Influence of the Casserius Tables on fetal anatomy illustration and how we envision the unborn

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Objective: The paper demonstrates how visual representation of the fetus in early anatomy texts influenced the reader’s perception of the unborn child as an autonomous being.

Data Sources: The health, art, and history literatures were used as sources. Original texts and illustrations, with particular attention paid to the Casserius Tables, published by Andreas Spigelius in 1627, are discussed.

Study Selection: A review of the literature was conducted to identify and analyze published renderings, reproductions, and discussion of images of the unborn child. Original anatomy atlases were consulted.

Main Results: Artists’ renderings of a particularly vulnerable state of human life influenced early perceptions of the status of the unborn child. The images show fetuses as highly independent, providing a visual cue that life is fully formed in utero.

Conclusion: The legacy of the Casserius Tables is that they are still able to capture our attention because they portray the idea of a fetus and newborn even more clearly than our modern representations of this charged topic. The use of deceptive realism provides the viewer with an accessible visual representation of the unborn child. These early anatomy illustrations continue to influence modern-day perception of the unborn child as a separate being, completely autonomous from the mother.

The image of a human fetus arouses a wide range of conflicting emotions. Whether the fetus is in the early or late stages of development, this image provides the viewer with a glimpse of human life that we are not usually able or permitted to see. Whether conscious of it or not, the observer of an image of a fetus may well be suspicious that some sort of invasive procedure must have taken place to make this image available. Access to this subject in any century and in most cultures is typically forbidden, prohibited, or just plain unobtainable. It is perhaps for all of these reasons that there are very few of these images in the history of art or medicine. The images that do exist in the history of Western civilization have been primarily created for medical textbooks.

Five hundred years have passed since the creation of the Casserius Tables, originally published in Andreas Spigelius’s De Formato Foetu. Spigelius succeeded Giulio Casserio (Casserius) to the chair of anatomy at the University of Padua, and his publication contains the most complete collection of original impressions of Casserius’s tables. The most unique of these oversize engravings depict the pregnant uterus, placenta, and fetus (Figures 1, 2; Figures 3, 4, 5, 6, and 7, online only).

Although countless discoveries in the anatomy of the unborn have been made since the seventeenth century, Casserius’s illustrations continue to be reproduced and presented as de facto representations of this mysterious subject. While the modern-day viewer is aware that these are not realistic images of the fetus and newborn, there is, nevertheless, a widespread acceptance that these illustrations do visually represent our current concept of a still largely unviewable subject: the fetus and newborn child. Casserius’s Table 4 (Figure 1) in particular has been used to illustrate obstetric and gynecologic texts and has been featured in anatomy catalogs [1] and an online exhibit at the National Library of Medicine [2].

Even as anatomical advances were made over the ensuing centuries and the representation of the fetus...
became more realistic, the Casserius Tables continued to be considered standard representations of the subject, not only by the medical profession, but also by the lay public. The ability of the Casserius Tables to capture the attention of the modern reader shows the widespread impact this genre of anatomical representation has had on modern society’s perception of the unborn child. The implications for this phenomenon are the topic of this paper.

It is important to acknowledge that the task of representing a fetus poses distinct problems in any era. These problems account for why there are so few of these images in the history of art and medicine and why the ones that do survive have made such an impact on the way we visualize the unborn child. Even in late sixteenth-century Italy, a society and an era preoccupied with scientific and medical investigation, the topic was not frequently addressed visually. The examples that do exist were created to illustrate anatomy texts. The problems in representing the anatomy of the fetus show how art had a more prominent influence than scientific observation when it came to representing the unborn child in anatomy texts of the early modern period.

Before turning to the specific problems of representing a fetus, it is helpful to identify the images of fetuses that were produced up until the seventeenth century. It is worth noting that some of the earliest anatomical illustrations are that of the unborn child. The earliest known examples of fetal images date to the second-century manuscripts of Muscio’s Latin treatise (Figure 8, online only). The drawings are stylized illustrations of miniature men who are depicted in a variety of frolicking poses. They are contained in an even more stylized lightbulb-shaped uterus. Different versions of these images were copied for centuries to come and accompany the texts of widely distributed midwives’ manuals well into the nineteenth century. It was not until Leonardo da Vinci’s pen-and-ink drawing of the fetus in the late
1480s that the fetus is shown in a more realistic, albeit breech, fetal position (Figure 9, online only).

