PERSONAL EXPERIENCES

&

OBSERVATIONS OF

PLANT GROWTH ABNORMALITIES

IN

NORTH WEST QUADRANT

OF

THREE MILE ISLAND

Mary Osborn
1/14/85
(revised & corrected 2/85)

PERSONAL EXPERIENCES & OBSERVATIONS OF

PLANT GROWTH ABNORMALITIES IN NORTH WEST QUADRANT OF THREE MILE ISLAND

Since the spring of '79, I have observed, collected and photographed abnormal growth of flora in the areas around Three Mile Island. Regardless, or in spite of the arguments of how much radiation did or didn't get out, if chemicals were released, or even a combination of both - these are my findings and experiences since the early days of the TMI accident.

First I will restate some of my experiences (I will not get into the reports of farm animals & pets, birds, insects or bumble bees dying or disappearing following the accident). I live in the northwest quadrant of TMI, in Swatara Township, approximately 6½ miles away from the plant. Between Harrisburg and Three Mile Island (near the Host Inn, see: NUREG 0600, figure II-3-6).

On Wednesday, 3/28/79 at six o'clock in the morning, my husband and I were outdoors. We had a clean metallic taste at that time. (Our taste was not coppery or rusty or like burning galvanized steel as others have reported) My son and I were outdoors from 7:45 am to 10:00 am; later that day we both had sunburn effects on our hands and faces.

Thursday, 3/29/79, we drove to the west shore, to Ashcombe Vegetable Farm near Grantham, to just get-away for a while. During that drive I had tearing and burning of my eyes. It was so bright, it hurt to see. I did not connect the skin and eye burns to the accident, although we joked about the metallic taste sometime later as being vaporized metal from the accident.

Friday, 3/30/79 (or black Friday as we call it now) after hearing sirens, church bells and the radio news of uncontrolled radiation releases from Three Mile Island, we evacuated.

The next week, on Tuesday evening, my husband and I returned home for winter clothing, medicine and teddy bears. During our brief two hour trip home I encountered an "unusual event" - the problem I observed was the accelerated growth of my umbrella plant (genus cyperus). New growth, fresh green in color, had appeared - more than a 3" x 5" card within 5 days! (Friday to Tuesday)

We evacuated for eight days. Sometime later (I don't remember how many days), while giving my two year old a bath, I noticed a "small wad" of hair in the tub. His hair had thinned, you could see his scalp. (I think all of us in my family had some amount of hair loss and have met women from Middletown saying the same happened to them.)

That spring, one pinkish tulip had a petal growing 2" down on the stem. In the spring of 1980 that tulip "branched", it had two tulips on one stem. This has not occured since that time.

In May of 1979, my daughter picked a bunch of wild field daisies, with two grossly deformed flowers among them. I also found three dandelions in my back yard that appeared to be similarly deformed. I have found many of these every year since 1979. (My neighbor who lived here over 25 years had never

mary stamos osborn

observed this before. I have lived here since 1969 and had never observed this either, anywhere).

In the fall of '79, my children picked up leaves from the front yard, to do crayon "rubbings". The leaves would not fit under a sheet of 8½" x 11" paper. One leaf would not fit where two or three used to.

I have also found abnormalities on the west shore, in the areas of the Aamodt Health Study. The plants were found easily by observing shapes or colors that weren't normal.

In May of '84, Marjorie Aamodt and I took some of the specimens collected to a botanist, Dr. James Gunckel. He is the "world authority on modifications of plant growth and development induced by ionizing radiations". (See his affidavit attached, from the Aamodt Health Survey.) At that time Dr. Gunckel gave us two reprints of his research and mentioned clues as to what additional effects or symptoms to look for: thickening of leaves, leathery leaves, unusual dwarfing, multiple leaf axils (stimulations), reversion (vegetative-floral growth back and forth), etc.

To date, I have found plant abnormalities in these areas around TMI: Londonderry Township, Derry Township, Lower Swatara Township, Fairview Township, Harrisburg, Newberry Township, Swatara Township and Upper Allen Township. The plants I've found are: daisies, dandelions, chrysanthemums, pyrethrum, sunflower, forsythia, marigolds, crown vetch, maple leaves, redbud leaves, rose leaves, queen anne's lace, corn tassels, some common weeds and a few others. Also, very unusual growth patterns on two pine trees and dandelion leaves 31" long. (see list and sketches attached)

I cannot say "all" abnormalities found were caused by radiation or chemicals from the Three Mile Island accident, but I believe the fallout from the accident has caused most of the effects I've seen.

..The fact that abnormalities are being found 5 years after the accident raises serious questions.....

Is there something in the soil <u>now</u> that is causing these effects? Is the plant releasing enough from clean-up or Unit 1 testing to cause this now? Has the Chinese Bomb Fallout and weapons testing combined with years of continuous radiation releases from TMI done irreversable harm to our environment? To our babies, children or families? To our animals, plants, water, air and earth? What Environmental Impact Statement ?

A key point to make is the finding that these abnormalities, modifications, or mutations occured in the same areas where people have reported having the metallic taste, skins burns, and other accident related symptoms. We have found people, animal and plant effects in the same areas where symptoms were reported at the time of the Three Mile Island nuclear accident. They have been discounted by some "experts" but not all. The fact is there is still no other explanation to these terrible effects. Everything I've found seems to tie into the accident and the more one learns the more this seems to be true.

