

SAHNIANTHUS DINECTRIANUM, SP. NOV., A NEW SPECIES  
OF THE PETRIFIED FLOWER SAHNIANTHUS FROM  
THE EOCENE BEDS OF THE DECCAN

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ABSTRACT.—In the present paper is described a new species of the petrified dicot flower *Sahnianthus*. The flower is characterised by the presence of two nectaries inside the base of the calyx-tube, besides epicalyx. Traces of petal marks are also seen though their definite nature is not certain. On the basis of its prominent nectaries, the flower is referred to the new species *Sahnianthus dinectrianum*.

INTRODUCTION

THE discovery of petrified flowers from the Eocene beds of the Deccan is indeed an outstanding event in the history of fossil



angiosperms. Of these, *Sahnianthus* (Shukla, 1941, 1944) and *Sahnipushpam* (Shukla, 1947; Verma 1956) have been remarkable among the dicots and recently a new genus *Shuklanthus superbum* (Verma, 1958), truly superb in its form and structure has been described from among the monocots. The discovery of the genus *Sahnianthus* of which now easily over a few hundred specimens have been collected by Professor Shukla, could in fact, be associated with the remarkable fruit genus *Enigmocarpon*, first described by the doyen of Indian Palaeobotany Professor B. Sahni, F. R. S. (Sahni, 1943). As described by Prof. Shukla it was this flower of his, which ultimately developed into the *Enigmocarpon* fruit. To put it in Professor Halle's words, (Halle, 1952) "The definite classification of this fruit to which Sahni gave the generic name *Enigmocarpon*, came about in a curious way which seems worth recording. Though its excellently preserved structure was studied and described in detail by Sahni (specially 1943 B with references) the exact affinities long remained obscure.

Finally, Dr. V. B. Shukla discovered in the same locality at Mohgaon-Kalan numerous specimens of a flower for which he proposed the name *Sahnianthus*; these were so completely preserved that he could construct a floral diagram. One of the two families to which this flower could possibly belong was the Lythraceae. On renewed studies in the light of this clue, it was found that both the *Sahnianthus* and the *Enigmocarpon* fruit belonged to that family and represent different stages in the development of the same plant.

Subsequently, a large number of specimens were also collected by Dr. S. D. Chitale who made some further contributions on this genus (Chitale, 1955). Dwivedi's study of a unique *Enigmocarpon* specimen, still retaining some features of the flower, has also been an important contribution in this direction (Dwivedi, 1956).

The present study is based on yet another unique specimen of *Sahnianthus*, which for the first time gives us the vision of a new species of this wonderful genus.

MATERIAL AND METHOD

The rock which has yielded the present specimen was collected several years back from the Mohgaon-Kalan beds of the Deccan. When cut into thin slices it revealed an abundance of fossil flora including fruits, seeds, leaves, branching roots, some spores of water ferns besides a large number of

*Sahnianthus parijai* flowers cut along various planes. Two such slices from the collection of Professor Shukla are represented here on Pl. 18, figs. 4 and 5. It was a small rock-piece adjoining these slices which appearing unpromising, was kept aside and when sliced by the author recently, revealed the present new flower, though as a solitary specimen, with an unusually large *Enigmocarpon* fruit lying by its side. This shows the possibility, sometimes, of getting rare material even from rocks, otherwise appearing unpromising externally.

It was in a little depression on the extreme edge of the rock-piece that the specimen was lying and had to be sliced out after mounting on a glass surface. The lower surface of the specimen being a little weathered out, it was not possible to get further sections either. For photographs, strong reflected light gave good results and on the parts lying at a depression, a thin coating of olive oil was found useful to make them reflect better.

#### DESCRIPTION

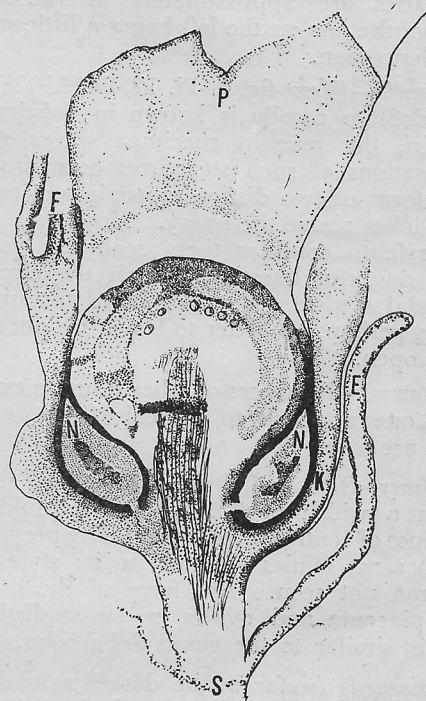
The present specimen (Pl. 17, figs. 1, 2 & 3) is a petrified flower referable to the genus *Sahnianthus*. It is fractured not quite radially thus retaining about two third thickness of the ovary within the rock. The entire specimen measures 0.4 cm. in length and 0.3 cm. in width at the broadest region. The stalk is barely present but fortunately the portion right above the region of epicalyx is preserved. Of the total length of the flower, the ovary alone has a height of 0.2 cm., the calyx and the epicalyx being included in the remaining lower region.

