The Oldest Known Petrified Forest

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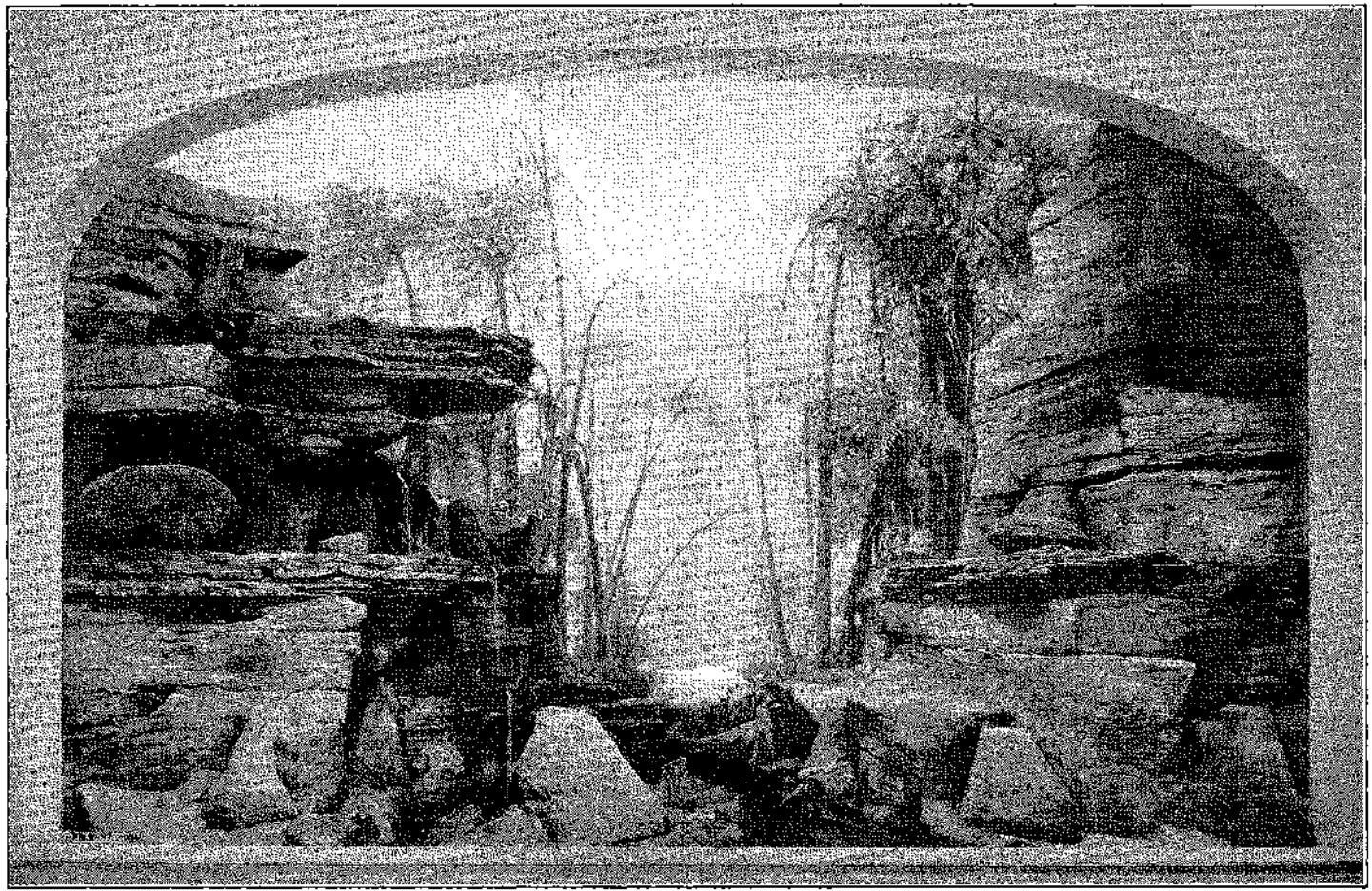

FIG. 1. RESTORATION OF THE DEVONIAN FOSSIL FORESTS FOUND AT GILBOA, N. Y.

IN THE FOREGROUND IS SEEN AN IDEALIZED REPRODUCTION OF THE ROCK SECTION AT GILBOA, SHOWING THE THREE LEVELS AT WHICH FOSSIL STUMPS WERE FOUND. THE BACKGROUND IS A PAINTING OF THE FOREST AS IT PROBABLY LOOKED WHEN LIVING, WITH LIFE-SIZE RESTORATIONS AT EITHER SIDE. THIS RESTORATION IS AN EXHIBIT IN THE NEW YORK STATE MUSEUM, HALL OF FOSSIL PLANTS. IT WAS EXECUTED BY THE ARTIST AND SCULPTOR, MR. HENRI MARCHAND, AND HIS TWO SONS, GEORGES AND PAUL, UNDER THE SUPERVISION OF MISS WINIFRED GOLDRING, PALEOBOTANIST.

THE OLDEST KNOWN PETRIFIED FOREST

By WINIFRED GOLDRING
NEW YORK STATE MUSEUM, ALBANY, N. Y.

DREAMS do come true, sometimes; and one of the most recent dreams of the New York State Museum was realized when on February 12, 1925, there was formally opened to the public the restoration (see Fig. 1) of the extensive forests that flourished in eastern New York a few hundred million years ago during Upper Devonian (Ithaca) times. The history of the discovery of these trees and the gradual accumulation of material which led to the final solution of their nature is almost as interesting as the ancient trees themselves.

1. HISTORY OF DISCOVERIES

Back in '69, over half a century ago, the little village of Gilboa in the Catskills (Schoharie County) came suddenly into prominence from a paleobotanical point of view. In the autumn of that year the upper valley of the Schoharie Creek was swept by a great freshet which tore out bridges, culverts and roadbeds around the little village of Gilboa. But science, at least, has much for which to be grateful, for at the same time that all this disaster was caused the freshet very obligingly exposed in the bed rock along the creek standing stumps of fossil trees, all at the same level. The discovery of these trees was described in the Albany *Argus* of January 30, 1870, and in the twenty-fourth Museum Report (1872, for 1870); and it was considered of so much importance that it was brought by Professor Hall to the attention of the British Association for the Advancement of Science in 1872. Excavations were made during the year 1870 in the bed of sandstone containing these trees and five stumps and a number of fragments were taken out of this ancient forest. The greater part of this material was brought to the State Museum, where it has for some time constituted a remarkable exhibit of the ancient, extinct flora of the state.