TYPE OF PLANT	LOCATION*	ABNORMALITY OBSERVED
CHRYSANTHEMUMS	UAT	MULTIPLE BUDS.
CORN	DT, E	SEX REVERSAL.
CORNFLOWER	ST	WHITE, SHOULD BE BLUE (CHLOROSIS?).
CROWN VETCH	ST	CHLOROSIS (FRENCH VANILLA COLOR).
DAISY	E, ST	STEM FASCIATION, ~~MULTIPLE BUDS~~, AXILLARY FLOWER HEAD.
DANDELION	E,ST,O,H,M	DEFORMED FLOWER HEADS, MULTIPLE BLOOMS.
DANDELION LEAVES	FT	HUGE, 31" LONG.
FORSYTHIA	E, LST	MULTIPLE BUDS.
MAPLE LEAVES	E,L,ST,LST	MARGIN ABNORMALITY, THICK & LEATHERY, PUCKERED, CHLOROSIS, SOME DWARFED, SOME HUGE.
MAPLE TREE	ST, FT	BLIND SHOOTS, EXCESS SEEDS (WOULD NOT SPROUT).
MAPLE TREES	LST, ST, FT	DEAD AREAS ABOUT 15' IN DIAMETER AS IF "PLUME" WENT THRU.
MARIGOLDS	FT	STUNTED, STEM FASCIATION, NO FLOWER PETALS, ALL FLORETS, LEATHERY LEAVES.
ONION/GARLIC WEED	ST, LST	REVERSION.
PINE TREES	E, ST	UNUSUAL GROWTH PATTERN FOR PINE CONES, UNUSUAL MASSIVE GROWTH.
PYRETHRUM	ST	STEM FASCIATION, THICK LEATHERY LEAVES.
QUEEN ANNE'S LACE	ST, LT	PINKISH FLOWERS, WOODY STEM.
REDBUD LEAVES	ST	MARGIN ABNORMALITIES.
ROSE	LST	WHITE ROSE ON ALL YELLOW BUSH.
ROSE LEAVES	LST, ST	LEAF FUSION, STUNTING, CHLOROSIS, AXILLARY BUDS FORMED.
SPIDERWORT	NT,ST	EXTRA PETALS & STAMENS.
SUNFLOWER	E, L, ST	STEM FASCIATION, AXILLARY BUDS.
YELLOW BUSH TYPE WEED	ST	WRONG COLOR (CHLOROSIS?).

*see previous page for location code

GLOSSARY

ADVENTITIOUS BUDS: Buds formed where it shouldn't be, from tissues that shouldn't form a bud.

AXIL: Angle between leaf or leafstalk and the stem that carries it. Any new growth or flower bud that arises from an axil is called axillary.

BLIND SHOOT: Where normal tip of shoot that would normally have leaves or flower, but it doesn't; it just forms a long shoot tip without leaves or flowers.

BUD: A condensed shoot, often protected by overlapping scales. A growth bud contains embryo leaves. A flower bud contains embryo flowers or flower clusters.

CHLOROSIS: A condition in which leaves become unnaturally pallid, whitish or yellow. Usually due to lack of essential minerals.

DIFURCATION: Branching into two.

FASCIATION: Multiple stems from multiple buds.

MARGIN: The edge or boundary of any plant organ - most often applied to the border area of a leaf. (margin deformity see Redbud leaves.)

MORPHOGENETIC ABNORMALITIES: Form abnormalities.

VACUOLATION: Formation of a largely water filled cell.

Abnormalities have been observed in the following areas around Three Mile Island since the spring of 1979:

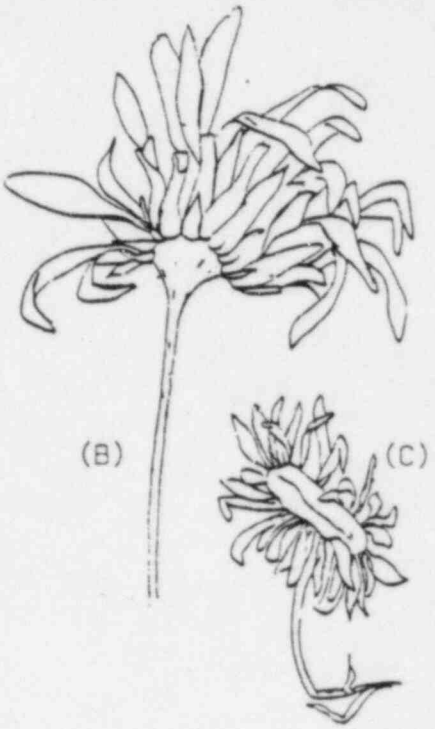
LOCATION CODE* (see following page)

DT	DERRY TOWNSHIP	LST	LOWER SWATARA TOWNSHIP
E	ETTERS	M	MECHANICSBURG
FT	FAIRVIEW TOWNSHIP	NT	NEWBERRY TOWNSHIP
H	HARRISBURG	O	OBERLIN
L	LISBURN	ST	SWATARA TOWNSHIP
LT	LONDONDERRY TOWNSHIP	UAT	UPPER ALLEN TOWNSHIP