*Epicalyx*—(Text-fig. 1 and Pl. 17, fig. 3 E) The epicalyx is clearly represented by its one lobe on the right. The total length of the epicalyx-lobe is nearly 0.4 cm. and its tip which is slightly bent and appears rather natural to warrant its original shape, reaches nearly the top of the ovary. Here one is reminded of a detached bract-like structure, rightly observed by Dr. Chitale in one of her specimens (Chitale, 1950). Could this actually have been one of the epicalyx-lobes?

At a few places some cellular details are seen in this lobe and its organic connection

with the flower axis is clear. On the left, the specimen being unevenly fractured, the other lobe is not seen though some indication of its position could be marked.

*Calyx* (Hypanthium)—(Text-fig. 1., Pl. 17, fig. 3K) The right and the left lobe of the calyx tube emerge from the base of the ovary stalk in the characteristic manner of *Sahnianthus* enclosing a clear space for



TEXT-FIG. 1

E, Epicalyx; K, Calyx; N, Nectaries; P, Petal marks (?); F, Filament of the stamen; S, Flower stalk (X15)

accommodating the two nectaries, one on either side. While the right lobe of the calyx merges into the rock, at the tip of the left, there can be seen a portion of the epispalous stamen attached to it. (Text-fig. 1 & Pl. 17, fig. 3F.) Cellular details are seen at places.

*Nectaries*—(Text-fig. 1, and Pl. 17, fig. 3N) The most outstanding feature of this specimen, hitherto unknown, is the presence of two nectaries, one on either side, in organic

connection with the tiny ovary stalk, the gynophore. Each nectary exists in a neat pocket formed by the calyx tube. It has a fairly short stalk and a solid spindle shaped body with pointed tip. Incidentally, most of the portion of each nectary is filled with silica leaving a comparatively hollow region in the middle which either might have been present from the beginning or developed subsequently during fossilisation. Both the nectaries are approximately at the same plane, the one on the left being a little more in depression.

*Corolla*—(Text-fig. 1, Pl. 17, fig. 3P) While no definite corolla is known in *Sahnianthus parijai*, the present specimen shows some indications of such structures occurring in the form of two distinct impressions of petal-like lobes above the ovary. How far it will be safe to consider these really as petals, is a doubtful question though the circumstantial evidence is amply in its favour. It may, perhaps be better to leave this question still open.

*Stamens*—No traces of other stamens except the one attached to the calyx-lobe on the left, are seen.

*Ovary*—The ovary is spherical in shape with a width of 0.2 cm. in the middle. Tissues of central axile placenta are preserved with some ovules attached to it; style and stigma not seen. The form of the ovary, its placenta and ovules, so far studied, are again similar to the genus *Sahnianthus*.

*Diagnosis* (so far as the data is available): Flower hermaphrodite, stalked, 0.4 cm. long; epicalyx present, each lobe nearly 0.4 cm. in length, extending high enough up to the top of the ovary; calyx as hypanthium-tube enclosing two nectaries within its base; corolla not definite; stamens episepalous; ovary spherical, 0.2 cm. diameter, placentation axile.

Now, before passing on to the discussion of this specimen, it may be worth while

giving a brief account of the forms and tissues found in the vicinity of this specimen as represented in the rock-slices A and B (Pl. 18, figs. 4 & 5 respectively).