Illustrated anatomical textbooks did not begin to appear until Berengario’s *Carpi commentaria cum amplissimis additionibus super anatomia Mundini* in 1521 [3]. Even with the advent of printing press technology and the explosion of anatomy textbook production that followed it, few depictions of the fetus exist in comparison with the volumes of images created to depict adult anatomy in this same period. Even comprehensively illustrated anatomical treatises like Andreas Vesalius’s *De Humani Corporis Fabrica* did not include representations of the unborn child. When Vesalius’s monumental and comprehensive work, the *Fabrica*, debuted in 1543, his title page featured the in-progress dissection of a young woman’s abdomen, but she was not pregnant. And while Vesalius discusses the development and birth process in his text and prominently features cherub-like putti in his capital letters (Figure 10, online only), he does not provide any images of the unborn child nor does he depict its anatomy.

Later in the sixteenth century, approaching the early modern era, discoveries made through dissection of the unborn child begin to be recorded in a more visual fashion. A closer look at the *Casserius Tables* in the context of how they were published as an important anatomy text helps deepen our understanding of the scope of the problems associated with representing the fetus.

Shortly after the publication of Spigelius’s *De Formato Foetu*, images from the *Casserius Tables* were appropriated for other medical texts. Casserius’s Table 4 adorns the first page of the text for the 1656 publication of Thomas Chamberlayne’s *The Compleat Midwifes Practice, in the most weighty and high concerns of the birth of man. Containing perfect rules for midwifes and nurses, as also for women in their conception, bearing, and nursing of children: from the experience not onely of our English, but also the most accomplisht and absolute practicers among the French, Spanish, Italian, and other nations. A work so plain, that the weakest capacity may easily attain the knowledge of the whole art. With instructions of the midwife to the Queen of France (given to her daughter a little before her death) touching the practice of the said art. Published with the approbation and good liking of sundry the most knowing professors of midwifery now living in the city of London, and other places. Illustrated with several cuts in brass. By T.C. I.D. M.S. T.B. practitioners. As the lengthy title indicates, the readership for this volume was broader than just midwives. By including all women who would either be giving birth or assisting with one, the publishers vastly expanded the target audience. The title of this midwives’ manual informs us that the business of delivering babies in the seventeenth century was still predominantly women’s work. This illustrated handbook was geared to even women of the “weakest [reading] capacity”’ so that they could “attain the knowledge of the whole art” of midwifery.

In a text with such a broad and chiefly illiterate audience, accompanying illustrations were important. Like the many editions of midwives’ manuals that had been published since Rösslin’s *Rose Garden* in 1513, the text is filled with practical advice for manipulating the abnormally positioned fetus and primarily illustrated with Muscio’s fetuses. It also contains more routine information directed at the new mother or wet nurse regarding the care of the infant. The addition of Casserius’s Table 4 added a level of contemporary anatomical authority. Later in the volume, Casserius’s Table 7 is also reproduced in this publication [4]. Including this cherubic newborn with his flayed abdomen in a manual intended for women may be a bit puzzling to the modern reader. Midwives’ work did not focus on autopsying infants, and it was certainly not what a new mother would have wanted to concern herself with. The illustration appears on a page discussing the navel vessels, and it is the detail of the placenta and umbilical cord that would have interested the seventeenth-century female reader, because it was her duty to both deliver the placenta and cut the cord.

There is no recorded explanation for including Casserius’s plates in this context, and their origin is not cited anywhere in the text. Openly appropriating illustrations for these kinds of publications was common practice in the seventeenth century. What today is called plagiarism and regulated with strict copyright restrictions would have been viewed as a practical approach to publishing a new book. While reusing illustrations was a matter of convenience in most cases, the fact that Casserius’s illustrations were chosen suggests their seventeenth-century renown and availability. By copying the illustrations from the *Casserius Tables* and reissuing them in the context of widely distributed medical handbooks like Chamberlayne’s *The Compleat Midwifes Practice*, the images commissioned by Casserius the century before were instantly introduced to the next generation of laypersons who were interested in the anatomy of the fetus. No more realistic than the earliest known examples of fetal images, the stylized figures of Muscio’s second-century Latin treatise, the *Casserius Tables*, nevertheless, aided the reader in understanding and visualizing what a fully developed fetus and newborn would look like. Having these anatomical illustrations featured in a midwives’ manual indicates that these images were widely available to a much broader audience than if they had only been viewable in Spigelius’s anatomical atlas.

