, destructive, or killing) and *ekbolion* (expulsive) respectively. The expulsive kind of abortive drugs was more acceptable to the physician, and typically reserved for the early days of pregnancy (less than one month). The term *ekbolion* is, however, ambiguous in Greek medicine, and may be applied to drugs meant to accelerate pregnancy or facilitate delivery, and expel the dead fetus, the placenta, or even the menses. In fact, drugs reputed to have emmenagogic properties are cited by Soranos as means to terminating an early pregnancy.

The *Materia Medica* refer to a large number of drugs exerting an action on the embryo (a term covering all stages of fetal life). This information is summarized in Table 1, distinguishing between modes of administration of the drug and its alleged effect on the product of conception. The principal modes of administration are by vaginal suppositories and by oral intake (mostly in the form of potions); the "others" category" includes insessions (sitzbaths), *suffitus* (vapor baths) or simply external rubbing; in two cases, miscarriage occurs when the pregnant women steps, perhaps accidentally, over a particular substance. The action on the embryo resulting from the administration of the medicine is expressed by a verb (e.g. *ekballein*, to expel) or the corresponding noun (*ekbolion*, expulsive). These action can be regrouped in general categories: some simply "lead" or "move" the embryo (*agein* or *kinein*); others expel, remove, bring down or draw out (with verbs such as *ekballein, elkein* or *kataspan*), and in four instances the text specifies that a dead embryo is involved; a number destroy or kill (*phtherein, ktenein*); and finally, a number cause abortions or miscarriages (*ektitrôskein, examblôskein*).

Table 1. Mode of administration of drugs affecting the fetus, and their supposed mode of action, In Dioscorides's *Materia Medica.*

	Suppositories	**Oral intake**	**Others**	**Total.**
Lead, Move	13	13	4	30
Expel, extract	13	10	3	26
Destroy, kill	9	8	2	19
Abort, cause miscarriage	3	1	3	7
Total	38	32	12	82

Source: Wellman 1958.

In the list, only those drugs that kill or destroy are unambiguously abortifacients. Those that are said to act on the embryo or expel it are usually also those that are said to have a similar action on the menses or the placenta. They could be meant to help the pregnancy along, facilitate a difficult birth, or expel a dead fetus. A priori, the actions implied by the verbs spelling out move or expulsion are likely to be therapeutic in intent. If the *Materia Medica* reflect the practices of folk medicine or the experience of local herbalists, one would expect the drugs facilitating the birthing process to be most in demand in this type of society. There are very few plants in the list, however, that are explicitly beneficial to the future mother –if we except the numerous products that treat diseases of the reproductive organs. Only two facilitate conception; two are good for women in childbed, two for those having a hard labor, two accelerate delivery, and one "bring forth without pain". It is therefore likely that most of the recipes that have been interpreted as abortifacients (most notably emmenagogic drugs in Riddle's account) are really meant to be proceptive in nature. Stimulating menstruation is a condition for fertility; drugs that move the fetus along are mostly meant to facilitate birth, those that expel it probably are meant to expel a dead fetus (as specified in four instances). There is no clear dividing line between so-called emmenagogues (products to drive out or stimulate the menses) and ecbolics (drugs to help delivery or to facilitate the extraction of the child) or abortifacients. The roots of the two first words include the very roots *agein* and *ekballein*, which we encountered earlier. Riddle greatly expanded the number of abortive prescriptions that he identified in the Materia Medica, by (1) counting as abortions the instances where the text says: "to expel the child" and even "to expel the dead child"; and (2) by suggesting that recipes "to stimulate the menses" were also implicit reference to abortifacients. I interpret these drugs as meant to facilitate the birthing process, and stimulate fertility by restoring the menstrual flow (van de Walle, 2001).

When used in a suppository, in Soranus's account, the function of the expulsive drugs is to soften the tissues so that the passages will open and the conceptus will drop out –an action that is the exact opposite of that of the products that constrict the entry to the womb and prevent entry of the sperm in the contraceptive recipes. Oral expulsive drugs should stimulate the womb and elicit contractions. To quote Soranus (1991:66), the woman "should use diuretic decoctions which also have the power to bring on menstruation, and empty and purge the abdomen with relatively pungent clysters." The destructive drugs administered through suppositories (which Soranus mentions reluctantly, as a last resort) are meant to penetrate the womb and kill the fetus. When ingested by oral means, the action on the embryo, assumedly, is systemic, and the vegetable poison is assumed to kill the fetus. The only active drug cited in this case by Soranus is rue, although it is administered mixed with various other substances. In the letter category, Dioscorides lists also juniper (which retained a reputation as an abortifacent, to wit the use of gin in English folk practices in the nineteenth and early twentieth centuries.)