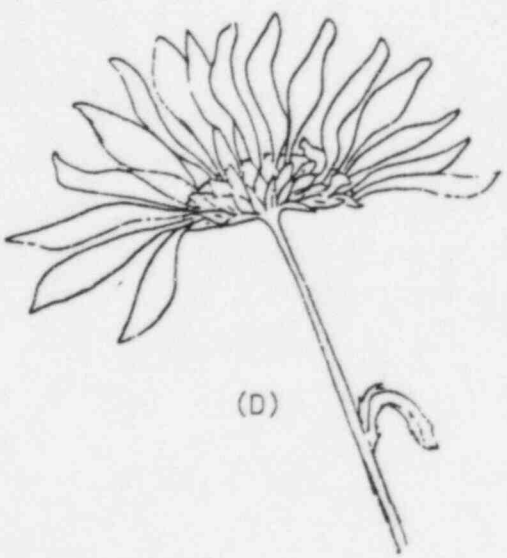
note-

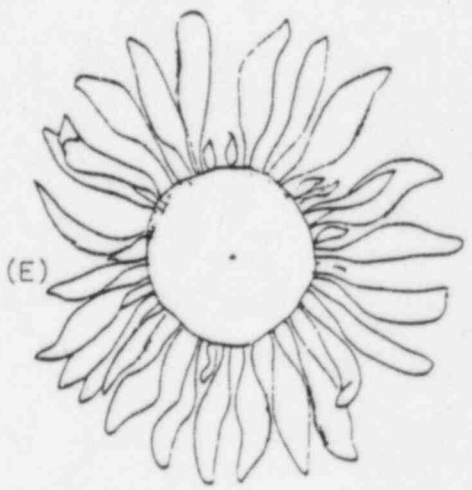
There have been other reports of strange or unusual plant growth in the TMI area since the accident. Abnormalities are not limited to locations mentioned here. My observations are up to the period of January 1985 and have been found as far as 15 miles from Three Mile Island. In many instances the findings seem to follow the "plume" pathways as evidenced by the reports of exposure at time of the accident by human dosimeters.

Abnormalities/mutations occur in nature, it is the frequency of these occurences that merits attention and concern.



(A) AXILLARY FLOWER HEAD
(B) STEM FASCIATION
(C) DEFORMED INFLORESCENCE, TOP VIEW
(D) NORMAL SIDE VIEW
(E) NORMAL TOP VIEW





(Shape and form characteristics are similar in dandelion, sunflower, chrysanthemum and daisy)