Both the slices A and B were obtained from the original rock by Professor Shukla who very kindly placed them at my disposal in connection with the study of the present specimen. The slice A is a small piece of approximately 6.5 sq. cms. (Pl. 18, fig. 4). In this small area are exposed a couple of *Enigmocarpon* fruits, a branching rootlet and a group of nearly a dozen *S. parijai* flowers, cut along various planes (arrow marked). This group of flowers (Pl. 18, fig. 6) shows several anthers (A), mostly from a single flower, a few flowers cut transversely through the ovary and one specimen (Pl. 18, fig. 6 W) cut neatly along a radial plane. The object of giving a brief account of this slice is primarily to reveal the flower W which though nicely preserved like various other *S. Parijai* flowers described by previous workers, hardly shows any trace of nectaries or any scar on the short gynophore, a fact also corroborated by another excellent specimen described by Dwivedi (Dwivedi, 1956, Photo. 1). For the present we leave this point here.

The slice B (Pl. 18, fig. 5) is at a thickness of 0.5 cm. from the slice A. It again shows a few *Enigmocarpon* fruits associated with a profusely large number of *Sausarospermum* (Sahni, 1940) spores besides some *S. parijai* flowers.

This brief description gives us a general idea of the rock containing the present specimen.

#### DISCUSSION

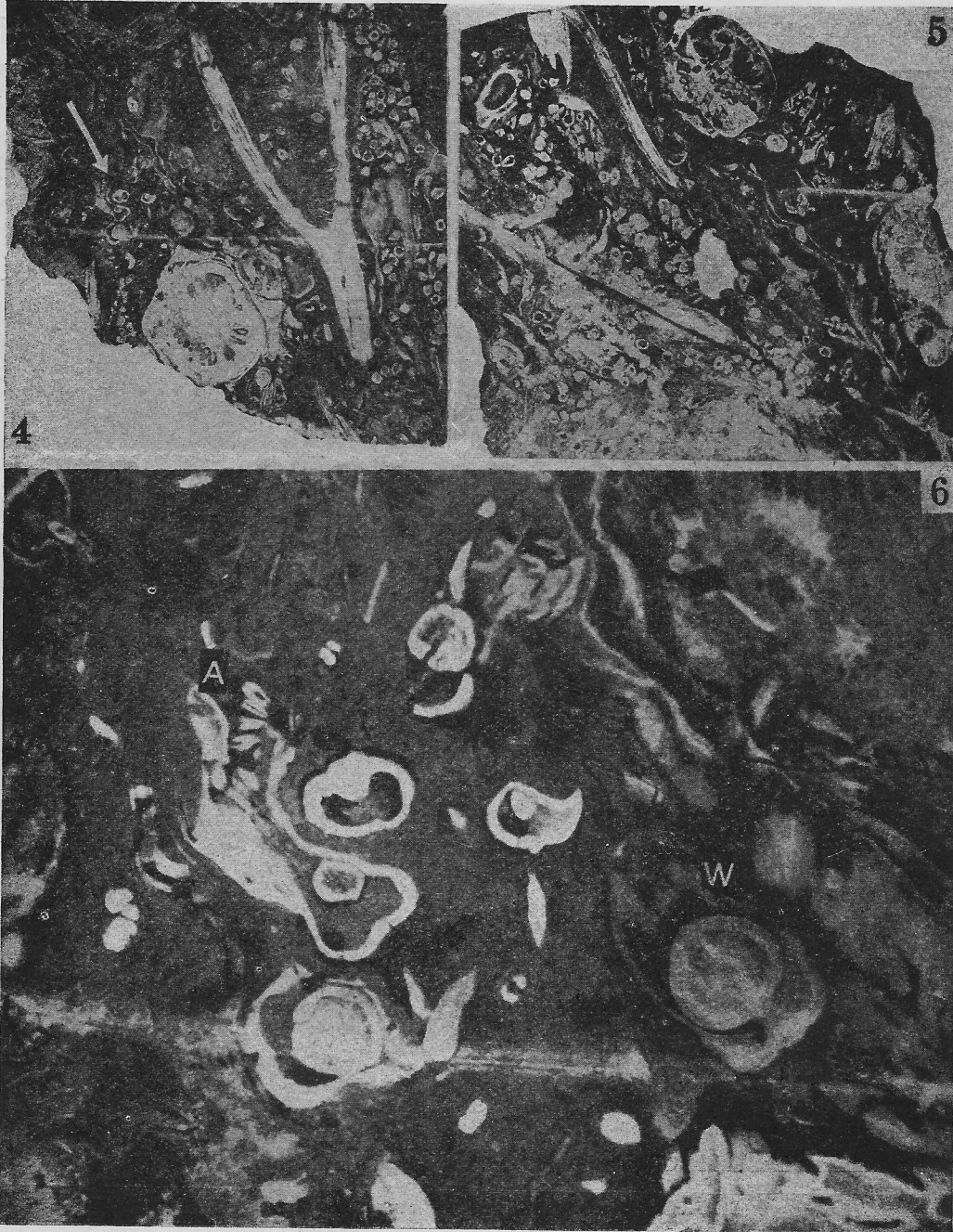
The main features of discussion here, centre around three points: firstly, the presence of epicalyx; secondly, impressions of petal-like lobes and thirdly, the two solid, stalked nectaries.