Were these techniques effective? The issue may be addressed with two arguments. The first relies on the very abundance of substances that have gynecological applications. Dioscorides makes no recommendation, and he does not even differentiate between the claims about their efficacy. Rather commonplace herbs that are part of everyday diet are supposed to have relevant properties. Chickpeas, sage and pepper have an effect (*agogon*) on embryos; cress kills the embryo, sage expels it; lettuce is supposed to reduce the sex drive of men. Such unlikely claims were not filtered out empirically, and there was no mechanism to separate ineffective recipes from potentially effective ones. Presumably, this was a task for the physician, as a result of experience.

The second argument against the effectiveness of the herbs has to do with the mode of administration. A majority are to be used to prepare suppositories. This is a notoriously ineffective approach to abortion. Intuitively, in the mind of a Greek physician, a vaginal suppository uses the shortest path to the womb and the fetus, but this commonsense approach is deceptive. The child in the amniotic sac is well protected against such chemical invasions, and the vagina is not an organ that absorbs chemicals easily into the blood stream (in contrast to the anus where suppositories are effective.) Moreover, the notion that emollient suppositories or sitzbaths are going to facilitate the expulsion of the embryo is probably wrong. As for oral abortifacient drugs, they have never been conclusively tested for effectiveness. As in the case of contraceptive recipes, the methods recommended to induce abortion are predicated on a faulty view of physiology. The abortifacients administered orally would be expected to operate through a systemic action in the body. Riddle has argued that some might be effective, but the verdict is still out.

I

Birth control and Natural fertility

By today's standards, Dioscorides's birth control seems to be almost completely ineffective, and this raises an issue. Why did it survive for so many years (at least one millennium and a half)? A second issue is the following: Why was the text not censored, when it publicized techniques of birth control that were condemned by the dominant ideology of the time?

The conditions of intellectual survival.

Riddle believed that the survival of the tradition of herbal abortifacients and contraceptives was due to their actual effectiveness, and he supported this argument by showing that the transmission was not absolutely literal, but that the recipes changed slightly from one author to the next. My explanation for this drifting is that there were often poor renditions in the transmission of a text that had to be hand copied, translated, and adapted to local needs. Moreover, there may actually have been selective elimination of birth control recipes in the transmission (Hopkins 1965 thinks so, see footnote on p. 150.) Renaissance authors felt the need to revert to the original, precisely because they thought the text had been adulterated.

Table 2: Effects of five popular abortifacients listed in versions of the *Materia Medica*

Source	Artemisia (Mugwort)	Pennyroyal	Rue (Herb of Grace)	Sage	Savin
Greek 1-6th century	Pros agogên (active on) embruon	Agei (affects) embrua	Phtheirei (kill) embrua	Kataspan (bring down) embrua	Ektinassei (shake out embrua
Macer Latin 9th - 12th century	Pellit (pull) abortivum	Abortit	Expellit partum	Pellit abortivum	Extrahit C\corruptos conceptus
Ex Herbis Feminis 10th – 14th century	n.i.	n.i.	n.i.	Disccutit (expel) fetus	n.i
Macer English 14th century	Deliver out the werpling	Put out warpelyng	Puteth out the child	Deliver of dede childe	Do to be bore the dede child
Latin Ruellius/ Mattioli 1516/1554	Ad detrahendos (pull out) partus	Ejicit (expels) partus	Enecat (kills) partus	Extrahit (pull out) partus	Extrahit (pull out) Partus
Catalan Laguna 1555	Atraher el parto	Provoca el parto	Mata la criatura	Provoca el parto	Acceleran el parto
French Mattioli 1572	Attirer le fruict	Fait sortir hors l'enfant	Fait mourir l'enfant au ventre de sa mère	Fait sortir hors l'enfant	Fait sortirl le fruit
English Goodyer 1655	Drive out the embryo	Expelleth the embrya	Kills the embrya	Draw out the embrya	Drives out the partus

Sources: Wellman 1958; Choulant 1832; Kästner 1876; Frisk 1949; Matthiolus 1552; Matthiolus 1572; Dubler 1953; Gunther 1959.

Table 2 presents, for five common abortifacients, the variants existing in the versions rendered in different languages. Most of these versions are attributed directly to Dioscorides, whereas Macer is a widely diffused medieval adaptation. The examples chosen are of some of Dioscorides's abortifacients that were adopted in European folk pharmacopoeia: Artemisia (mugwort), Pennyroyal (a mint), Rue (herb-of-grace), and Savin (a species of Juniper); to those I added a well known potherb, Sage. It is obvious that the various translations are deviating from the original. For example, the original (and ambiguous) Greek term "embruon" is rendered as the embryo, the dead or stillborn child, the creature, or the partus; the action is expressed variously, for the same product, as to kill, expel, draw out, and so on.