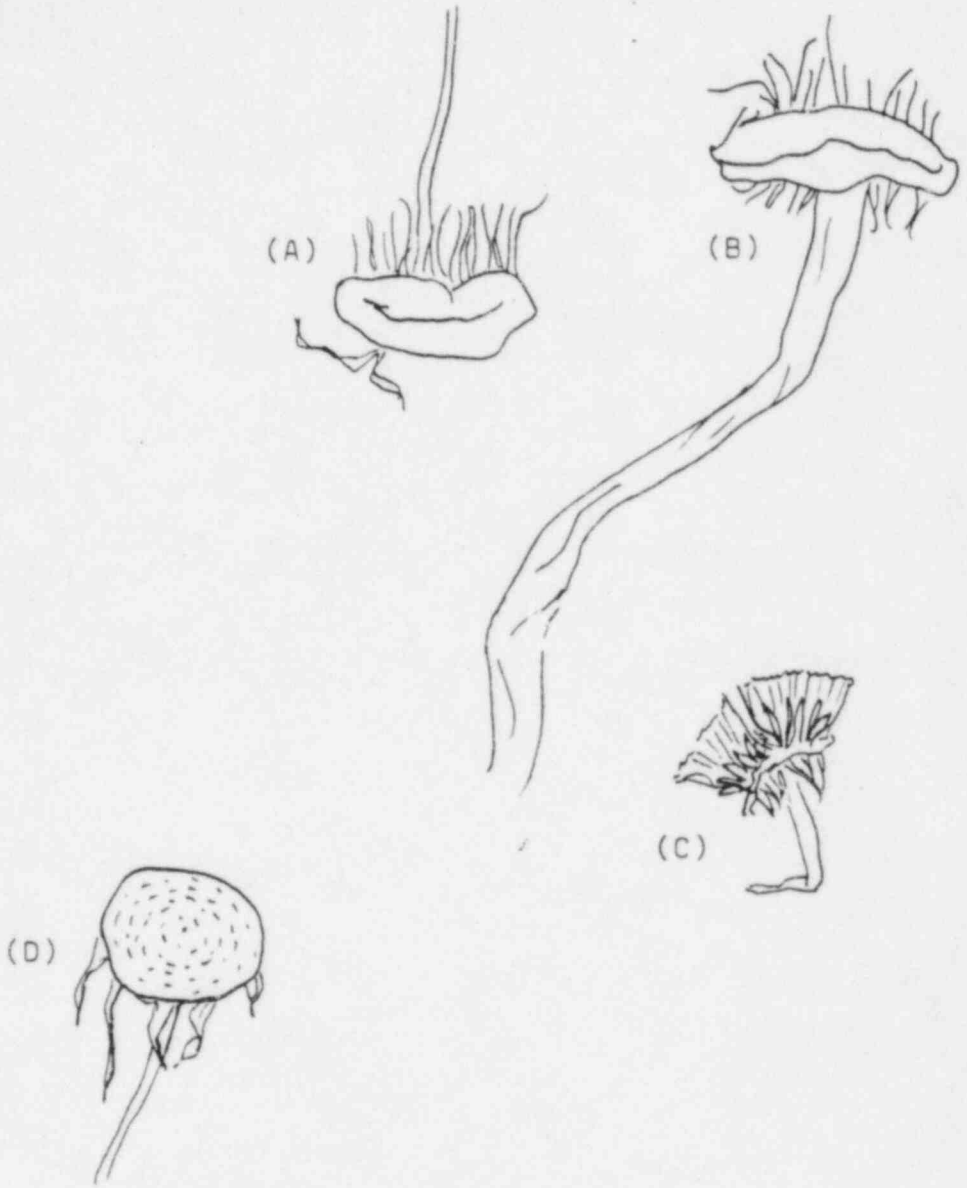
5/84

Swatara Twp, Etters

area-

FIELD DAISIES

D, ENLARGED



A, B, 5/82 OBERLIN
C, 7/82 HARRISBURG
D, 8/84 SWATARA TWP.
AREA

(A)(B) DEFORMED FLOWER HEAD
(C) DOUBLE BLOOM