The Gilboa collections were submitted for examination to Sir William Dawson, of Montreal, then principal of McGill College, and in his day an authority on the plants of the Devonian. Dawson placed these trees in a genus of true ferns, represented by trees, and distinguished two species, *Psaronius textilis* and *P. erianus*. The genus has in these later years been thoroughly studied; and it has been found that the structure is quite different from that of the Gilboa trees. Moreover, Psaronius belongs to the Carboniferous, the period of our coal trees, and is much more recent by millions of years than these Upper Devonian trees. The problem of the nature and relationship of our Gilboa trees was still left to science, and seemed incapable of solution until the summer of 1920.

It had always been assumed that our Devonian trees had a scattered distribution—no one dreamed of a vast and extensive forest. The old locality had long since been covered up and the rocks at the level in which the trees were discovered did not outcrop again in this area. Nothing more was heard of these fossil stumps until in 1897, when Professor C. S. Prosser, then connected with the New York State Survey, reported finding some small specimens, from a higher horizon, lying loose at Manorkill Falls about a mile above Gilboa. Occasional attempts since then to relocate this primeval forest of the Devonian period

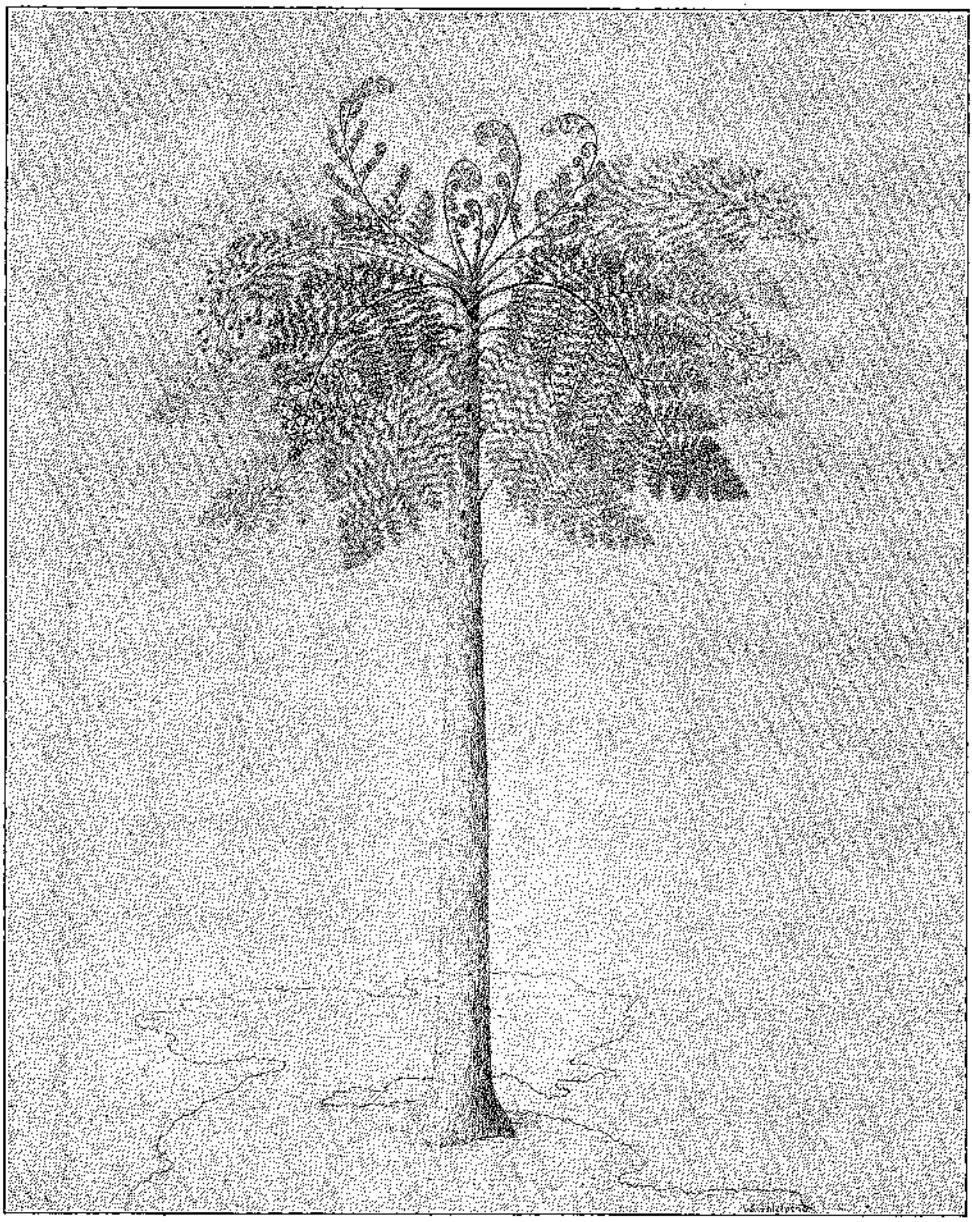

FIG. 2. RESTORATION OF THE DEVONIAN SEED-FERN TREE

SHOWING THE BULBOUS BASE, THE GRADUALLY TAPERING TRUNK AND THE CROWN OF LARGE FRONDS BEARING AT THE TIP, IN SOME CASES, THE SEEDS AND SPORE-BEARING ORGANS. RESTORATION BY MISS WINIFRED GOLDRING.

were fruitless until the summer of 1920, when special effort was made to add to the collection of Devonian plant material already in the hands of the museum. In this year the efforts to relocate the Schoharie forest or to find some additional evidence as to its extent led to the discovery of upright tree stumps not in the original locality but 6,400 feet south, at the higher level along the road in the vicinity of the lower falls of the Manorkill, tributary to the Schoharie Creek (see Fig. 6). Five specimens were taken from this site. These trees, as was the case with those first discovered, were found with their bases resting in a bed of shale, black or greenish-black in color, and representing the original mud in which the trees grew. This tree locality, which constitutes the highest horizon in which these stumps have been found, has an elevation of 1,120 feet above tide, and when the Gilboa reservoir is filled the flow line will be some feet above this spot. The old locality, on the same side of the Schoharie just above the old Gilboa bridge, had an elevation of 1,020 feet A. T., giving a difference of just one hundred feet between these two tree horizons. Since 1920 the city of New York has been doing construction work at Gilboa, preparatory to impounding the waters of the Schoharie Creek for the future use of its citizens. The resultant reservoir will extend over a length of nearly seven miles and will drown the village of Gilboa and its vicinity, including the two above-mentioned fossil tree localities. In 1921, in the course of quarrying in connection with the work on the dam, the old locality, which is directly at the spot where the dam was being built, was uncovered and seven stumps were found, some of them too badly broken to permit removal. One specimen taken weighs nearly a ton and has a circumference of nearly twelve feet (diameter about four feet). In a quarry about half a mile (2,300 feet) down stream from the old locality, trees were found at a level of 960 feet above tide, 60 feet below the oldest or middle locality, 160 feet below the highest level where trees were found. This quarry, known as "Riverside Quarry" (see Figs. 4, 5), has yielded the greatest number and also, on the whole, the largest stumps found. During one period, eighteen specimens were taken from an area fifty feet square, not counting those destroyed in quarrying. One of the largest specimens of this group has a circumference at the base of approximately eleven feet (diameter approximately 3.5 feet), a height of twenty-two inches and a diameter at that height of twenty-one and a half inches; stumps of greater height, but of smaller girth, have been obtained. At all the three tree horizons the stumps were found with their bases resting in and upon shale and in every case in an upright position with the trunk extending into the coarse sandstone above. The shale beds representing the muds in which the trees stood vary in thickness from six inches to two feet, more often thin than thick.

