BOTANY

America's Earliest Herbal

Written in Aztec by an Aztec and Translated Into Latin by Another, It Tells About Native Plants

By DR. FRANK THONE

FOR MANY, many years, in a quiet alcove in the great Vatican Library in Rome, there reposed a little book, hand-written with a quill pen, bearing on its pages many pictures of plants, a bit odd-looking but astonishingly bright-colored and clear, considering the age of the volume. For the closing sentences on the last page announced that it had been completed on the feast of St. Mary Magdalen in the year 1552.

Nobody paid a great deal of attention to the book. It was not a rarity, to all appearances: manuscript volumes four centuries old are as common as sparrows in the Vatican Library, and the librarians are busy men. They gave it a curt name and a number: "Codex Barberini, Latin 241" and turned to their next indexing job. A few scholars, browsing, looked at it with mild curiosity once in a while, but for the most part the only times it got touched was when a caretaker came along with a dustcloth.

Such seeming neglect, however, was only serving the uses of destiny. For thus it came to pass that the first thorough study of the book was made by an American; appropriately, since it is one of the earliest books ever written in the New World, and so far as is known the very earliest that is entirely an American product. It was written about the ancient medical and herbal lore of the Aztecs—written by two Aztecs who had been educated in the first American college founded especially for the benefit of Indians.

Photographed Page by Page

The American who "discovered" the book, who first knew it for the real treasure it is, was Dr. Charles U. Clark. He was on a library-exploring expedition, hunting for manuscripts pertaining to early Latin-American history, under the auspices of the Smithsonian Institution, with the support of Ambassador Charles G. Dawes. It was photographed, page by page, and a set of beautiful color sketches copied from its illustrations was made by a French artist, Mme. Missonnier, niece of the pro-prefect of the library. A publication describing the manuscript and its historical background has been prepared by Emily Walcott Emmart of the Johns Hopkins University.

On the basis of the material thus obtained, the Smithsonian Institution has published this description of the book and as much of the history of its making as can be unearthed. For full publication, with illustrations that will do justice to the original paintings, still bright as jewels, a depression budget denies the means. The Institution's secretary, Dr. Charles G. Abbot, hopes to obtain a fund for that purpose later.

But an examination of the photographic copy, and of the preliminary description already published, shows what a treasure of science lay little noticed all these years. It is nothing less than a chief source of information about the medical and plant lore of the Aztec people, preserved elsewhere only in one or two other works written by Europeans.

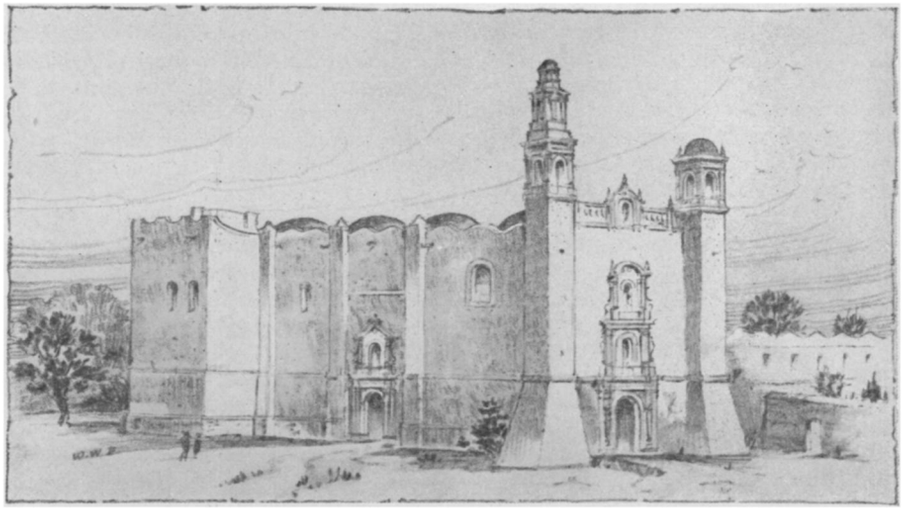
Sought Aztec Knowledge

That the first all-American book should be about medicine and the plants used in its practice is not remarkable. When the Conquistadores under Cortez overthrew the Aztec monarchy and claimed the land for Spain, the respect of the newcomers for the medical knowledge of their Indian subjects was at least as great as their hunger for Aztec gold had been. And although they found no such medical treasures in Mexico as they did in Peru, with its contributions of quinine and cocain, the Spaniards nevertheless did assidiously cultivate both the Aztec medical men and the Aztec medicinal plants. It is worthy of note that in the first college established for the education of selected "sons of Indian gentlemen" the subjects included Latin, Aztec, philosophy, music and *Aztec* (not European) medicine.

