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[Were someone to write a history of man's interest in the palms, the book would be a long and fascinating one. The accompanying translation is of special interest, and is reprinted (as is a further note in volume 34: 309, 1957) with minor corrections from *Tropical Agriculture* 33: 207-213, 1956, with permission of the translator and the General Editor of the journal. Notes of the translator have been lettered in this reprinting; those of a commentator (though initialed F. R.) numbered. The latter appeared as marginal editorial observations beside Redi's text in the original edition of his *Opere* (vol. 6: 282-298, 1728) edited and published by Hertz. Redi lived from 1626 to 1698. Ed.]

An Account of the Date Palm by Francesco Redi, A.D. 1666

Translated by
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(Translator's Note:

I have translated the article by Redi because it appeared to me of interest in that it contains, so far as I am aware, the first rational account in a European language of the pollination of the date palm, the preparation of date syrup, and the use of the date-palm heart and date-palm sap (*lagbi*). He is the first European writer to mention six well known North African varieties of dates which, so far as he goes, he describes correctly. He, however, confuses the date palm with the Theban palm (*Hyphaene thebaica* Mart.) and with the oil palm (*Elaeis guineensis* Jacq.). His article *Concerning the Nature of Palms*[1] (*Notizie intorno alla natura delle palme*) was written 'for Signor N.N.' and is dated 1 May 1666. Dr. Redi states that his information was obtained from Khawaaja Abul Gheith bin Faraj es-Sa'iid, who was educated in the celebrated schools of Fez and, by virtue of his qualifications, sometime attached to the court of Hajji Mustafa Laas, King of Tunis. M. d'Herbelot is said to have consulted him about oriental languages.—V.H.W.D.)

The palm is a very common and very useful tree in Asia and Africa, but in Europe, particularly in our Italy, it is seen but rarely, and, if it is seen, either it gives no fruit or the fruit does not mature. Of this, there is not only daily experience, but there is also the evidence of Pliny in the 13th book of his *Natural History;* and, before Pliny, Varro mentions it in the 2nd book of his *Rerum Rusticarum* (*sic. De Re Rustica?*) (1) (a).

(1) *The Capuchin Father, G. A. Cavazzi of Montecuccolo in the *History of the Three Kingdoms, Congo, Matamba, and Angola* (*Istoria de' tre Regni Congo, Matamba, e Angola*), speaks at length of the palms. Also there are many excellent notes on these plants by F. Gemelli, in his *Tour of the World* (*Giro del Mondo*), published in Venice, Vol. 5 (1719), p. 102 *et seq.*, and in a short work on the palms printed in Florence in 1693.—F.R.

The palm likes the plain but it is also at home on the mountains provided there be springs there, for there is nothing the palm dreads more than drought, which damages it and kills it, so much so that, although it likes to be well manured and supplied with dung, nevertheless, this is harmful to it in dry years and in places where there is no possibility of watering it abundantly, but if there is water which is applied at the right time, and if the soil suits it, the palm will grow and bear so heavily that sometimes one palm will give two camel loads of dates.

Whereas, according to those who write of the qualities or nature of plants, all plants have a male and a female, yet in no plant is this more evident than in the palm, because they relate that the female will not conceive or bear fruit without the male, and that around the male many females stretch forth their fronds, and it would seem that they entice and coax it, while the sight of him, rough and robust, with his breath, and with his powder makes them gravid. If the male dry up or be cut off, the females growing around it may be said to become widows, for they become sterile(2).

A. Tazio in the first book of the *Loves of Leucippus and Clitofont* tenderly describes these loves of the palm, and the following also have mentioned them with equal grace: T. Simocate in *The Epistles*, M. Glica in *The Annals*, A. Marcellinus, and Claudian who, in *The Marriage of Honorius* (lines 65 & 66) wrote:

Vivunt in Venerem frondes, omnisque vicissim Felix arbor amat, mutant ad mutua Palmae Foedera . . .