By the spring of 1924 with the additions to our collection, which we owe to the courtesy of the commissioners of the New York Board of Water Supply and the various engineers connected with the work, we had in our museum a total of nearly forty stumps, partial or complete, and a number of broken pieces. We have not added to our number of fossil trees since then; but they have been distributed among various museums and some even have gone into private hands. Taking into consideration with all these, those still at the quarry, the weathered stumps discarded, and those destroyed in quarrying, the number of stumps taken from these primeval forests must run into the hundreds, and continued quarrying will bring more to light. "Riverside Quarry" is not included in the area covered by the Gilboa reservoir, but its

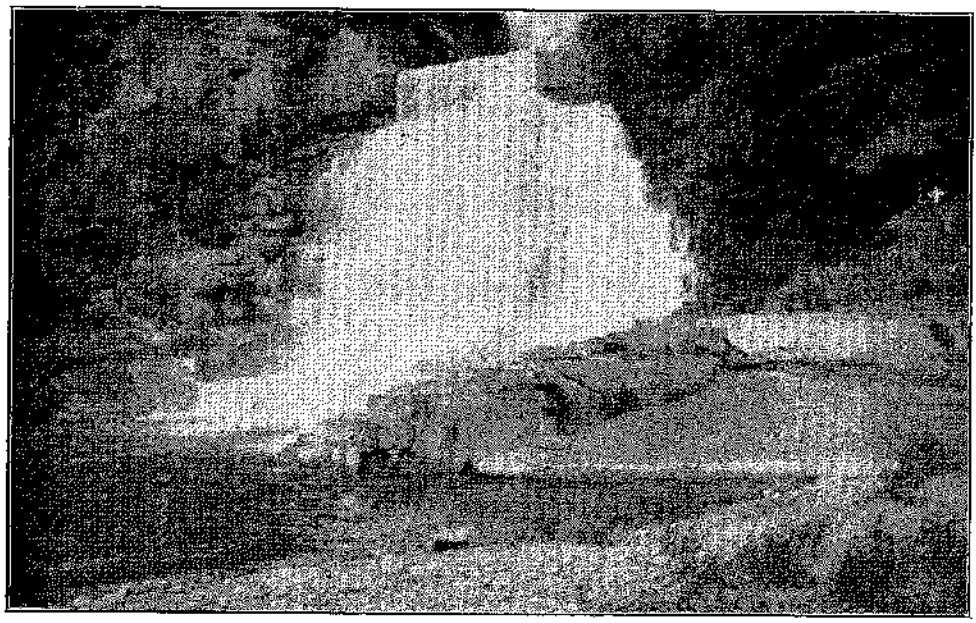

FIG. 3. THE LOWEST FALLS OF THE MANORKILL, GILBOA, N. Y.
THE HORIZON WHERE THE SEEDS AND SPORE-BEARING ORGANS WERE FOUND IS AT THE LEVEL MARKED WITH A CROSS; THE AREA WORKED EXTENDED SOME DISTANCE TO THE RIGHT.

value as a fossil tree locality will be greatly lessened with the cessation of quarrying operations. Now that the rock layers containing the stumps have been located, it is quite possible that they can be traced around the hills and found outcropping elsewhere. In the area known, the tree localities have been found stretching over a distance of something more than a mile and two thirds. No forest as old and as extensive as this has anywhere been reported up to date. We therefore have in eastern New York, up to date, the oldest known forest in the world, and in our museum a unique and unmatchable exhibit.

Except for the discovery of the seeds, which was quite accidental as many very important discoveries are, we would still have been left with a forest of fossil stumps and have been little better off than were Professors Hall and Dawson in 1869. By the merest chance, Dr. Rudolf Ruedemann, state paleontologist, who was on the ground with some other collectors in the summer of 1920, came across a slab of dark shale containing seeds along the edge of the Schoharie Creek in the vicinity of the Manorkill Falls (see Fig. 3). The slab was traced to the bed of shale from which it was derived and a number of good specimens were obtained. Later in that summer the writer and an assistant worked this bed of shale and a fairly large collection of excellent material was obtained, including not only the seeds, but another kind of fruiting body, bits of foliage and roots. Further efforts in the summer of 1923 led to the discovery of a new locality about thirty feet south of the original exposure, and in this and the following year our already unique collection was considerably augmented in both quantity and quality. Collecting in the spring of 1925 showed both localities to be practically exhausted, and besides this whole area will eventually be under the deep waters of the Gilboa reservoir.

In addition to stumps, portions of the trunks of these fossil trees were found in 1920 and later. In the early summer of 1923 bases of stumps were found in "Riverside Quarry" with the long, radiating strap-like roots attached, so that there could no longer be any doubt that these trees grew *in situ*. In 1925 three specimens of the outer bark showing peticlar scars were brought in by Mr. R. Veenfliet, Jr., a local collector. The greatest numbers of the trees comprising these ancient forests were of this "Gilboa" tree type, but evidences of two other kinds of trees have been found. One is a Protolepidodendron, a lycopod-like tree, similar to the Naples tree, Protolepidodendron primaevum (Rogers), known for so many years from the Portage beds of central New York. This tree has not yet been described. In the fall of 1925 two specimens of another type of tree with long, grass-like leaves on the trunk were collected in "Riverside Quarry," and they have been described under the name Sigillaria ? gilboensis (N. Y. State Museum Bull. 267, 1926) as another lycopod type of tree.

In the early summer of that year a rootstock was found in the same quarry, which may belong to either of the last two mentioned types of trees.