(D) NO DEFORMITY

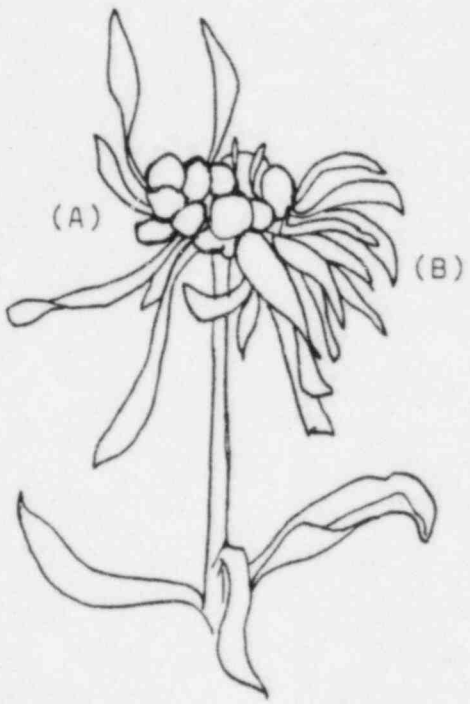
DANDELION

CLOSE TO ACTUAL SIZE

9/84
SWATARA TWP.
AREA

NO DEFORMITY
CHRYSANTHEMUM

CLOSE TO ACTUAL SIZE



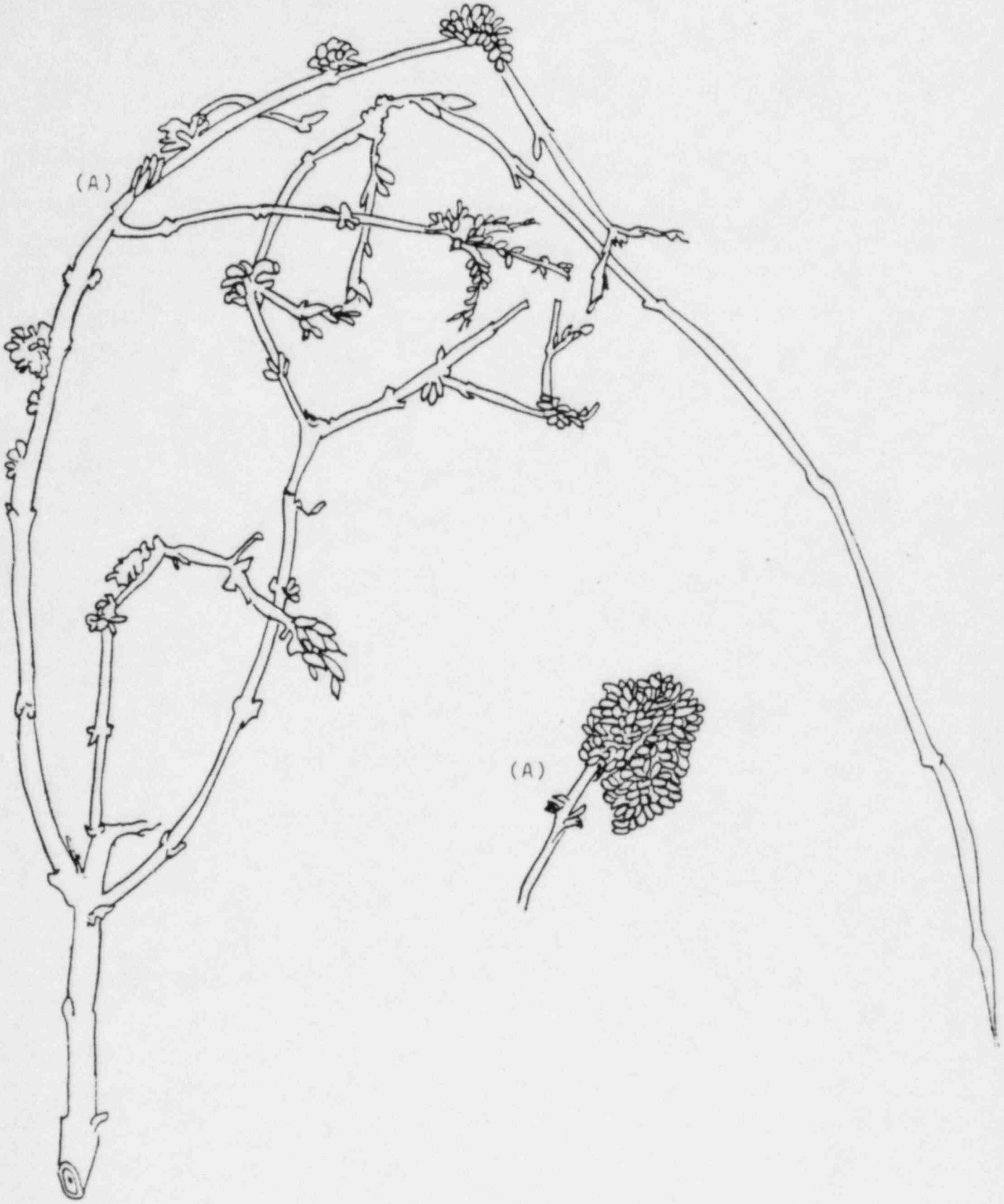
9/21/84

about 14 miles n/w