College For Indians

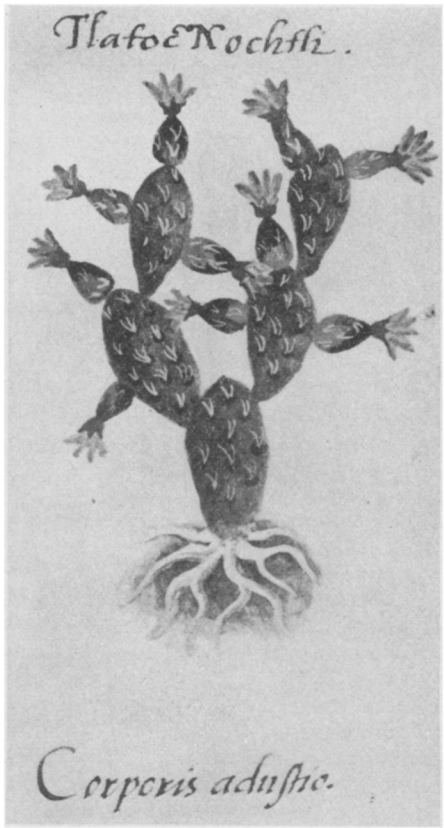
Furthermore, there ruled in Mexico, for His Most Catholic Majesty Charles V of Spain, a pair of remarkable men. The first, Don Antonio de Mendoza, desired the development rather than the exploitation of the country, and was wholly willing to give the conquered Indians a fair chance. Accordingly he provided for the erection of their special college, the College of Santa Cruz, in a suburb of Mexico City.

Here Indians as young as twelve years were matriculated, and here they were taught by a remarkable faculty of Franciscan friars. Some of these boys later became rulers of cities and governors of provinces. Most outstanding among the teachers in this college was one Bernardo Sahagun: scientist in medicine, botany and anthropology, linguist in Latin and Aztec, brilliant teacher and encyclopedic



COLLEGE OF SANTA CRUZ

Here, a hundred years before Harvard's first classes, the sons of "Indian gentlemen" were trained in European learning, and in exchange taught their Spanish teachers what they knew about native plants and their medicinal uses.



TLATOCNOCHTLI

(Prickly-pear cactus to you.) With so much cactus growing in Mexico, its use in Aztec medicine was inevitable. The Latin inscription underneath seems to indicate that it is recommended for "dryness" or "heat" of the body.

writer. His accounts of his observations in Mexico are among the best of all source material for historians to this day.

This College of Santa Cruz was founded in 1536, only fifteen years after the Conquest, and exactly a century before the organization of Harvard. It still stands, but is used now as a church.

Young Mendoza a Botanist

By the time the college had been a going concern for about a decade and a half, the elder Mendoza had been transferred to Peru and his son, Don Francisco Mendoza, was in charge in his stead. He inherited his father's interest in good government and education, it seems, and in addition he had one pet project very dear to his heart: the utilization of native plant resources and the introduction of new plants from other lands in the vast Spanish empire.

In the words of an English translation of a contemporary record originally in Spanish: "Don Frauncis De Mendosa, Sonne unto the vise Roye, Don Antony de Mendosa did sowe in the new Spaine Cloaves, Pepper, Ginger and other spices, of those whiche are brought from the Orientall Indias."

This botanically-minded official set aside a sum of money to make possible the assembling and systematic arrangement of the Aztec medical knowledge. A member of the faculty at the College of Santa Cruz assigned the task to a man who must have been one of his prize pupils, an Indian who had been baptized with the Spanish name Martin de la Cruz.

This Martin seems to have been thoroughly learned in the medical-botanical knowledge of his people, and possibly was the artist of the finished book also. But he wrote in his native Aztec tongue. After he had completed his task, the work of translating his manuscript into Latin, for the benefit of educated gentlemen in Spain, was given to another Aztec, one Juannes Badianus. His Latin style is simple, but correct and idiomatic; the friars had certainly done their work well, to make so good a Latinist out of an Indian only one generation removed from the first days of the Conquest.