2. Upper Devonian Geography and Present Geology

The Gilboa trees afford an index to the geography of the western Catskills and the Schoharie valley during the late Devonian period to which they belong. During these times, the present Catskill

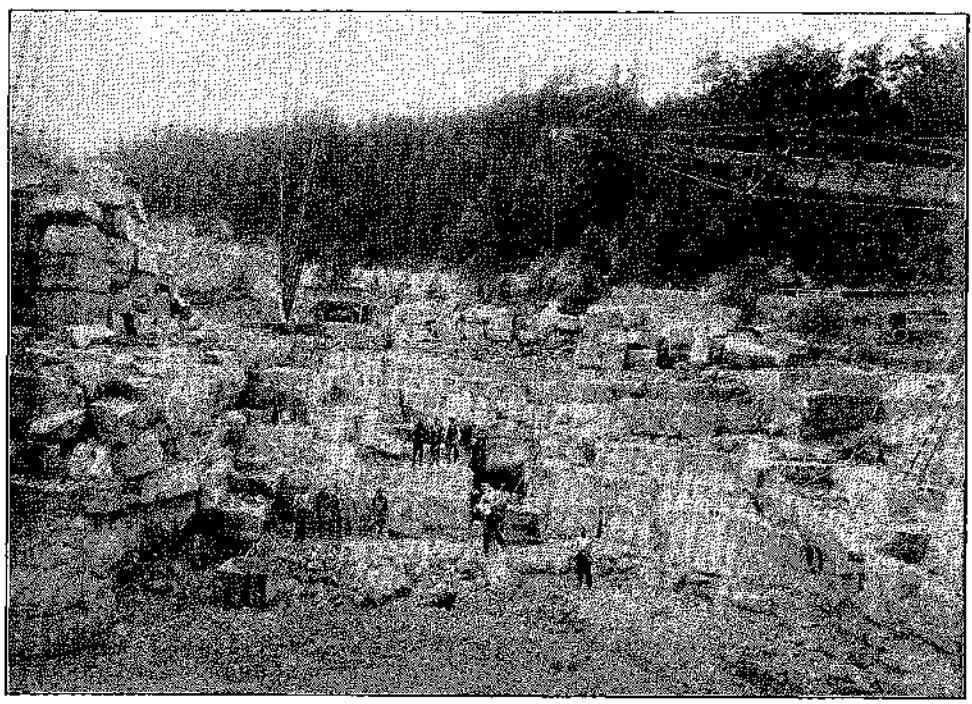

FIG. 4. RIVERSIDE QUARRY, GILBOA, N. Y.

This quarry is located along the Schoharie Creek, one half mile below the dam. From this quarry was taken the stone used in the dam and the greatest number, and the finest, of the fossil tree stumps. This constitutes the lowest tree horizon at 960 feet above tide.

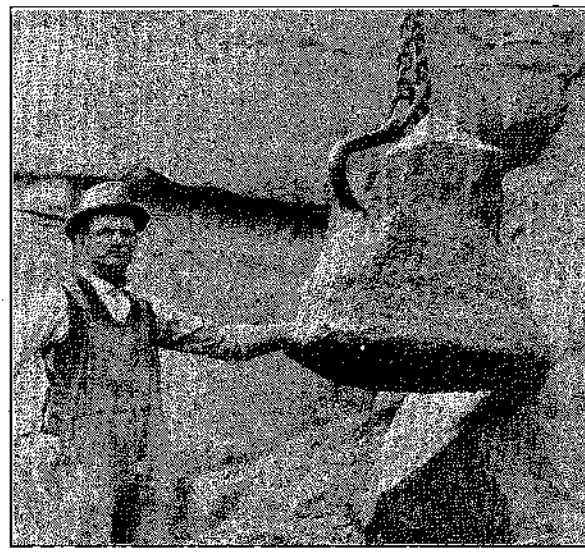

FIG. 5. FOSSIL TREE STUMP IN RIVERSIDE QUARRY

BEING REMOVED FROM THE SPOT WHERE IT HAD RESTED FOR MILLIONS OF YEARS.

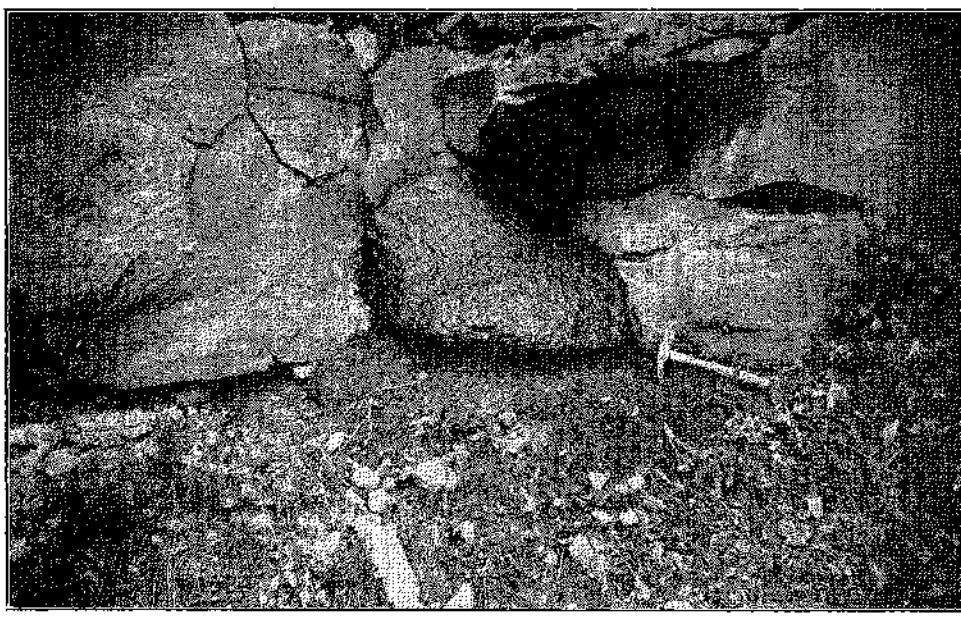

FIG. 6. FOSSIL TREE STUMP

IN PLACE AT THE HIGHEST TREE HORIZON AT 1,120 FEET ABOVE TIDE, ALONG THE ROAD ABOVE THE LOWEST FALLS OF THE MANORKILL. THE MIDDLE HORIZON (1,020 FEET ABOVE TIDE) IS AT THE SITE OF THE GILBOA DAM.

Mountains formed the low shore-line of a shallow sea; and the continental land lay off to the east of the Catskills, extending far into the present area of the Atlantic. This shallow sea covered the interior of the state and country and received the heavy drainage from this eastern land mass. The southwesterly flowing rivers brought down débris of the primitive vegetation with which that lost land was wooded, and scattered the remains, leaves, stems, branches, etc., through the vast delta and shore deposits. Perhaps nowhere else in the known records of the rocks is there such an extraordinary accumulation of the land flora of this geological age as in these sands which underlie the slopes of the Catskills westward into the Alleghany plateau. Plant remains were mingled with the earliest of the fresh water mussels which burrowed in the sands of the river mouths; at times the rivers carried the forest growth far out among the marine deposits and it was mingled with the animal remains of the salt sea. This close intermixture of terrestrial and marine conditions is most abundantly shown in the lower or earlier part of the Catskill terrane. The coasts of those days were very unstable, which would give a swampy shore-line. Forests of primitive trees grew along these shorelines, spreading down to the water's edge. Gradual submergence of the coast carried these trees beneath the water and the sediments piled up over their bases. At a later period when the sinking basin was again filled by deposits the forest again crept down to the water's edge. The discovery of these horizons of fossil tree stumps shows that three successive forests flourished here, were submerged, destroyed and buried. The fact that the stumps are buried in a fairly coarse sandstone indicates a rapid destruction and burial.