All those writers, however, wrap up the truth in a thousand poetic conceits, so much so that, as Abul Gheith tells me, it is not true that the male should be planted near the female, nor that it should be seen by the female, nor that the female should smell its odour, because there are gardens and palm groves where there are no males, yet the females there are fertile, and furthermore, if, in places where there are males, these are removed, the females will not for this reason cease their yearly bearing. It is, nevertheless, true that the male contributes something towards the fecundation of the female and I shall here write to Your Lordship what I have been able to understand of the matter, and this is that the palm, from the age of three, four, or five years to the age of one hundred, produces, at the beginning of each spring, at the place where many of the lowest fronds join the trunk, an involucre, called by Dioscorides *phoinix elatis* (3), which grows to about half the size of an arm, and which then in the month of April, when it is the time for flowering, of its own accord, splits, and opens, and is seen to be full of very many white stalklets bearing a large number of milk-white flowers resembling those of jasmine, with a little yellow in the middle. These spathes and these flowers are borne by both males and females; but the male flowers, which have a pleasant smell, and from which falls a certain white powder, like chestnut flour, sweet and delicate to the taste, however vigorously they grow, never develop into dates, although Theophrastus was of a contrary opinion (4).

(a) The commentator may be confusing the date palm, a native of the sub-tropics, with tropical palms.—V.H.W.D.)

(2) Pliny was of this opinion, as may be seen from the 13th book of his *Natural History*, already mentioned.—F.R.

(3) Dioscorides, Bk. 1, Cap. 127, quoted by Mattioll.—F.R.

On the other hand, the female flowers, which do not smell sweet, and which do not produce the dust, produce dates in large quantities, provided certain things are done. When the flowers begin to burst out of the involucre, that is to say the spathe, this spathe is cut away all round, and the flower stalks are left exposed. Between them are inserted two or three branchlets of flowers cut from the male. The whole is now tied up and left so until the rod-like branchlets of the male have withered, when the tie is undone. It is thus that the female is fecundated. Without such fecundation the dates do not reach perfection or full maturity. I myself do not know whether this practice is a superstition, or just perhaps a useless habit. However, the custom is very ancient; and A. Tazio was indulging in fables when he said that, if the male palm is planted a long way away from the female, it withers and dries up, as though it pines away, and soon becomes a bare trunk, unless the wise cultivator, perceiving what is the matter with it, detaches a sprig from the desired female and inserts it in the male, right in the middle of the medulla, called by some the heart of the palm ([5]).

I must mention, however, that others have told me that, to fecundate the female, it is not necessary to insert those two or three branchlets of the male flowers into the female flowers: it is enough to dust the latter with a little of that white powder that falls from the male. If that were true, we could believe Pliny, who, writing of the palms, wrote:

Adeoque est Veneris intellectus, ut coitus etiam excogitatus sit ab homine ex mariti flore, ac lanugine, interim vero tantum pulvere insperso feminis ([6]).

That which many writers of fables have written of the palms corresponds with the foolish efforts of the Sicilians in their country in fecundating pistachios. These efforts are referred to by Father Don S. Baccone in his *Museo di Fisica*, cap. 282. Experience shows in many places in Italy that the pistachio tree bears fruit as do other plants, without the fecundation, whose value is imaginary.

To Father Anton Salvini were shown by Signor B. Girolami at his villa at Arcetri fine, new pistachio nuts but empty, owing, said Signor Girolami, to not having been fecundated by reason of the death of the neighbouring pistachio tree.

However this may be, when this operation of fecundating the female is done, the dates on the bunch are the size of pearls, and are at that stage very susceptible to damage by rain, which at all other times is of great benefit and should be frequent, and which is necessary for the growth and maturation of the dates. The dates, after the flower has fallen, are green but, when grown to the size of an olive, they begin to turn yellow, and little by little become, when ripe in the autumn, red. When the dates are red and mature on the tree, there sometimes drops from them a certain sweet liquid (as Pliny also notes), which thickens and which becomes granular like honey, whence arose the custom of removing the honey of this fruit artificially. For this purpose,

([4]) Theophrastus' sentence, in which he says that both male and female palms produce fruit, is not confirmed. Mattioli, in the first book of his discourse on Dioscorides falls into the same error.—F.R.

([5]) See the address of Tournefort to the Botanical Institute, chapter 69, where he confesses to not having found enough evidence to believe this.—F.R.

([6]) P. Alpino considers that this practice is necessary for fecundating the palms, whence he is constrained to maintain that, in the deserts of Arabia, the wind carries the fertilizing powder from the males to the females, which seems truly incredible and opposed to reason.—F.R.

at date harvest a large quantity of dates is put in a room provided with a marble floor, in the middle of which a channel is let in, leading to a small pit or basin. The honey oozes out of the mass of dates by itself and collects in the basin. This honey can be put to many of the uses of bees' honey (b).