Increased interest in the anatomy of the fetus continued after the 1627 publication of Spigelius’s *De Formato Foetu*. With the 1666 invention of a reliable method of preserving corpses, anatomists were able to work on cadavers for extended periods of time and keep these unique artifacts around, and even on display, after they had been dissected. An important pioneer in perfecting these early embalming techniques was Frederik Ruysch of Leiden. During the seventeenth century, Leiden University succeeded Padua as a major medical center for anatomical study, and Ruysch’s groundbreaking work with embalming corpses focused on the preservation of fetuses and...
children. He maintained a museum of his work that was known throughout Europe and was ultimately purchased by Peter the Great in 1717. As part of his contribution to the Age of Enlightenment, Peter the Great returned to Russia with these specimens, featuring many fetuses in jars, and exhibited them alongside his growing collection of stuffed dwarves and giants in St Petersburg. Indeed, this very realistic representation of the developing fetus had never before been more accessible to the general public. European society was becoming less reliant on diagrams and anatomically enhanced drawings of such subjects and able to view the real thing. Ruysch’s fame for his work in dissecting fetuses and children is memorialized in the oil portrait by Jan van Neck, *Anatomy Lesson of Dr. Frederik Ruysch* (1683) [5] (Figure 11).

Here, the infant’s independence is still emphasized. Like the male baby in Casserius’s Table 7, this well-developed newborn holds on to his umbilical cord as if to participate in his own dissection. Ruysch’s son, Hendrik, holds up a skeleton of a small child, further emphasizing Ruysch’s interest in the anatomy of fetuses and children. Ruysch is pictured with his colleagues in much the same fashion that Rembrandt portrayed Tulp and his fellow anatomists in *The Anatomy Lesson of Dr. Tulp* in 1632. Ruysch’s corpse here, however, is a healthy looking newborn, not a decaying, yellowed, middle-aged stiff. Van Neck emphasizes the lifelike qualities of the young corpse in order to highlight the success of Ruysch’s embalming techniques. The representation is more closely linked to the living anatomy so prominent in the anatomical atlas tradition. Yet, the scene depicts a close and detailed look at a real dissection of a very controversial corpse. The interest on the part of artists like Rembrandt and van Neck in depicting scenes of anatomy reflects the popular interest in this activity in seventeenth-century Europe. Realistic artistic renderings of the anatomy of the fetus were becoming more in vogue, yet still did not emphasize the morbid qualities of a dead baby.

In the eighteenth century, anatomy text illustrators began taking a more realistic approach to depicting the fetus. William Smellie’s *Treatise on the Theory and Practice of Midwifery* (1752) features life-size images of fetuses presenting in nearly all the abnormal positions described in midwives’ handbooks like Rösslin’s *Rose Garden*. Even though “midwifery” is in the title, both the style of the illustrations and the format of the publication differ from the medical handbooks that were being simultaneously produced for midwives. As noted by Martin Kemp and Marina Wallace:

Scale is important. Large illustrated books were prestigious and expensive, requiring a hefty investment on the part of
the publisher, and substantial means on the part of the purchaser. Vesalius's Fabrica was a grand luxury item, far beyond the reach of average medical practitioners. The eighteenth-century picture books were not infrequently financed by subscription, and the printed lists of subscribers are more likely to be rich in titled nobility than in qualified doctors. [5].

While the audience for these hauntingly realistic images was not necessarily the general public, the layperson rather than the medical professionals drove the production of such oversized medical texts. Even though realistic images would have clearly aided the physician and student of medicine, the primary intended audience of this type of representation was the nonmedical citizen. Much like the intended audience for the Vesalius and other earlier anatomy books, eighteenth-century books were also created not exclusively for medical men, but for society in general. The layperson had evidently adjusted to a much more realistic genre of visually represented obstetrical anatomy.