The geologic horizon of the occurrence of the Gilboa trees apparently is the Ithaca formation. The Oneonta is characterized by red beds and they are not found as low as any horizon containing tree stumps. Red beds characteristic of the Oneonta are seen a few feet above the highest tree horizon at the Manorkill. Collections made at a higher horizon four miles to the south at the intake of the tunnel show a prevailing Ithaca fauna; and it is therefore apparent that we have an intermingling of Ithaca and Oneonta sediments. The fresh-water unio, *Amnigenia catskillensis*, occurs in a massive sandstone one and a half miles northeast of Gilboa, some 600 feet above the level of the Schoharie Creek at Gilboa, which clearly indicates that the horizon of this shell is above that of the tree trunks found at Gilboa. The Ithaca fauna is also present on the hillsides above Gilboa; and all this indicates that we have in this area an interfingering of the Oneonta and Ithaca sediments.

3. Structure of Gilboa Trees

A full, technical description of the Gilboa trees may be found in a previous article by the writer (N. Y. State Mus. Bull. 251, 1924, pp. 50–93) by those who care to go into more detail than is given in the following description.

The stumps taken from the three horizons show great variability in size and some variability in shape (see Figs. 7, 8). The bases of the stumps are bulbous, as might be expected of certain trees growing under swampy conditions, and show a circumference at the base from three feet and less up to nearly twelve feet (diameter less than one foot to nearly four feet). In general, the height at which the trunks were broken off varies from a few inches over one foot to about three feet or slightly over, but in the spring of 1925 a large specimen was taken from "Riverside Quarry," which extended up into the trunk for five and a half feet. Some of the stumps narrow quite gradually from the

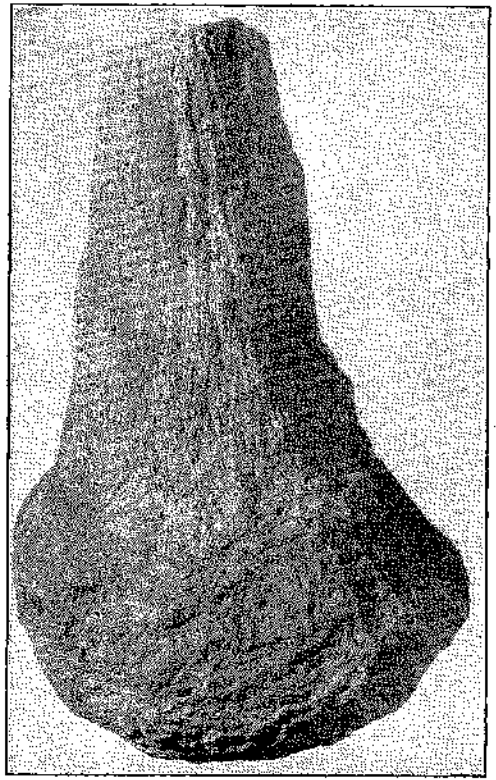

FIG. 7. FOSSIL STUMP OF THE *TEXTILIS* TYPE

SHOWING RAPID NARROWING ABOVE THE BASE AND THE NETWORK OF INTERLACING STRANDS OF STRENGTHENING TISSUE. HEIGHT ABOUT 3 FEET; CIRCUMFERENCE AT BASE 6 FEET 3 INCHES (DIAMETER 23.8 INCHES).

FIG. 8. FOSSIL STUMP OF THE *ERIANUS* TYPE

SHOWING THE MORE OR LESS PARALLEL STRANDS OF STRENGTHENING TISSUE. THE STUMP NARROWS GRADUALLY ABOVE THE BASE. HEIGHT 38 INCHES; GREATEST DIAMETER (LEFT TO RIGHT IN FIGURE) 38 INCHES; DIAMETER AT RIGHT ANGLES TO THIS 30 INCHES.

bulbous base into the trunk, others very abruptly. The parts of trunk above the heights shown in the stumps, which have been found infrequently, are in a flattened condition. The museum has two of these specimens, one over four feet long and the other over three feet long. In the case of the latter, which was taken from the underside of an overhanging ledge, as much again of the trunk had been broken away and lost; and, beyond the section obtained, the trunk continued into the solid rocks with little, if any, diminution in width. Another specimen, too poor to be removed from the rock, showed some twelve feet of slender trunk which must represent a portion near the top of a large trunk or the trunk of a very small tree. Judging from the stumps and the portions of trunks, the largest of these trees must have reached heights of thirty to forty feet.

The outer cortex is the only structure of the stumps and trunks of these trees that is to any extent preserved. The interior structures have been washed out and the cavity left filled with sand which has helped preserve the shape of the stumps in fossilization. The structure of the outer cortex is similar to that seen in a group of Carboniferous seed-ferns (Lyginopteris, Heterangium). It consists of interlacing strands of strengthening tissue (sclerenchyma), forming a network or more or less parallel (see Fig. 9). In transverse sections, unlike the Carboniferous forms, the sclerenchyma appears in the form of dots or short thick irregular lines, irregularly scattered. This zone of the outer cortex varies from an inch or less to several inches in thickness, depending upon the size of the stumps. In the majority of cases, the outside portion of the outer cortex is missing, but it is well shown in several cases. The outer surface is marked with shallow ridges and furrows, in some cases giving the effect of a bark; in other cases the outer surface is only irregularly furrowed and wrinkled or even just roughened, some of which is undoubtedly due to shrinkage in preservation; but in either case the outer surface appears to be composed of layers of sclerenchyma forming a kind of bark, which in the living tree probably had a covering of ramentum or fibers. The underside of the base of the stumps (see Fig. 10) is quite strikingly furrowed in a radiate manner, and in some specimens a depression is seen at the center. The base as well as the sides has the outer zone or covering of sclerenchyma layers above which is the zone several inches thick, varying according to the size of the stumps, of interlacing sclerenchyma strands.

The interior structure of the trunk for the present remains unknown. A transverse section of one of the smaller trunks shows toward the center an irregular, thin ring of sclerenchyma tissue and within this ring and to some extent outside are irregularly scattered strands of sclerenchyma tissue. The scattered sclerenchyma strands may be due entirely to some maceration before preservation; but the ring itself appears to be a definite zone, part of a missing central cylinder of strengthening tissue. Transverse sections of larger trunks were made, but nothing was found. Success in this line can probably only be attained when a petiole or rachis of a frond is found preserved in such a condition that thin sections can be made for study.

