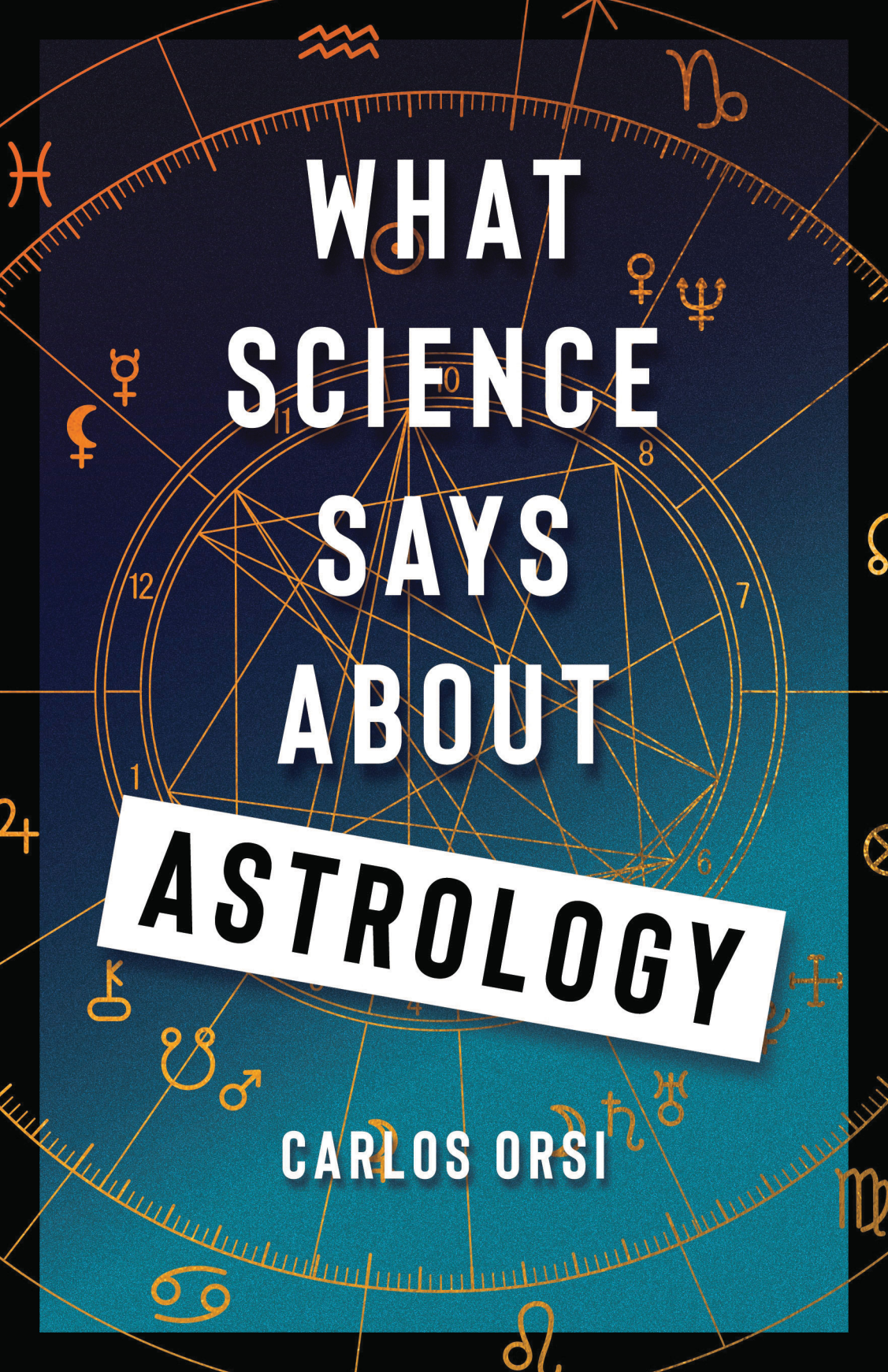




WHAT SCIENCE SAYS ABOUT

ASTROLOGY

CARLOS ORSI

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The What Science Says series is a collection of short books about subjects that are rife with misinformation and apparent controversy in public discourse but have a clear scientific consensus. Written by recognized experts in each field, books in the series are aimed at interested general readers. The books reveal the cultural and historical context in which disputed claims emerged, how they were scientifically tested, and what the results were. Our authors believe that everyone can understand basic scientific concepts and arguments if they are well framed, referenced, and explained.

WHAT SCIENCE SAYS ABOUT ASTROLOGY

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INTRODUCTION TO THE BOOK SERIES

NATALIA PASTERNAK, STUART FIRESTEIN,
AND CARLOS ORSI

“ACCORDING TO SCIENCE . . .” “Scientists say . . .” “Scientists have shown that . . .”: These are phrases commonly used to bring credibility to all sorts of claims.