AREA

(A) MULTIPLE BUDS
(B) PETALS

CHRYSANTHEMUM

CLOSE TO ACTUAL SIZE

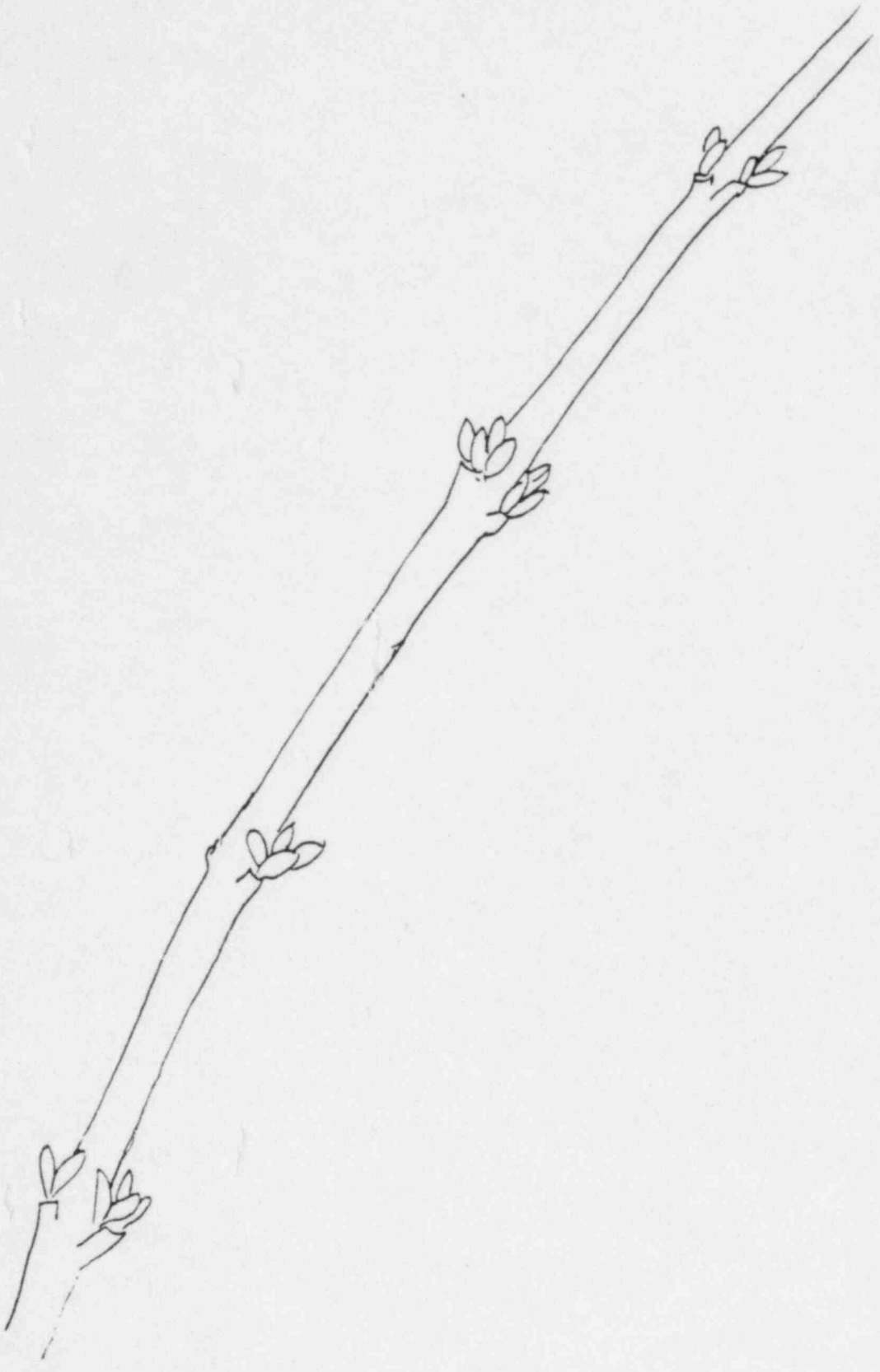


4/83
ETTERS
AREA

(A) MULTIPLE BUDS

FORSYTHIA

CLOSE TO ACTUAL SIZE

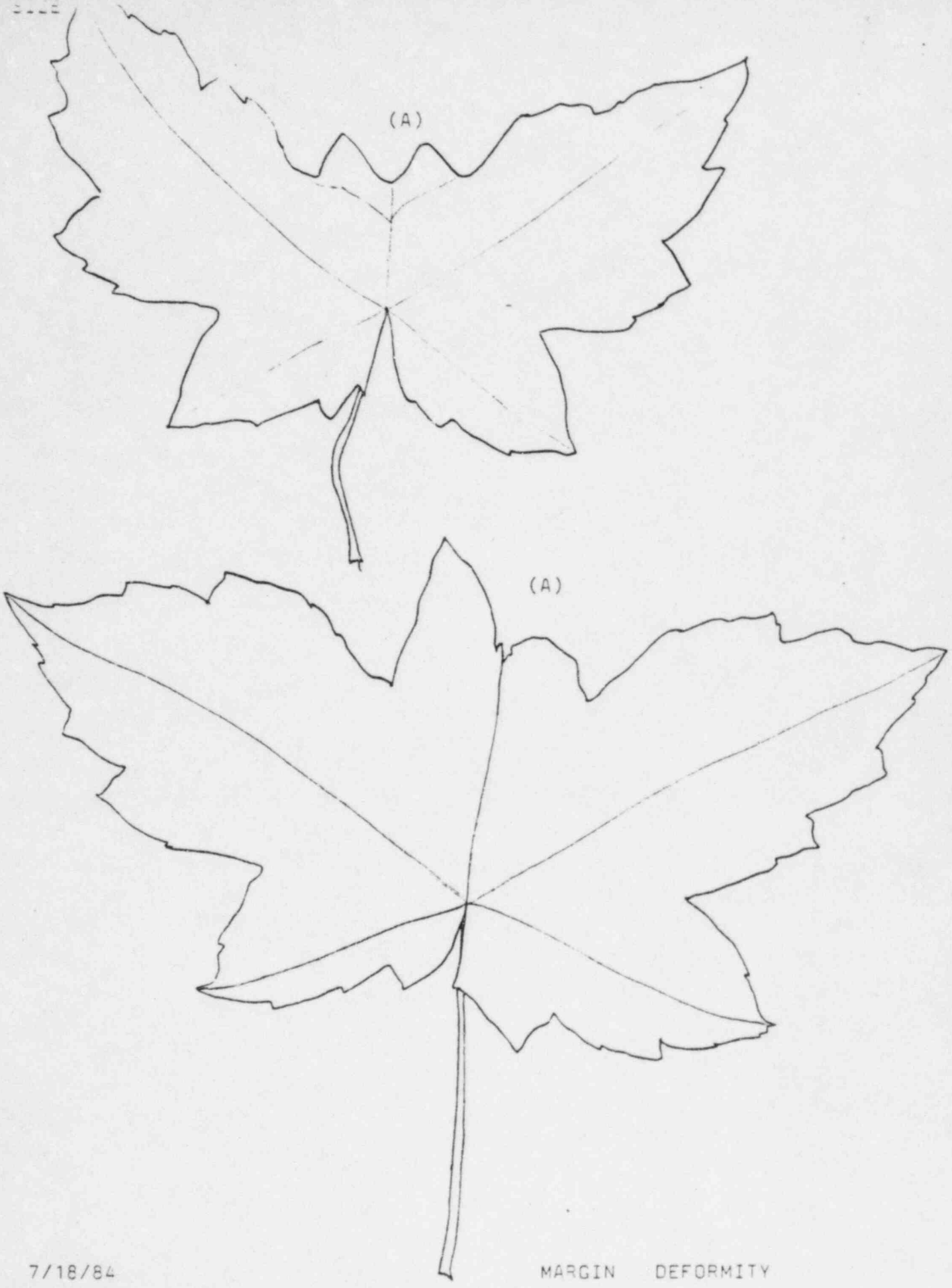