#### EXPLANATION OF PLATE 17

- FIG. 1—*Sahnianthus dinectrianum* sp. nov. type specimen (x 3.5) as seen on the rock surface; R, an unusually large *Enigmocarpon parijai* fruit lying by its side.  
 2—*Sahnianthus dinectrianum* sp. nov. type specimen (x 11).  
 3—*Sahnianthus dinectrianum* sp. nov. type specimen; S, flower stalk; N, Nectaries; K, Calyx-tube (Hypanthium); E; Epicalyx; P, Corolla marks; (?) F, Filament of a stamen attached to the calyx lobe. (Fig. 7.5)



SHUKLA : SAHNIANTHUS DINECTRIANUM SP. NOV.



SHUKLA : SAHNIANTHUS DINECTRIANUM SP. NOV.

The occurrence of epicalyx, though not present in *S. parijai* is not a feature uncommon to Lythraceae to which the present flower is referred. So far as *S. parijai* is concerned one may, of course, be not justified in presuming that epicalyx might have been present there as well, and fallen off subsequently, since the study of over a hundred longitudinal sections of this flower by now, has hardly left any room for this surmise. Similarly, Dwivedi's specimen, referred to above, having a clean stalk below the hypanthium tube hardly leaves any room for the existence of the epicalyx. Again, Professor Shukla's flower No. 6 (Shukla, 1944, Pl. 3, fig. 15), which for the first time brought to light the stalked nature of *S. parijai* was by itself an enough testimony to the absence of epicalyx in that flower.

The present flower, therefore, though in external features a *Sahnianthus*, is certainly different from *S. parijai*, so thoroughly investigated by the previous workers.

Since only one specimen of the present material and that too fractured along a longitudinal plane is in hand, it is difficult to assess the number of epicalyx lobes but it is presumed it might have been approximately equal to that of the calyx lobes.

Next, the question of petals! It is sad, no convincing evidence of petals has so far been obtained for this genus and even the present specimen is silent except for revealing two petal-like impressions. Though these are in their correct position, still unless we have the actual petals in organic connection with the thalamus, it may be safer to leave it as an open question.

Now, coming to the nectaries: The occurrence of two nectaries in this flower is an important issue. Situated as they are in the pockets formed by the hypanthium tube, both the nectaries are cut almost radially along a plane through which the

ovary has just been skipped. This means a deeper longitudinal section through the ovary, i.e., nearly radial would hardly have left us any remnant of the nectaries. In other words the nectaries are not situated in the centre of the flower but are actually on one side.

Could it be for this position of the nectaries that in Dr. Chitale's radially cut specimen, described recently (Chitale, 1955, text-fig. E & G) only one nectary (out of the two?), in the form of a thin scale has remained visible, which otherwise in its complete form might have been more massive? That the scale-like form in that particular specimen was natural, possibly due to arrested growth, is of course, another possibility, leaving the nectary much undisturbed in section.

Coming to *S. parijai* itself, I have taken an opportunity of examining dozens of tangential and radial sections of this species from the collection of Professor Shukla, which he kindly placed at my disposal and also ground up longitudinally a few young flowers of this species starting from the ovary wall, only to see if the nectaries lay concealed somewhere, but not a single case showed such an occurrence.

The only conclusion left, therefore, is that the present specimen, marked by its two nectaries and the epicalyx, is the first new species of the wide genus *Sahnianthus*, which in due course may embrace perhaps many more species within its fold. On the basis of its two prominent nectaries, it is proposed to assign this new form to the new species *Sahnianthus dinectrianum*.

## ACKNOWLEDGMENT

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## EXPLANATION OF PLATE 18

- 4—Photograph of slice A showing fruit, branching wood, various seeds and a group of *S. parijai* flowers (arrow marked) (x 1).
- 5—Photograph of slice B showing various seeds, fruits and *Sausarospermum* spores (x 1).
- 6—Arrow marked region from fig. 4 magnified; W, a flower of *S. parijai* cut radially; A, group of anthers from a flower. Various other flowers cut transversely may also be seen (x 6).

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