We live in a world where the emblems and credentials of science are highly valued: In most debates, be it at the pub or in the capitol, having science on your side is almost synonymous with “being right.” No wonder there are so many self-help authors who seek to legitimize their recipes for happiness and success by trying to create an illusion of scientific respectability. To be recognized as “scientific” is to claim attention, prestige, and a privileged space in the media and in the eyes of public authorities.

Like everything that is highly valued, however, science is also the target of falsification. The credibility associated with science comes from its fundamental attitude of respect for the totality of evidence—including most importantly the parts that

contradict what we would like to believe—and openness to critical review.

This means that before sharing a result scientists must consider all the data relevant to the question they seek to answer, not just those that confirm their hypothesis or their biases or, worse, their prejudices.

Furthermore, if other scholars on the same subject find errors in their work or if new results are obtained that invalidate the previous conclusion, criticisms and new data must be assimilated in a transparent and honest way, even if the result is the rebuttal of a hypothesis that seemed well confirmed.

It is thanks to this scientific attitude that science can claim to be the best possible description of factual reality in a given context and time.¹ This does not mean that science is infallible or has never been wrong in the past. Quite the opposite: it means that science is one of the few human activities that actively seeks self-correction. And it means that, most of the time, when there is a divergence between descriptions—say, that of science and that which came to a charismatic leader in a dream—the one that was produced according to the scientific attitude is the one most likely to be right.

When the basic scientific attitude is set aside, what you are left with is pseudoscience: a falsification, an imposture, something that claims the credibility, social prestige, and public attention rightfully given to science without, in fact, deserving them.

Decades ago, Isaac Asimov (1920–1992) published an essay, “The Relativity of Wrong,” where he explained that although scientific ideas about reality are always, in some way,

wrong—after all, science progresses by criticizing and revising its own discoveries—they are less wrong today than they were a hundred or two hundred years ago.²

Asimov writes: “When people thought the Earth was flat, they were wrong. When people thought the Earth was spherical, they were wrong (it is oblate, flatter at the top and bottom). But if you think that thinking the Earth is spherical is as wrong as thinking the Earth is flat, then your point of view is more wrong than the other two together.”

Science progresses and accumulates new evidence, but to change well-established scientific consensuses to incorporate pseudoscientific ideas—for instance, the concept that the more you dilute a substance the more powerful it becomes, that crystals can heal, or that quantum mechanics explains the evil eye—would compel humanity to discard all the scientific knowledge behind technologies from the wheel to the smartphone, all at once. When extraordinary claims are made without strong evidence, the baby often goes with the bathwater.

Why is it important to point out pseudoscientific nonsense? Is it just a matter of intellectual vanity? After all, what’s wrong with believing that our solar signs are compatible, that drinking detox juice helps the immune system, that complementing a medical treatment with sugar pills makes the disease go away faster, or that the pyramids were built by ETs?

These may sound like harmless beliefs, but they are not. Unwarranted beliefs—ranging from astrology and UFOs to those with more potential for immediate harm, like traditional Chinese medicine or bizarre diets—share something: magical thinking.

Magical thinking can lead people in situations of vulnerability and despair to make dangerous and irreversible decisions. People die, get sick, lose their life savings, undo friendships, and break family relationships by believing in nonsense. People are routinely deceived by charlatans in a perverse market highly specialized in selling false solutions for real problems. And once you have begun to believe one pseudoscientific idea with no real basis it is easier to be susceptible to other baseless claims.

We do not claim that science is the only tool to assess reality or that other fields of knowledge are less important. Of course there are “other knowledges” or “other epistemes” important for human life, in addition to science—no one would imagine conducting a double-blind test with a placebo group before choosing a romantic partner, for example (although this might occasionally be a good idea).

Traditional “ways of knowing” should be respected and can bring a great deal of understanding for our current beliefs and cultures. Anthropological investigations reveal, for example, that traditions that revolve around the theme of illness and death can allow the community to discuss its problems, expose hidden resentments, and reduce personal and collective levels of tension and anxiety.³ The problem lies in deeming these folk ways on equal footing with scientific conclusions when evaluating empirical reality for setting policy or making legislation or as medically valid techniques to treat diseases. There are several reasons that may lead a certain practice, ritual, or behavior, culturally linked to health, to crystallize as a tradition; that the perceived effectiveness of the practice against certain types

of illness or in maintaining health is real is certainly a possibility but not the only one and perhaps not the most likely one.

There may be important symbolic, political, and even ecological relationships encoded in cultural behaviors that ostensibly serve to heal the body, the spirit, and stave off death. But identifying, understanding, and even respecting the social functions of a tradition does not answer the question of whether these methods actually provide benefit to the ill or alleviate their disease.