1/2/85

SWATARA LOWER SWATARA LINE AREA

NORMAL TWIG

FORSYTHIA



7/18/84
SWATARA TWP.
AREA

MARGIN DEFORMITY
(A)CENTER LOBE NOT DEVELOPED
MAPLE LEAF

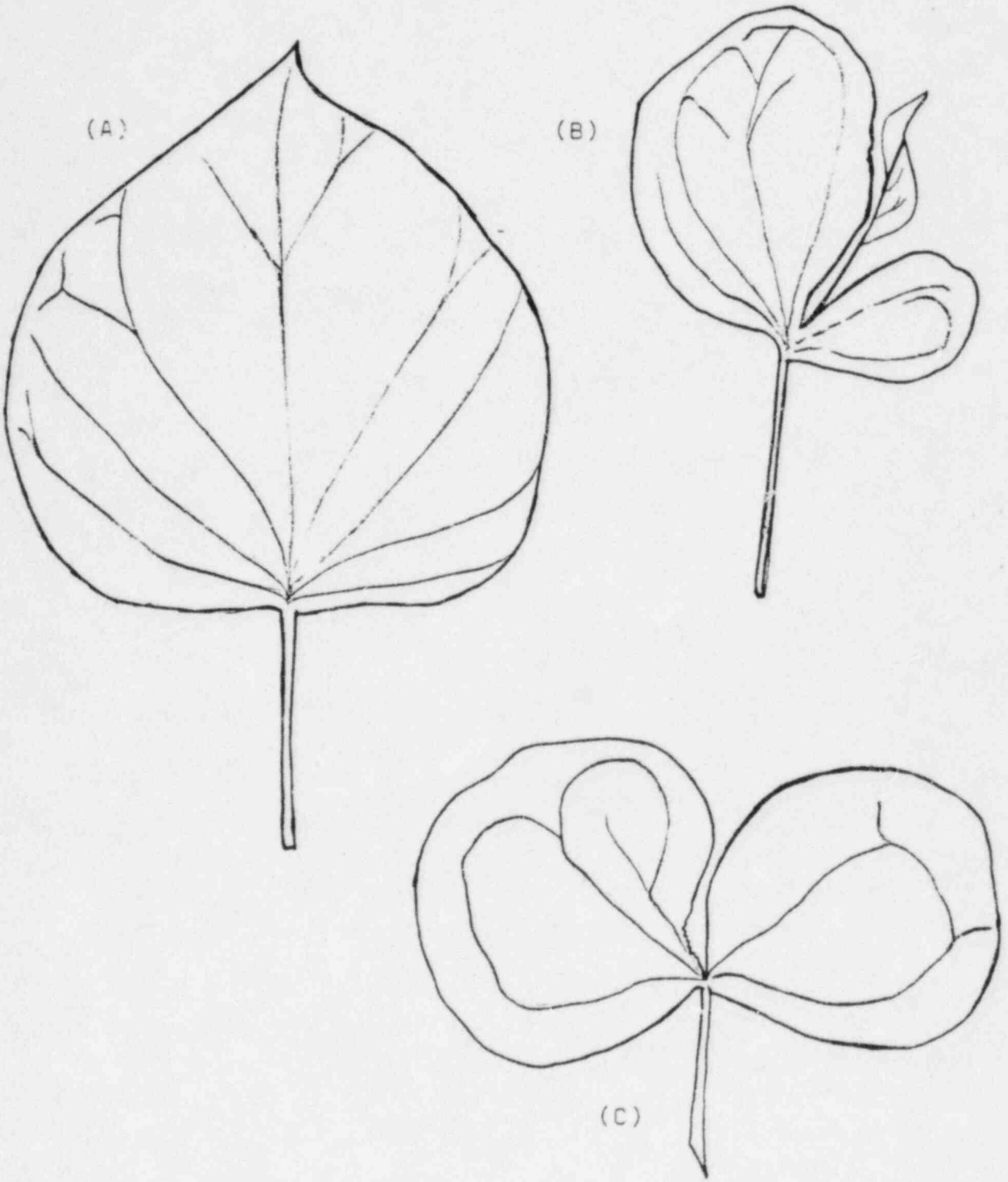
10/84

SWATARA TWP.