In the earlier collections specimens of roots were found, but no stumps were taken with roots attached. This brought forth criticism of our statement that the stumps were buried *in situ*. The discovery in the spring and early summer of 1923 of specimens showing the underside of the tree bases with roots attached (see Fig. 11) finally settled the question. The roots are long and strap-like and radiate from the margin of the base. One specimen was obtained under difficulties and set up in concrete to form a

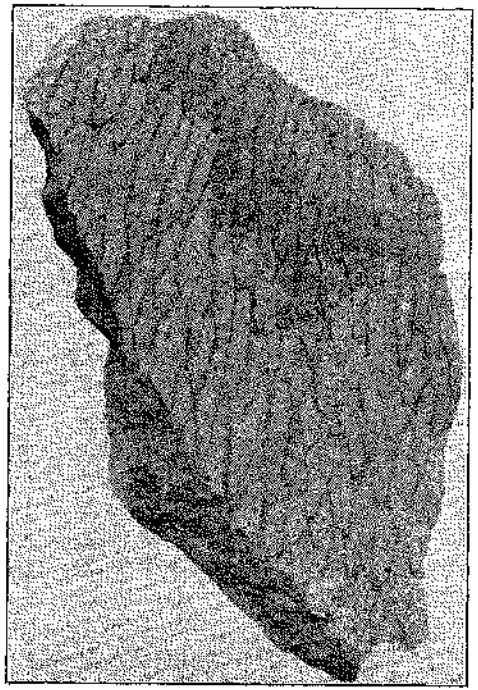

FIG. 9. PORTION OF OUTER CORTEX OF ONE OF THE STUMPS

SHOWING THE NETWORK OF INTERLACING STRANDS OF STRENGTHENING TISSUE, OF THE TEXTILIS TYPE OF STUMP. SLAB ABOUT 15 INCHES LONG.

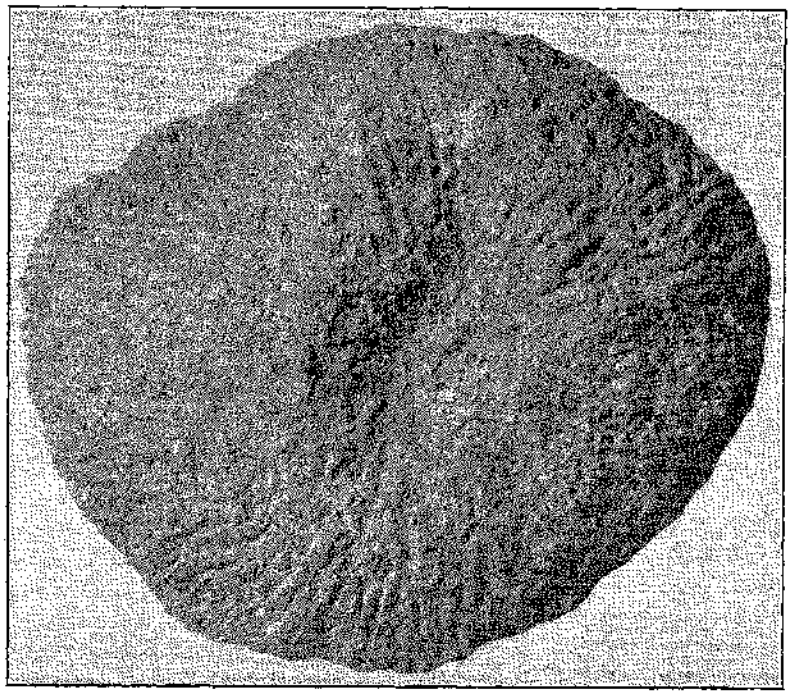

FIG. 10. UNDERSIDE OF BASE OF STUMP OF *TEXTILIS* TYPE

SHOWING RADIATING RIDGES AND FURROWS AND THE CENTRAL DEPRESSION. DIAMETER 25 INCHES.

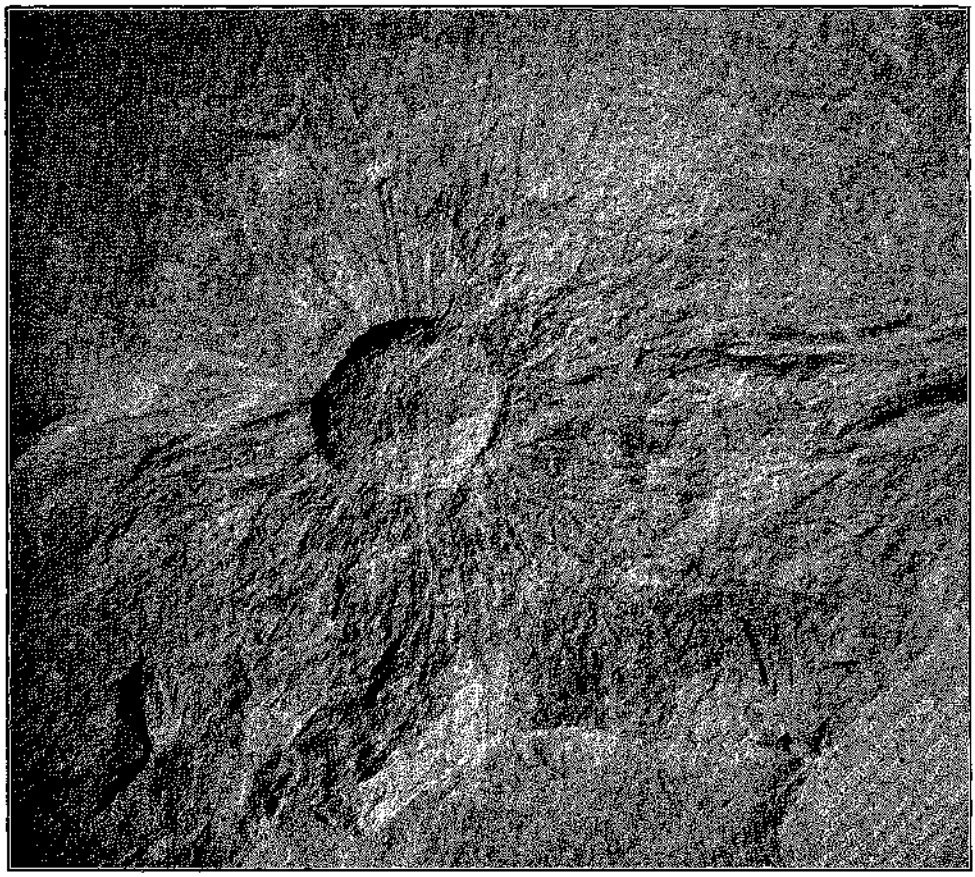

FIG. 11. UNDERSIDE OF BASE OF SMALL STUMP
SHOWING THE RADIATING STRAP-LIKE ROOTS. STUMP 14 INCHES IN DIAMETER. SLAB 6 FEET 4 INCHES BY 5 FEET 7 INCHES.

museum exhibit, through the kindness of Mr. Henri Marchand, who was then working on the Gilboa restoration. The slab, as exhibited, measures five feet seven inches by six feet four inches. The base of the stump is about fourteen inches in diameter, and the radiating roots, from one half inch or less in width to around an inch, extend without termination as far as the rock is preserved. From a study of this and other specimens it appears that the roots were undivided. Much larger specimens were found in the quarry with roots at least nine feet long, but it was impracticable to get them out. The museum specimen is in sandstone, seen from the under side; but other specimens were found on the dumps some time later, showing the impression of the root base in the shale bed beneath the sandstone, often with the radiating roots well shown. The shale bed, as pointed out previously, represents the muds in which the trees grew.