As the biologist and Nobel laureate in medicine Peter Medawar (1915–1987) once wrote, when disputing the idea that myths from traditional cultures are “as true” as scientific facts, a person suffering from toothache is likely to prefer a treatment that will indeed eliminate the pain to a magical ritual of deep spiritual significance that will do nothing to alleviate their suffering in the long run.⁴

Acknowledging that beliefs we carry with us in life can make even nonsensical claims seem reasonable is not new. Attributed to Voltaire, the phrase “whoever leads you to believe in absurdities can lead you to commit atrocities” gains special relevance in this era of social networks and messaging applications, more than three centuries after the death of the French philosopher. A hundred years after Voltaire, another philosopher, the Englishman William Clifford, formulated the principle that everyone has a moral duty to carefully curate the things they believe in, eliminating everything that was poorly founded—precisely so that rationality would not lead to atrocities.⁵

It is, however, a duty that is much easier to recognize than to fulfill. We acquire or sustain beliefs all the time and for many

different reasons—because it is comfortable to believe certain things, because accepting or denying facts would require a change in behavior or attitude, or maybe just because we want to fit in with our parents, friends, lovers, priests, associates, colleagues, and neighbors. Others are thrust upon us by incessant marketing and advertising. Even so-called common sense can lead one astray. In such a busy environment, how to curate properly? Who has the time, or the means?

The *What Science Says* series is a collection of short texts about subjects that people think are scientific or science-based but are in fact pseudoscience. Popular themes such as astrology, quantum healing, and homeopathy are often sold to the general public as scientific and attract a large number of users or followers. Other fields promoting various kinds of “healthy eating” and dubious “physical exercise” programs are replete with myths that also need debunking.

While scientists know that these claims, whether in alternative medicine or in the food/diet market, are not always science-based, there are surprisingly few books that explain these issues in an accessible, easy-to-read language.

Our series is unique because we have a very distinct aim. By focusing on subjects commonly viewed as science that are in fact pseudoscience or on themes loaded with misinformation and myths, we move into uncharted territory, exploring subjects in which the public perception may differ substantially from what real specialists in these subjects know to be true.

A common characteristic of pseudoscience is trying to masquerade as science. The use of scientific jargon or certain scientific concepts is common. Some of these fields even publish

peer-reviewed papers (the “peers” in this case, being other followers of the same pseudoscientific doctrine), meaning that they desire the credibility of science, without paying the “price” of going through well-defined methodologies and subjecting themselves to the criticism of real experts.

Without a clear explanation of how homeopathy purportedly works, someone can easily be misled into assuming that it’s a natural treatment, based on herbal medicine, while in fact, homeopathy is by no means “natural,” but based on the principles of “like cures like” and “infinite dilutions.” Few people are aware of what dilution indicators like 30C or 100C, seen on homeopathic labels, actually stand for. Even fewer realize that not all homeopathic remedies come from plants. A survey conducted by the Center for Inquiry in the United States showed that most people using homeopathic treatments feel cheated when they learn the truth.⁶

Other fields are not pseudoscientific in essence but carry, mixed with some solid scientific information, many myths that can harm people’s health and wallets. Fashionable fad diets, vaccine misinformation, fear of genetically modified foods all need clarification on what science has to say about them. Misinformation and disinformation can mislead the public into thinking that these matters are controversial and that science is undecided or scientists are divided. Conspiracy theories join in to warn you about what “they” might be hiding.

Our authors will guide you through claims and subjects that are seen as controversial when in fact science has a clear consensus about them. You will learn the origins of false claims and the cultural and historical contexts in which they emerged, how

they were tested, and what the results were. What science says about each of the topics we address will be delivered with no moral judgment. We do not presume to prescribe. But informed engagement requires information, presented in a clear and easy-to-understand way so that people can enjoy learning more about these subjects and make their own decisions responsibly.

Correcting mis- and disinformation is necessary, and it is not intuitive. Much like the scientific method, the techniques for seeing through them have to be learned. While there are some principles common to all science-versus-pseudoscience controversies it is difficult to find simple and reliable rules for telling the difference between real science and fantasy science. Thus, each field—health, climate, energy, disease, and so forth—requires an individual treatment. This series will provide both an overview of science and pseudoscience and individual cases and case histories so that the informed reader can better judge what to believe among competing claims.

If even for science majors, rational thinking and the ability to separate science from nonsense must be carefully taught and curated, where does that leave the regular person, who has no background in science but wishes to be well informed and make good choices in everyday situations that require some scientific understanding, situations such as vaccinating their children, choosing between organic or regular produce in the supermarket, buying a supplement to build muscle?

We believe that everyone can understand basic scientific concepts and arguments if they are well framed, referenced, and explained. And everyone is certainly capable of understanding why some claims, if true, would violate scientific consensus. Of

INTRODUCTION TO THE BOOK SERIES

course, having access to the best information available is no guarantee of making good decisions, but it is certainly a good starting point. And it is certainly better than having no information at all.

Our target audience is busy, curious people who appreciate science but have little or no scientific background. Our books can be read in the subway or late at night, don't require any kind of extra research, and are enough for the reader to have a brief but solid introduction to what science says about these subjects. We hope, of course, that readers will come for one book in particular and then become interested in some other title. The whole series will serve as a repository of enjoyable information that would make a good gift for friends and family. Sometimes it is easier to present that antivax uncle with a book than to confront them at the Thanksgiving dinner.