Courtly Phrases

But is not only the language of the book that shows how well taught its writers had been. They were thoroughly versed in the literary etiquette of their time, as the formal foreword and conclusion show. In the courtliest kind of phrasing they praised their patron, Don Francisco, to the skies, and almost apotheosized "His Holy Caesarian Royal Catholic Majesty," who was also to see the book—and perhaps be moved thereby to renew his generous support of the College.

In phrasing equally ornate they abased themselves in "that we poor unhappy Indians are inferior to all mortals, and for that reason our poverty and weakness implanted in us by nature merit your indulgence." That was not grovelling; it was just good manners, sixteenth century style, as can be read in the foreword of any contemporary European book.

These Aztecs, whose own fathers might have traded blows with the soldiers of Cortez, could even gracefully swing a classical literary allusion, referring to their philanthropic ruler as "my Maecenas." (How many college graduates of today can tell offhand what that means?)

Having done the elaborate courtesies required by good breeding of the "sons of Indian gentlemen," Senor Martin de la Cruz got down to business. He went through the ills that human flesh is heir to in logical anatomical order, beginning at the head and proceeding leisurely to the feet. For each disease he described and pictured the plants used in its treatment—sometimes animal or mineral drugs also, but mostly plants.

He told where the plant is found, in what kind of soil it grows, what part is used, how it is prepared and administered. Names are given only in Aztec—no effort was made to translate them or to Latinize their form. It looks a bit queer to find a sudden tongue-twisting Aztec word, all "xihuitls" and "pocatls," in the midst of easy-flowing Latin; but it is evidence of good sense on the part of both first author and translator, and it is what gives the book today its incomparable value as both scientific and historic document.

No Magic

The superior-minded Nordic who thinks that all "native" systems of medicine are mere jumbles of ignorant magic will have an eye-opening shock on reading Martin de la Cruz's text. There are no incantations, and only a few references to charms. For the most part the remedies are based on hard, common-sense experience. They had been tried, the patient got well, therefore they were good for what ailed you.

The directions are simple and straightforward. Did you have catarrh? Turn to the fourth chapter: "Those troubled with a dripping nose or cold are to sniff the herbs Atochietl and Tzompilihuizxihuitl and help the cold thus." With pictures of Atochietl and Tzompili . . . (well, *you* spell that one!) and descriptions of its habitat.

That formidable Aztec name is apt, after all, if you only understand a little Aztec. Tzompilihuiz means cold-in-the-head. Xihuitl means a green thing, therefore a plant. Cold-in-the-head-plant. What could be simpler?

Or again: "The root of the herb Yztac Pahtli ("white medicine") is to be bruised in a little clear water and the liquid poured into the nostrils drop by drop for those suffering from a headache." If the headache were due to sinus trouble, the remedy might easily have worked very well.

Most of the plants illustrated are hard to identify unless you know the flora of the Mexican uplands pretty thoroughly. But anyone can spot the two kinds of cactus recommended by Senor Martin de la Cruz, and it does not require a professor of botany to identify the pictures labeled respectively Tolohuaxihuitl and Nexehuac. They are two different kinds of jimson-weed or thorn-apple. One has green pods with prickles, the other purple pods without prickles. Both are recommended for pain in the side. And

jimson-weed is still recognized as a pretty good poultice for allaying pain, because it contains the powerful narcotic alkaloid called atropin.

The list of diseases prescribed for is extensive: skin disease, gout, pain in the joints, worms, burns, cracks in the soles of the feet, wounds, and a number of others. It is worthy of note that fear, fatigue and feeblemindedness are looked upon as diseases and treated as such. There is a special chapter on diseases of women, another on the ills of children. Appropriately, the book closes with two pages entitled, "Of certain signs of approaching death."

Although the illustrations are quite naturalistic, so that a good botanist can identify many of them by simple inspection, some traces of the old stylized art of the Aztecs cling to them still. A plant that grows in stony ground will have the Aztec hieroglyphic sign for stone attached to its root tips. Similarly, if it grows in water, the water-glyph is appended. One plant is shown with both stone and water signs at its root-ends—and the text explains that it grows on pebbly creek-beds. In all likelihood, an Aztec could have read a good deal of the book from the pictures alone.