The fronds of the Gilboa tree are compound, tripinnate (three divisions), and judging from the fragments and larger specimens collected, were at least six to nine feet long (see Figs. 12, 13). The pinnules were bilobed, with the lobes slightly recurved. The impression

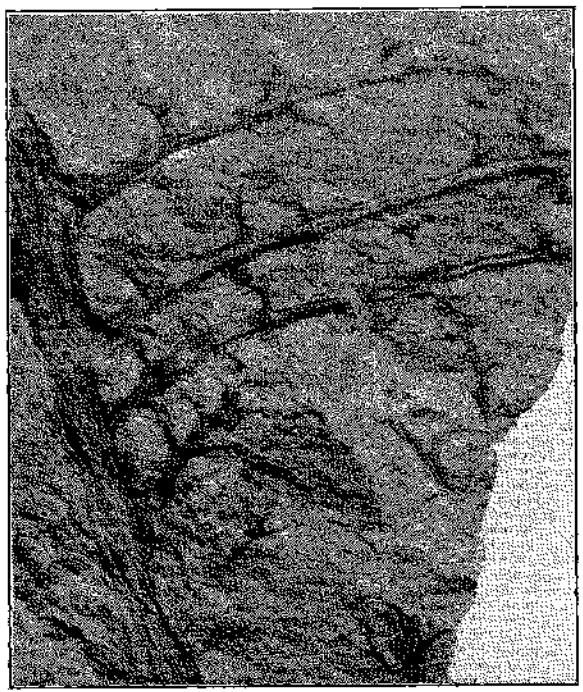

FIG. 12. PORTION OF A FROND
SHOWING ULTIMATE DIVISIONS WITH PINNULES. THE PINNULES OR LEAFLETS ARE SET RATHER FAR APART. THEY ARE BILOBED WITH THE LOBES SLIGHTLY RECURVED. NATURAL SIZE.

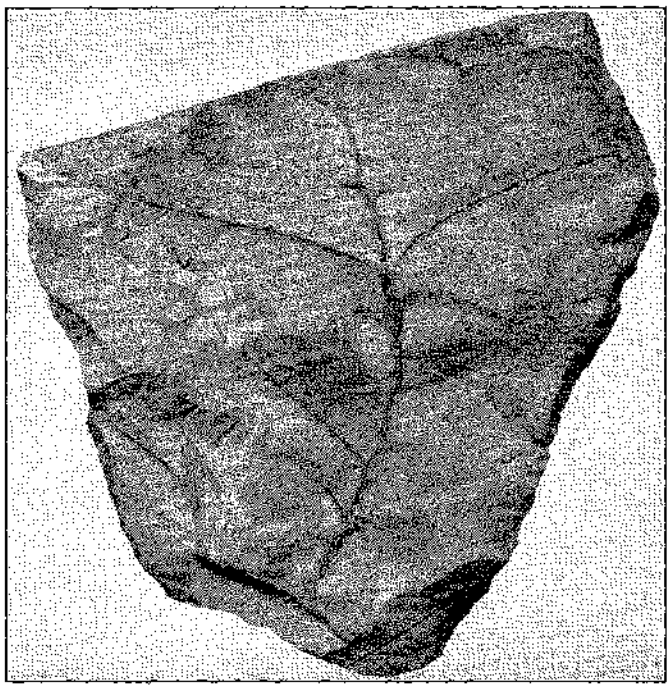

FIG. 13. PART OF MAIN STEM, OR RACHIS, AND LATERAL BRANCHES OF FROND
THE FRONDS HAD THREE DIVISIONS AND MUST HAVE BEEN 6 TO 9 FEET IN LENGTH. GREATEST WIDTH OF SLAB, 2 FEET.

of the main rachis or stem of the frond in the widest part varies from three eighths inch to five eighths inch in the larger specimens. Both the primary and secondary divisions are alternately arranged. The petioles are described as slender and much expanded at the base and spirally arranged in about five ranks. Specimens of outer bark showing petiolar scars were collected in the summer of 1925; but, as yet, the museum has not located any specimens of trunks showing the attachment of the petioles. About 1870 or 1871 a Mr. Lockwood, of Gilboa, found the upper part of one of these trunks, with its leaf scars preserved and petioles attached. The specimen was described by Sir William Dawson as probably the upper part of one or the other of his species of Psaronius found in the same bed.

The seeds of this Upper Devonian tree (see Fig. 14) bear a strong external resemblance to those of the Carboniferous seed fern, *Lyginopteris oldhamia*, and to other Lyginopterid seeds. They were borne in pairs at the end of forked branchlets and were probably borne near the tip of the frond. Sometimes the dichotomies are such a short distance apart as to bring, frequently two, sometimes three, pairs of seeds close together, giving a clustered effect to the seeds. The seed is broadly oval (measuring in the larger specimens 5.3 mm x 2.5 mm to 6.4 mm x 3.4 mm) and inclosed in an outer husk or cupule, which in some cases appears to be lobed. Separate nutlets were found. They occur in groups of small, rounded, thick bodies.

The second type of fruiting body found has been interpreted to be part of the male fructification, a sporangia-bearing organ (sporangiophore), though no separate sporangia have been found. These sporangia-bearing organs are modified pinnules; they are rounded-oval, saucer-shaped to funnel-shaped, and are borne on branching pedicels. It is believed that the sporangia were clustered and attached to the underside of the sporangiophore near the place of attachment of the pedicel and extending out toward the margin.

The two species described by Dawson were distinguished by the arrangement of the sclerenchyma strands of the outer cortex which he interpreted as aerial roots; and to-day the species can stand only on those characters upon which they were originally separated, since we have discovered nothing further to add. His *"Psaronius" textilis* (Fig. 7) is distinguished by a network of interlacing strands of sclerenchyma and *"Psaronius" erianus* (Fig. 8) by more or less parallel strands. Only one kind of foliage has been found; also only one type of seed and male fructification. It would appear then that only in the internal structure of the trunks could these two species of trees be distinguished while living; for if the two species differed in foliage and fructifications, with all the collections that have been made, some evidence of this would have come to light. There may, however, be another explanation of this. The fact that stumps of the *textilis* type have been found in numbers greatly in excess of those of the *erianus* type may account for the collection of only one kind of foliage and fructification, especially since the localities from which the collection of this material was made were few and of limited extent.