It is not only honey that may be obtained from dates. On the contrary, in many countries a certain beverage may be expressed from them which can be used as wine, and, just as wine is made both strong and weak, so this beverage can be found either sweet or insipid, and also sometimes rough, according to the variety of date from which it is made (c).

There is a place named Dara, seven days' journey south from Marrakesh, where are to be found dates, which are always green, both when unripe and when mature, bigger than others, and much better than them. When dried in the sun they become hard, and when bitten into they taste like sugar candy, whence their name, *Bu Sukri*, meaning 'Father of Sugar' (d).

Another kind of dates is harvested at Tausar (Fr. *Tozeur*), a place in the Kingdom of Tunis, which is called Hura (*Hurra*), white in colour, with a very small stone, of exquisite flavour, not inferior to that of what are called Ftaimi (*Fatiimi*), a much esteemed variety, whose dates, owing to their excellence, are sent as gifts to Constantinople. In Tunisia also is found a variety called Menacheirzeneib (*Menakhiir Zeinaab*), also good, but having the stone bigger than that of either *Fatiimi* or *Hurra*.

At Djerba are to be found dates called *Lemsi*, which even unripe are sweet, and have not that harsh bitterness which is characteristic of all other unripe dates (e).

Indeed, the flavour of unripe dates is very rough and astringent or *strozzatoio* (choking), as the common people say. Pliny recounts how certain of Alexander the Great's soldiers, in the country of Gedrosia, were choked with eating unripe dates (f).

Other dates are found (g) black, and called Ammari (*Ammaari*), which, being very early, have a large sale.

In antiquity, a large quantity of dates were grown round Thebes in Egypt, which, although they were sour, dry, small, and, because of the continual heat, burnt up and having a bark rather than a skin, nevertheless were of much use in medicine, if we are to believe Dioscorides, Galen, Theodore Priscian, Gariopontus, and, from the poets, Papinius Statius, who joking with his friend Plotius Gripus, enumerated to him amongst the gifts that people used to send to one another at the Saturnalia, namely, *Chartae, Thebaicaeve* (7) (h), *Caricaeve*.

I observe here in passing that in Statius dates are called *Thebaicae*, their

(b) (Correct.—V.H.W.D.)

(c) (I am not sure what is meant here. Perhaps the author is confusing *lagbi*, the sap of the palm, with *'arag*, the spirit distilled from dates.—V.H.W.D.)

(d) (If for 'green' there be meant 'hard' then this paragraph is correct. By Dará is probably meant the Waadi Dhira', south of the Atlas mountains, called on the French maps Oued Dra.—V.H.W.D.)

(e) (For this reason these dates are the earliest on the market.—V.H.W.D.)

(f) (Strabo (Bell, 1916, Vol. iii p. 123, sect. 7) states 'Many persons' (in Alexander's army on its way through Gedrosia) 'were suffocated by eating unripe dates'. On the previous page however we read 'The army was saved by eating dates and the marrow of the palm-tree. E. Gauba[2] suggests that the palm whose fruit Alexander's soldiers ate must have been *Nannorhops ritchieana* H. Wendl., the low *mazari* palm or *piish* of Baluchistan.—V.H.W.D.)

(g) (In Tunisia, that is.—V.H.W.D.)

proper name being omitted, as was common amongst the old Latin and Greek authors. Thus the Prince of Doctors, Hippocrates, having to mention cummin, uses only the word *Etiopico,* as Galen says, in his *Glossary of Ancient Words found in Hippocrates, aithiopikon, hypakousteon to kyminon.* Theocritus also in his *Fourteenth Idyll,* wishing to refer to that wine produced on the low hills of Castel Biblos in Coelesyria on the flanks of the Lebanon, called it simply *byblinos.* This was a very fragrant wine according to Archestratus, quoting Athenaeus in his *Deipnosophistae.*

I think this way of speaking the writers have learned from those who sell fruit or such like, who are accustomed, when selling their goods, to enhance their desirability by giving them the name of the country in which they grow best.

I remember having read in Cicero that a certain Barullus, who had brought figs from Caunus for sale in the port of Brindisi, went about shouting at the top of his voice:—

Cauneas, Cauneas. Cum Marcus Grassus exercitum Brundusii imponeret, quidam in portu caricas Cauno advectus vendens Cauneas clamitabat (8).