Knowledge of plants and of medicine did not constitute a quasi-secret lore of special professional classes among the Aztecs, as it does with us. An early historian of the Mexican conquest and of the overthrown dynasty that ended with Montezuma, relates that "Montezuma kept a garden of medicinal herbs and the court physicians experimented with them and attended the nobility. But the common people came rarely to these doctors for medical aid, not only because a fee was charged for their services, but also because the medicinal value of herbs was common knowledge and they could concoct remedies from their own gardens."

In setting down his knowledge of Aztec botany and medicine, therefore, Martin de la Cruz was not betraying any secrets of his conquered people, but only generously sharing a democratically distributed learning with white men who had (*mirabile dictu!*) been generous to him.

Science News Letter, October 19, 1935

CHEMISTRY

Research Problem of Future: How to Take Water From Sea

WANT to get gold from sea water? Then learn how to get the water out of sea water. Some cheap process of getting fresh water out of the salty ocean would bring gold to its discoverer and aid the future welfare of millions of people.

This is the statement to Science Service from the man who has been a storm center of controversy since he set scientific tongues wagging 2 years ago over his pronouncement that:

"It is no more impossible to extract gold from sea water now than it was to extract bromine from sea water ten years ago."

That man was Thomas Midgley, Jr., director of the American Chemical Society and vice-president of the Ethyl Gasoline Corp.

The only change in the oft-repeated prediction, Mr. Midgley said, is that the words "ten years ago" must now be changed to "twelve years ago."

The prediction still stands, Mr. Midgley contends, but he adds, "In no way, shape or form does it imply that gold will be extracted commercially from sea water in any given length of time."

Mr. Midgley's statement has consistently been interpreted in the press to mean that gold would be extracted from sea water on a commercially profitable scale within ten years.

"There is a much bigger problem associated with sea water," Mr. Midgley said, "upon the solution of which depends the future welfare of millions of people. This problem is the commercial extraction of water itself from sea water. No one can say that water is present in too small a quantity to be recoverable. The present price paid for water in arid lands for irrigation purposes indicates that the value of the water in sea water is about the same as the value of the bromine at present prices.

"What more enticing research problem could anyone ask for, an unlimited supply of raw materials, an unlimited market with unlimited profits and unlimited benefits to humanity?"

Discussing criticisms of his gold prediction statement, Mr. Midgley said:

"I have little use for the pessimistic viewpoint applied to the future possibilities of chemistry and chemical engineering. A discussion of the economic factors surrounding this problem, based on the best present knowledge, is entirely beside the point. Nor is the amount of gold in sea water particularly pertinent except to establish the difficulty of the problem. With all due respect to the analyses made by Dr. Fritz Haber, I personally incline to the more recent results reported by Mr. L. C. Stewart and Mr. W. H. Dow.

Concentration Varies

"Since Dr. Haber published his analyses, new quantitative analytical methods have been developed and applied. That variations in concentrations exist seems beyond dispute; however, one does not need to locate such a proposed extraction plant at the points of low concentration. Hence the minimum concentrations reported are beside the point. It is only high concentrations that need be considered as pertinent and Dr. Haber himself reported sample concentrations considerably in excess of 2.3 parts per billion.

"From a journalistic standpoint the word 'gold' has a value entirely dissociated from the metal itself and undoubtedly this is the reason why the variety of statements concerning the possibility of obtaining gold from sea water have been so broadly disseminated by the press. I personally have no active interest in this problem."

Comment by Dr. Wichers

Dr. Edward Wichers, chemist of the National Bureau of Standards in Washington, commenting on Mr. Midgley's statement given above, said:

"The new quantitative methods which are intimated to be the basis of the Dow Company's estimate of 2.3 parts per billion as the gold content of the Atlantic ocean have apparently not been published. Until they are available for scrutiny chemists generally can not be expected to accept conclusions drawn from them, especially since they are so strikingly different from the results of the exhaustive study made by Haber.

"As to the concentrations reported by Haber in excess of 2.3 parts per billion, he found, out of some 5000 samples, 7 which contained from 2 to 8 parts per billion. These were small samples (about 2 quarts). The highest *average* content found in any part of the oceans was only 5 parts in one hundred billion."

Science News Letter, October 19, 1935

To safeguard pedestrians at certain street crossings, British officials are testing use of an "electric eye" device, which would turn traffic lights red when a walker approached the corner and crossed the path of the infra-red beams.