Anatomists who understood the public’s expectation for lifelike representations took anatomy textbook illustration to new heights. Employing the talents of illustrator Jan van Rymsdyk, William Hunter compiled some of the most provocative images found in eighteenth-century anatomy textbooks. His 1774 publication of The Anatomy of the Human Gravid Uterus remains one of the most controversial books of this genre. Another eighteenth-century artist summarized the difficulty of van Rymsdyk’s task to illustrate this work. “Good God,” exclaimed William Hogarth upon viewing one of Hunter’s open gravid uteruses, “How snug and compleat the child lies. I defy all our painter’s in St. Martin’s Lane to paint a child in such a situation” [6]. Hunter’s commitment to representing the most lifelike images is clearly stated in the explanation of his illustrations. In the description for Table 6 (Figure 12), he writes, “Every part is represented just as it was found; not so much as one joint of a finger having been moved to show any part more distinctly, or to give a more picturesque effect” [7]. Hunter’s conscious efforts to portray a realistic anatomy mark a distinct departure from the earlier efforts of anatomists to portray an idealized form in the genre of a living anatomy. While the fully developed fetus appears to still be alive, what is left of the mother is decidedly not.

During the eighteenth century, men began taking over the duties of midwives. Medical publications produced during this time reflect a very different attitude toward women’s bodies in relationship to their role in childbirth. The disturbing disregard for the female torso in Hunter’s illustrations, where the woman’s limbs have been (for no apparent reason, medical or otherwise) savagely severed, is a stark contrast to the anatomical Venuses of the Casserius Tables. The independence of the developing fetus is still important, however. By reducing the physical body of the child’s mother to a helpless and inanimate butchered lower torso, the infant’s autonomy is further emphasized. Tensions between the physical dependence of an unborn child still connected to its maternal lifeline and the consciously exaggerated autonomy of the infant continue to make this subject a highly charged image.

The nineteenth century marked a turning point for anatomical representation on several fronts. Philosophically, the body was viewed more as a system, and less attention was paid to the individual parts. Lisa Cartwright writes:

Foucault has shown that the institution of pathological anatomy entailed a shift in focus from symptoms to organs, sites, and causes. With the rise of physiology later in the century, the body was reconfigured as a system, a network of functions taking place across organs and sites. Viewing the body and its parts as static entities and reading its surface alone were no longer viable methods of determining pathology. [8]

This philosophy further justified men’s growing movement to take over the duties of midwives. As the complexities of the human body were becoming more deeply understood through formal medical education (that was largely limited to men), new expectations were developing for the properly trained physician. A new view of the physician as hero emerged.

At the same time, women were cast in increasingly submissive roles, while male doctors introduced new
interventions during labor and delivery. Because men
had next to no experience with the events surround-
ing childbirth, it is not surprising that many of these
interventions actually endangered women more than
they helped. For example, the administration of ergot
to bring on contractions was frequently given too
early, causing ruptured uteruses and stillborn babies.
And with the nineteenth-century popularity of deliv-
ering babies in hospitals and using forceps, which had
been a carefully guarded Chamberlain family secret
until the end of the eighteenth century, came a steady
rise in puerperal fever [9].

The helplessness of the corset-clad nineteenth-
century obstetrical patient was captured in medical
texts from this period. Illustrations in Jacques Pierre
Magyier’s 1822 publication, *Nouvelle demonstrations
d’accouchemens*, depict fully clothed women during
obstetrical examinations. While protecting the mod-
esty of the woman, the actual procedure conducted by
the physician is obscured [10]. This type of illustration
gives great insight into the patient-physician relation-
ship during this time, even though it does not
explicitly show the reader the physical condition of
the woman’s reproductive inner workings.

One nineteenth-century enhancement to illustrating
medical textbooks was the use of photography. Although the camera obscura had been well under-
stood centuries before,† use of photography to
illustrate medical textbooks began in a significant
way in the 1840s [1]. Photography had a tremendous
impact on scientific investigation during the second
half of the nineteenth century. French neurologist
Jean Martin Charcot, believed that observation was
the key to knowledge and relied heavily on photog-
raphy to document his studies [12]. Photography
addressed the growing interest in a realistic portrayal
of figures in scientific study that had begun in the
eighteenth century. Medical textbooks continued to
use illustrations, however, and not all of these strove
for realism in the way Hunter had. Daniel Fox and
Christopher Lawrence describe the shortcomings of
photography for illustrating medical texts:

Soon after the invention of the modern camera, doctors
attempted to represent morbid anatomical specimens in
photographs in the same way in which they were shown in
the great pathological atlases illustrated by lithographs or
hand-colored engravings. However, the early photographs

† The earliest mention of this type of device was by the Chinese
philosopher Mo-Ti (5th century BC). Aristotle understood the
optical principles, and Leonardo da Vinci had explained it in his
sketchbooks. It was not used to help with anatomical illustration
until William Cheselden’s publication, *Ostetographia*. As noted by
David Bird [12], the fifty-six illustrations in Cheselden’s atlas were
not engraved, they were etched. Table 32 features a skeleton of an
eighteen month-old child. The skeleton holds up the *os humeri* of a
man in his left hand to emphasize the difference in scale of an adult
and a child. The skeleton child is shown perched on a jagged rock,
cleverly balancing on one foot, with a miniature village located
behind him. Once again, independence is emphasized in this young
skeleton of a corpse in the genre of a living anatomy. The camera
obscura technology ultimately developed into photography as it
was used in the nineteenth century.

of diseased organs proved disappointing. Although pho-
tography could represent the relative sizes and shapes of
pathological specimens, the detail in the pictures was
indecipherable. This was because photography did not
imitate the conventions which lithographers and engravers
employed to distinguish the textures and colors of patho-
logical specimens—cross-hatching, for example. Doctors
had learned the pathological significance of these conven-
tions from journals and textbooks illustrated by traditional
means. In 1886, the author of a paper in the *British Medical
Journal* complaining about photographs of morbid anatom-
ical specimens, revealingly stated that such pictures looked
like Ovid’s chaos since they “failed to give a good idea of
what they are supposed to represent.” [13]

Although photographs were good for recording
living people and places, they were not as good as
engravings for capturing pathological details that are
important to many of medicine’s specialties, includ-
ing obstetrics and gynecology. Photography could not
help with representing the anatomy of a fetus that
was still in the womb either. While observation was
beginning to be perceived as the most important key
to knowledge, illustrations still relied on deceptive
realism or schematic diagrams to communicate the
human physiological situations associated with the
unborn child.

By the twentieth century, new noninvasive tech-
nologies finally allowed scientists and clinical practi-
 tioners to record early glimpses of the developing
fetus. As a result of Wilhelm Conrad Röentgen’s
serendipitous discovery of X rays in 1895 and the
development of the more powerful X-ray beam in the
early 1900s, physicians now had a painless means of
visualizing the unborn child. By 1911, X rays were
used to help diagnose pregnancy and the position of
the fetus and detect a multiple pregnancy, major fetal
malformations or fetal death, and extrauterine preg-
nancy. While the potential hazards of radiation
exposure were recognized soon after the implementa-
tion of X-ray technology, it continued to be used in
obstetrical diagnoses until the 1960s, when it was
replaced by ultrasonography [14].

The ultrasound image is much like an X ray and
does not permit the viewer to see actual skin tone or
muscular contours the way photography does. Unlike
an X ray of, say, a leg, however, the ultrasound image
of a fetus is considered by many as worthy of being
included in the family photo album or a youngster’s
baby book. This biological image of the developing
fetus takes on the aura of a portrait, a document that
this fetus is a social being rather than a clump of
dividing cells. Although the representation of the
fetus with ultrasound technology is very real, it relies
heavily on the imagination and perception of what a
developing fetus should look like in order to achieve
the status of a portrait of a family member.

An apprehension is also associated with the
ultrasound procedure. The purpose of capturing an
ultrasound image of a fetus is not so that parents can
have that first portrait of their baby. It is an integral
part of prenatal testing. Although prospective parents
are usually thrilled to catch these early glimpses of
their unborn children, they are also aware that this procedure may reveal potential problems and anomalies with a developing fetus. In a review article on women’s views of ultrasound, investigators determined that while women were not fearful of the actual procedure (which is painless), they were not well prepared to receive news about adverse findings [15]. Early views of the developing fetus cause as much concern today as not being able to see them did five hundred years ago.