I find also the same in Pliny, in the 15th book of the *Natural History*:

Ex hoc genere sunt, ut diximus, Coctana, et Caricae, quaeque conscendenti navem adversus Parthos omen fecere Marco Crasso venales praedicantis voce Cauneae.

I could copy out many other examples, were it not high time to cut short this excessively tedious digression and to return to palms.

Palms produce not only dates for food and medicine, but they also provide, similarly for food and medicine, that sweet, tender, white heart or marrow, which is found at the top of the stem, at the base of the fronds, as mentioned by Galen, Plutarch, Athenaeus, and Philostratus. These said that it was called *enkephalos tes phoinikos* that is, brain of the palm. If this is cut off, the palm dries up and dies, as Abul Gheith several times told me. It must be mentioned, however, that Theophrastus and Pliny mention that there is a certain kind of palm, very different from the other, called *Chamairrhiphes* which lives even though the brain is cut off, and buds out again close to the ground.

This palm, according to Theophrastus, Pliny, Mattiolo, Castor Durante, Remberto Dodoneo, and Giovanni Bavino, is often found in Crete, Spain, Mount Argentaro, and in Sicily, where, as in Naples, its brain retains nearly its original Greek name, being called *Cefaglione* (9).

On the other hand, the heart or brain of the date palm is called *Jummaar* by the Arabs; and, when Abul Gheith mentioned the name to me, I called to mind that G. Emlacin, an Arab author, wrote that a certain doctor administered the palm-heart to one of the Abbasids. Emlacin writes, according to Erpinius's" translation:

Haronem Raschidum laborasse aliquando profluvio sanguinis, medicum autem suasisse esum Giummari palmarum;

(7) Stat. 1.5. Selva ult. *Thebaicae* means *palmulae,* that is dates.—F.R.

(h) (The author now seems to confuse the date with the fruit of *Hyphaene thebaica* Mart., the Theban or Duum Palm (Fr. *Doum,* Ar. *Daum*).—V.H.W.D.)

(8) Cicero. *De Divin.* I apprehend here a double meaning. The seller of Caunus dried figs cried *Cauneas,* as who should say *Cave ne eas.*—F.R.

(9) The *Chaemaeriphes* of Pliny, a small, low, recumbent palm, *Cefaglione* (big head), *kephalion* is, in Latin, *Capitulum.*—F.R.

and he adds:

Cum Giummarum Palmae edit, convaluisse.

The erudite Tommaso Reinesio was quite incorrect when, explaining this passage from Elmacin, and endeavouring to specify what part of the palm is the *jummaar* ([10]), he states that it is the palm inflorescence before issuing from its spathe.

If, however, Reinesio has made a mistake, the ancient commentator on some of the Arab authors has done no less, for according to him, the *jummaar* is the medlar.

This same *jammaar* is what G. Chermonese, in the Latin translation of Avicenna, Lib. 2, cap. 359, called *Jumar*, and what A. Alpago in the notes called *Giemar*. In my opinion, the *jummaar*, as I have already suggested, is the same thing as that which the Greeks called *enkephalos tes phoinikos* 'the brain of the palm' of which Plutarch in his *Dialogue on the Preservation of Health*, says that eating it gives one a headache.

The learned doctor T. Reinesio in his *Various Lessons* notices a serious error on the part of the translator of that particular dialogue of Plutarch, who because in Greek the word *phoinix* means both *palm* and *phoenix*, translating into Latin the phrase *enkephalos tes phoinikos*, writes 'brain of the phoenix' instead of 'brain of the palm.' The great Tertullian makes a similar mistake in his commentary on Psalm 92, *dikaios hos phoinix anthysei* (The just shall flourish as the palm), believing that David was speaking not of the palm but of the bird called phoenix; but what is worse is that he goes on to use the Scriptures as grounds for belief in the fable and uses the fable to persuade himself to believe in the profound mystery of the resurrection of the flesh. The truth of our blessed Faith does not need such frivolities and false bases; and I wonder greatly that the great Tertullian should have paid attention to such trifling. The Greek G. Pisida also used the fable of the phoenix as support for the belief in the resurrection of the body at the end of the world ([11]). Furthermore, Sig. de Digbi adduces the argument of certain crayfish fabulously reborn by means of their salt mixed with a prepared chemical. Enough, however, of this: it is not worth the time taken to confute such puerilities.