The answer then as to why and how Dioscoride's reputation survived for so long is relatively simple: The *Materia Medica* is a written document, and an illustrated one at that. The staying power of the written word is considerably greater than that of folk traditions handed by word of mouth. Moreover, pictures help, as they make it possible to identify plants that would otherwise be only known by local names. It helps too that people have a great love of flowers, and that illuminations remain attractive even after the texts that they support have lost their scientific value, or are in conflict with the dominant ideology. Thus, effectiveness is not a condition of survival for a technique that is written up.

Moreover, effectiveness is not easy to measure in this area. Other ineffective techniques of contraception have survived too. For example the rhythm method recommended by Aristotle and Soranus relied on a belief that fecundation was most likely just after menstruation, and least likely in the middle of the cycle. This interpretation was the result of identifying menstruation with estrus among mammals. When the French biologist Pouchet published his influential theory of fertilization in 1842, he still professed that the ova were released "somewhat after the menstrual period" and that "the union which occurs at the end of the menstrual period often determines conception" (Langley 1973, p. 100). Pouchet's discovery initiated a large literature setting the safe period in the middle of the cycle, and recommending periodic abstinence early in the cycle as a contraceptive technique; the notion was still advocated in books written in the 1930s, although the work of Ogino and Knaus was diffusing at the time. Similarly, quacks have been peddling ineffective "female pills" as abortifacients throughout the period of the demographic transition. It has been pointed out that one woman out of fours who take a lump of sugar to abort will appear to be successful, since the probability of fetal wastage after 4 weeks of pregnancy approaches 25 percent. There was no severe penalty for ineffectiveness, even at a time when strong motivations for family limitation had started to move fertility on a downward path. Even in a natural fertility society, there are motivations to avoid a birth: outside of marriage to avoid the shame of illegitimate birth; within marriage, to space births.

As to why Dioscorides's work was not more heavily censored by the dominant Christian church, several explanations may be offered. At a time when most of the population was illiterate, clerics had a monopoly of access to information. Being mostly celibate in principle, they may have had their own devious reasons to preserve this

information. Moreover, the learned encyclopedists who were entrusted with the preservation of the wisdom of Antiquity appreciated knowledge for knowledge's sake. Great medieval pharmaceutical compilations were signed by theologians such as Albertus Magnus (the teacher of Tomas Aquinas) or Hispanus (the future Pope John XXI). In the *Thesaurus Pauperum* that is attributed to Hispanus (second half of thirteenth century), there are 26 recipes given under the title "*De Impedimento Conceptus* [On he prevention of conception]*"* (da Rocha Pereira 1973, p. 259). The justification for their use is as follows: "When a woman does not want to conceive, because she afraid to die, or for something else…" Three of the recipes are attributed to Dioscorides. The paradox that under the same pen, manuals of theology could criticize abortion, and manuals of botany could list the virtues of plants, perhaps means that "bookish knowledge" was perceived to have little impact anyway on the behavior of the faithful in a natural fertility society. The work, written in Greek and Latin, was destined for specialists, and it only affected popular practice indirectly. Knowledge about contraception and abortion belonged to the domain of "secrets".

There were sound therapeutic reasons, articulated by Soranus and other Greek physicians, for resorting to contraception and abortion within marriage under a natural fertility regime. When the women was immature or conformed in such way that her life would be endangered by pregnancy or delivery, contraception and abortion were justified by most physicians even in societies where high fertility was valued. The legitimacy of therapeutic abortion remained a debated issue among theologians.

Dioscorides did not indicate under what circumstances the various recipes should be used; he was only interested in the properties of simples. Herein lays one of the secrets of his survival as a major authority on birth control through 15 centuries or doctrinal dominance by the Christian Church. In the same way that it is argued that "Guns do not kill; people do," it could be argued that "Plants do not cause abortions, women do". In all instances, nefarious aspects of the substances were compensated by their virtues, and the warning was similar to that on cigarette packages, "this can be hazardous to the health of your child". On the other hand, censoring the God-instilled virtues of plants was tantamount to doubting His providence. In the introductory epistle to his monumental 1554 edition of the *Materia Medica*, Mattioli wrote: "As it pleased God to enrich man with so many gifts and favors, he did not neglect to reveal their virtues and properties by divine inspiration."

To conclude, the existence of birth control is consistent with natural fertility. Birth control was attempted mostly out or wedlock, but there was some room for therapeutic motivations, recognized by physicians, to protect the health of the mother and her children. Dioscorides and his successor attempted to provide information on the necessary medicine to learned physicians who would be informed about their legitimate uses, and skilled in their application. The drugs were mostly ineffective, but this did not prevent their continued use for many centuries.

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