The ultrasound image has come to represent our modern-day understanding of the beginnings of life, even though it is sometimes difficult to make out exactly what is represented in these early baby pictures. It is no more a realistic image than the stylized or idealized early drawings in medical textbooks. It is merely a suggestion of what a human life looks like at these beginning stages. Like even the most realistic images of the fetus, the ultrasound image of a fetus has become a symbol for the vulnerable unborn. The vulnerability implied in these fetal images has been capitalized on in both commercial and political ways. Driving the billboard-lined streets of late twentieth-century highways, one was likely to encounter such images of the fetus in advertisements for Volvo cars [16] or political statements declaring the injustices of abortion. As vulnerable as these fetuses may appear, their independence is also emphasized by the absence of anything representing the mother carrying them.

The practice of using the image of a fetus as an icon for the anti-abortion campaign continues into the twenty-first century. Even though January 22, 2010, marked the thirty-seventh anniversary of the landmark Roe v. Wade case upholding a woman’s right to abort a pregnancy, the political debate continues to rage. The visual component of the anti-abortion movement, the representation of the fetus, has had a tremendous impact on society’s current perception of personhood and when it truly begins. Barbara Duden summarizes the implications for this:

A huge balloon containing a large-headed creature with four stumplike limbs floats near the Washington Monument during a rally addressed by Vice President Dan Quayle. In 1990, this sky monster evokes the same object for every American: a fetus. In barely ten years, this disconnected figure has taken on a new symbolic character. In the early part of the century it stood for ontogenesis and was cursed by creationists. For little Mary, it now means the brother in her mother’s belly. When it appears on a talk show, everyone knows that it stands for prenatal human life. When the law is at stake, it signals human rights. For some believing Christians, it is the smallest amongst the children of God and everyone’s neighbor. How can one explain this almost universal recognition for the new reality symbolized by such a strange public object? [17]

In an attempt to answer the question about the universal recognition for this symbol, Duden goes on to write that it is a synthesis of the fetus being scientifically created as fact, then played up by the media, and, finally, literally swallowed by women [17]. While the representation of the fetus has changed over the past five hundred years, the individualism of the fetus can be traced back to the stylized images of Muscio. It was not until the organized efforts of distributing published materials was begun in the early modern era that images of the unborn were made available to the public. The creation and, more importantly, the publication of the Casserius Tables sparked the emergence of our modern point of view regarding the autonomy of the fetus.

The power of today’s printed image is comparable to the influence of similar images at beginning of the modern era. The ease with which printed materials can reach a broad public audience makes the printed word and image one of the most effective means to publicize and communicate messages that affect public opinion. Today, in addition to coffee table books like Spectacular Bodies, we are also influenced by billboards like that of the Volvo commercial and nonprint media including motion pictures like Silent Scream and web-based exhibits like the National Library of Medicine’s Dream Anatomy. Each of these modern media has the same role as the early printed textbook. They feature the charged image of the unborn child and present this concept as of a highly independent and living entity. Because of the limited but consistent availability of these images throughout the history of printed material, the public perception of an unborn child is that of an individual. The idea that personhood begins long before a baby is delivered is reinforced by these independent representations of unborn children.

Even as an increased interest in realism entered into the art of representing anatomical figures, artists preserved the appearance of the independence of fetuses and rendered fetuses in a more potent fashion than their mothers. Independence and capability are the overarching themes continued throughout the history of representing fetuses. Even with increased realism introduced in the eighteenth century, fetuses are portrayed as living. The fetuses appear sleepy but not dead like their mothers. This form of deceptive realism presents the reader with the message that the beginning of life is clearly in the womb. As scientific discoveries produced noninvasive ways to record this early view of life, the images became less life-like and more surreal. Even as technology has enabled us to find out so much more about unborn children, the documentation of what fetuses looks like is not aligned with public perception of a baby. Artistic renditions are more identifiable than a printout of an ultrasound.

The legacy of the Casserius Tables is that they are still able to capture our attention because they portray the idea of a fetus and newborn even more clearly than our modern representations of this charged topic. Despite the overwhelming scientific progress that has been made in the field of images of this elusive state of human development, the implications of this legacy are that artistic renderings have had a more lasting role in shaping our understanding of what a developing fetus looks like. Although modern tech-
technology can deliver live moving images of the developing fetus, the images require interpretation and are more difficult to relate to than the fully grown, healthy looking babies displayed in the Casserius Tables. This suggests a mainstream preference for artistic renderings over scientifically authentic images.

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