I must not forget to mention that there is a certain liquor which issues from the trunk of the palm, which round Tripoli is called *Aghibi* ([i]), but the Arabs in other places usually call it *Haliib en-Nakhl*, that is date-palm milk, from its resemblance to milk both in colour and flavour.

In order to obtain the *lagbi* the fronds are stripped from the palm and the trunk is cut into in several places with a knife, the vessels are placed there to catch the liquor that oozes out. This liquor is refreshing and excellent for quenching the thirst, and is therefore widely used in medicine, more particularly for scalding urine. This tree milk little by little acidifies; and G. Eusebio Nierembergio states that the people of the Congo use it instead of vinegar ([j]).

In that very hot country many kinds of palms are found, some of which bear dates from whose stones there is obtain-

([10]) Perhaps Reinesio thought that *jummaar* was from the Latin *gemmula*.—F.R.

([11]) The sages of antiquity held that the phoenix lived for about five hundred years, as Dante affirms in cant. 24 of the *Inferno*, saying:

'Of the phoenix do wise doctors say
When its five hundredth year it do attain
It dies and is reborn'.—F.R.

(i) (Lagbi.—V.H.W.D.)

(j) (This must be the sap of another palm.—V.H.W.D.)

ed a butter-like oil used for food and light. Another kind of palm, a wild one, grows only in the Congo, having fronds very suitable for being woven into mats, baskets and such like. From these fronds, macerated like our flax and spun, are made with great skill various kinds of cloth, some of which are as good as our plain and flowered velvets or our damasks. I remember having seen some of the strongest and most highly coloured pieces of this cloth given to His Serene Highness the Duke by some Capuchin fathers, who had returned from the Congo, and who stated that it was sometimes worn by the people of that place. A less important product, but perhaps one more worthy of regard, is the clothes woven out of coarse palms by the ancient solitaries in the holy caves of Nitria, Syria, and the Thebaid, in imitation of Paul the first hermit.

This is the information that, amongst much other, I have obtained from Khawaaja Abul Gheith. The rest I do not transcribe because it is easily accessible in the works of the writers on natural history ([12]), especially G. Bavino, who has dwelt at length on the palms.

Therefore, having nothing more to add I make Your Excellency a deep reverence, and remain

Your Excellency's Most
Humble Servant,
Francesco Redi.
From his house, 1 May 1666.

References

[1]Redi, F. (1745). *Opere* pp. 185-196 Vol. VI. Hertz: Venice

[2]Gauba, E. (1952-3). *Botanische Reisen in der persichen Dattelreyion. Ann. naturh. (Mus.) Hofmus., Wien* 59, 122

([12]) For a full account of the palms see the second book of the *Astrologia*, written by G. Pontadera, the celebrated lecturer in botany at the University of Padua.—F.R.

A Note on the Pollination of Date Palms

In Redi's account of the date palm, published in *Trop. Agriculture, Trin.* 33, 207, 1956, the translator in his first note stated that this contained the first rational account he had come across in a European language of (amongst other things) the pollination of the date palm. He now wishes to add that since the translation was published he has rediscovered an earlier reference to pollination. This is in George Sandy's *A Relation of a Iourney begun An. Dom.* 1610, Allott, London, 1632, in which on page 101 the author states:

'Of these [date palms in Egypt where Sandys was in 1611] there be male and female: both thrust forth cods (which are full of seeds like knotted strings) at the roote of their branches, but the female is onely fruitful: and not so, unless growing by the male, (towards whose upright growth she inclines her crowne) and haue of his seeds commixed with hers; which in the beginning of March they no more faile to do, than to sow the earth at accustomed seasons.'

The female's inclining her crown to the male is, of course, nonsense, but the reference to the cultivator's not failing to pollinate in March is accurate. The comparison of the spikelets to knotted cords is apt.

PALMS AT THE ROYAL BOTANIC GARDENS, TRINIDAD

S. BHARATH

The Royal Botanic Gardens of Trinidad are situated in the city of Port-au-Spain, about two miles north of the wharves at an elevation of a hundred and thirty to two hundred and fifty feet above sea level. They are about sixty acres in extent and were established in 1818 to introduce, propagate, and