4. Description of Forests and Restoration

By June, 1922, after more than half a century since their first discovery, we were in a position to place our trees in their proper relationship and to attempt a restoration. These Gilboa trees in general appearance must have resembled the tree ferns of the tropics to-day, and also of the ancient Carboniferous and Upper Devonian times. The Gilboa

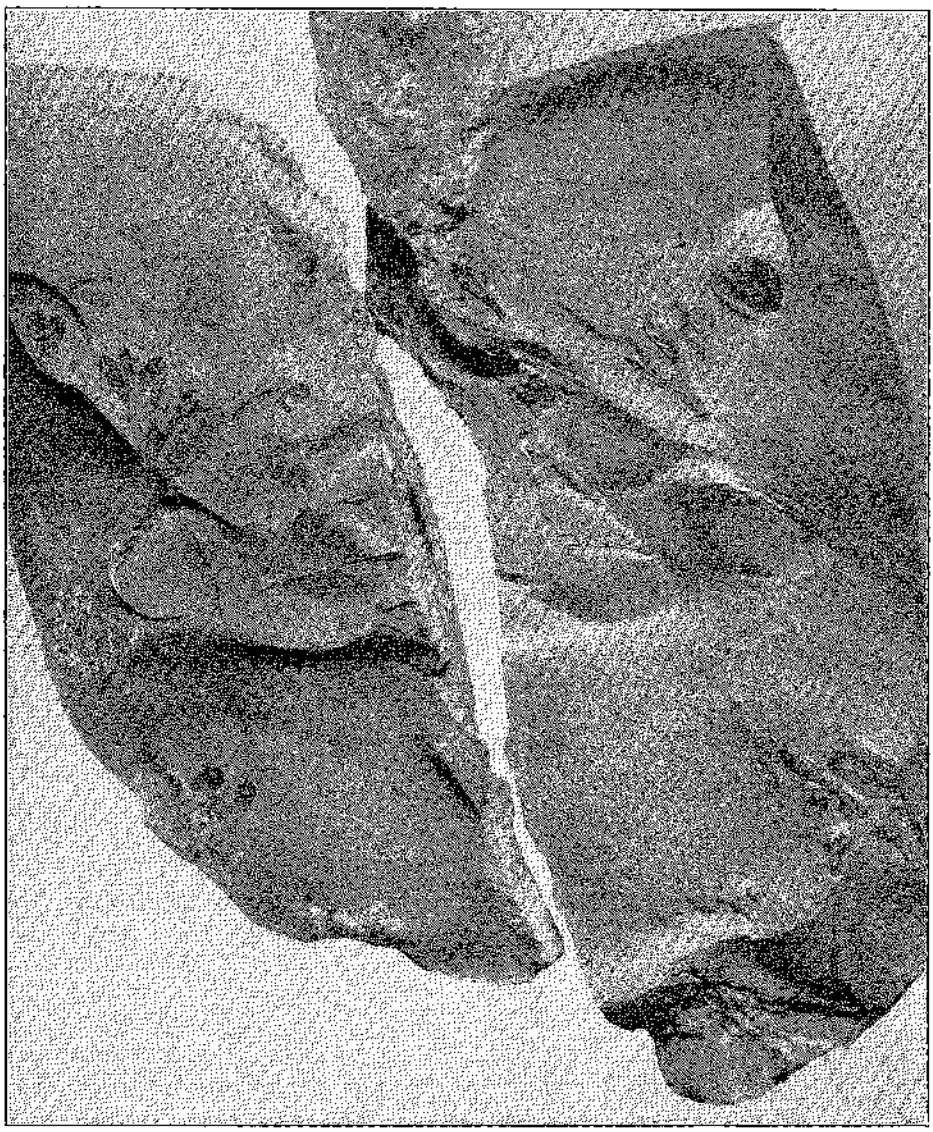

FIG. 14. SLAB SHOWING GROUPS OF SEEDS

THE SEEDS WERE BORNE IN PAIRS AT THE END OF FORKED BRANCHLETS AND WERE PROBABLY BORNE NEAR THE TIP OF THE FROND. NATURAL SIZE.

trees, however, do not belong in this group; they were higher types (seed ferns or Pteridospermophytes) standing in a position between the tree ferns and higher seed plants, and they differ from the true ferns in the possession of seeds and in the higher organization of the trunk. Since the name *Psaronius* had to be abandoned for these seed ferns, a new genus was created, *Eospermatopteris*, meaning "dawn of the seed fern" (from the Greek: eos—*dawn*; sperma—*seed*; pteris—*fern*), and the two species now stand as *Eospermatopteris textilis* (Dawson) and *E. erianus* (Dawson).

As already pointed out, these trees grew along a low swampy shore. They probably reared themselves to heights of at least twenty-five to forty feet and bore fronds at least six to nine feet in length, on the tips of some of which were borne the seeds. The bulbous base undoubtedly was buried in the swampy mud for some distance, as the roots are not heavy and the tree otherwise would not have adequate support. The foliage of the trees was not heavy, much looser than in the tree ferns of to-day and the pinnules or leaflets were far apart (see Fig. 2). There could have been no dense shade in this primitive forest; except perhaps for the heavy moist atmosphere sunlight could easily filter through. No higher forms of life existed there. The hum of insects was not heard, for there were no insects here at that time. All the sounds one would hear could one have been in that ancient forest would be the murmuring of the winds in the tree tops or sounds from the neighboring sea or at times the howling of destructive storms. Three such forests, undaunted, reared themselves in all their glory, were cut down by the sea, buried and fossilized.

The restoration of the Fossil Forests of Gilboa (see Fig. 1) was executed by the artist and sculptor, Mr. Henri Marchand, and his sons, Paul and Georges, under the supervision of the writer. As shown in the accompanying photographic reproduction, it includes an idealized reproduction of the Gilboa area, showing the three forest levels, and here the actual fossil stumps are used. In the center foreground flows the Schoharie Creek, which is joined at the left in a series of falls by a tributary, such as the Manorkill. Looking across and beyond this fossil section one sees the painting of our vision of this ancient forest as it might have looked in the height of its glory. The lycopod-like trees (*Protolepidodendron*), which grew in small numbers in these forests, are also shown in the painting. At both sides of the painting are life-size restorations of the Gilboa tree, which merge imperceptibly into the painting. The artist has depicted so understandingly and skilfully the character of the forest with its heavy moist atmosphere that this restoration is at the same time both a scientific reproduction and a beautiful piece of art.