AREA

NO DEFORMITY

MAPLE LEAF

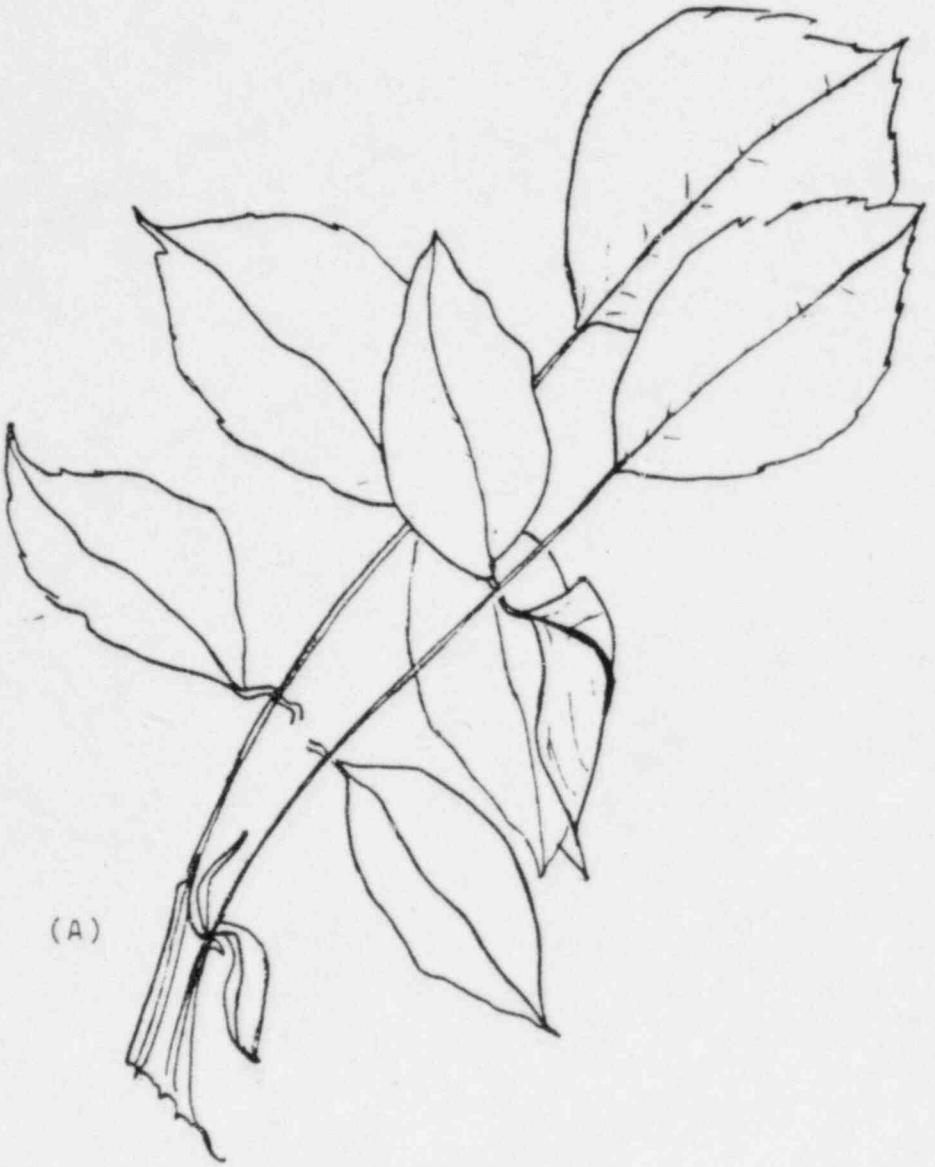


7/84
SWATARA TWP.
AREA

(A) NO DEFORMITIES
(B)(C) MARGIN DEFORMITIES

REDBUD LEAVES

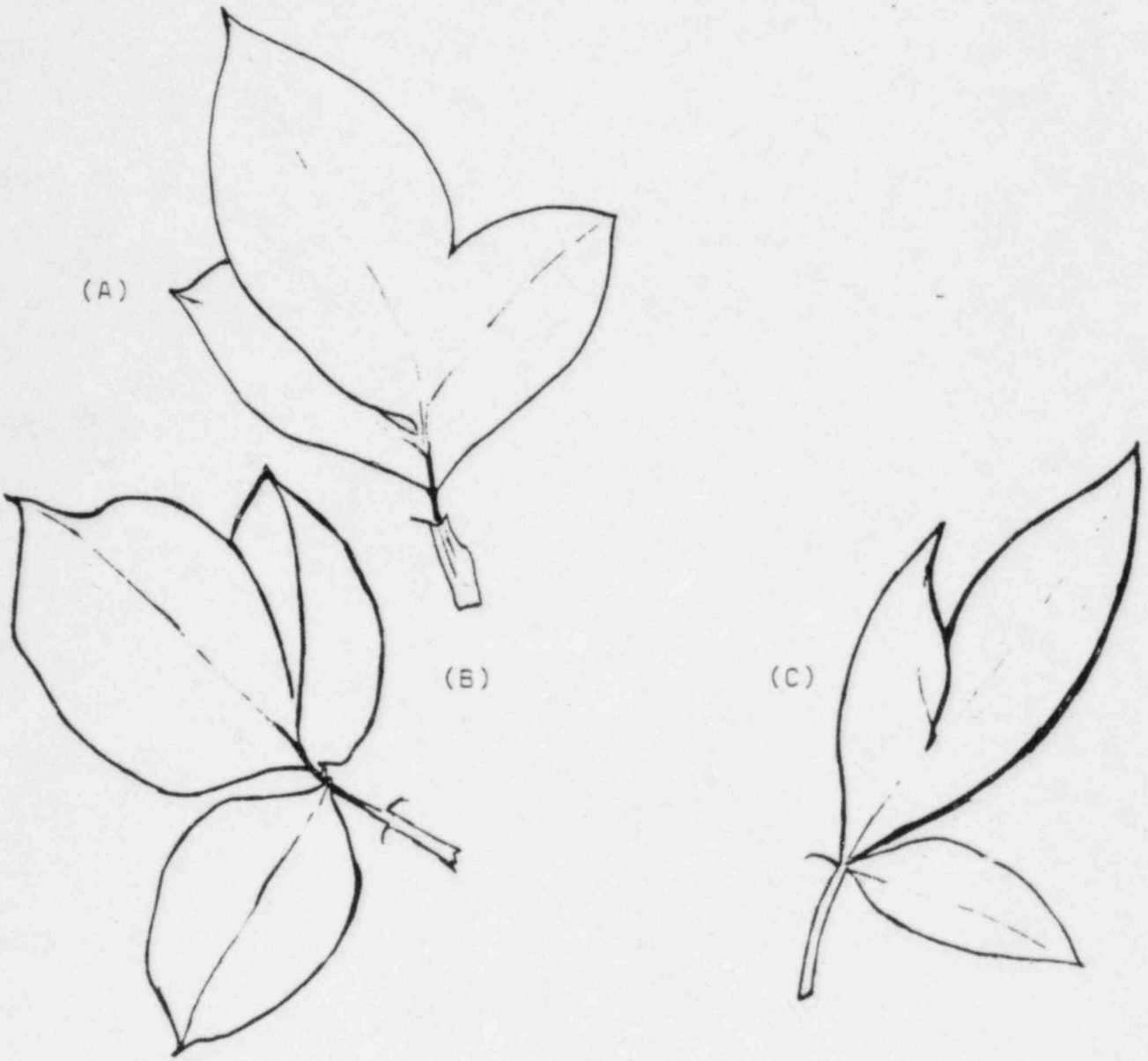
ACTUAL SIZE



(A)

7/84
SWATARA TWP.
AREA

(DECAPPED? & THEN)
AXILLARY BUDS DEVELOPED
BLAZE ROSE BUSH



6/84

A, B, LOWER SWATARA

C, SWATARA TWP.

FUSED LEAVES

ROSE BUSH

SEX REVERSAL (MALE TASSEL
PRODUCING FEMALE CORN)
TASSEL OF CORN

9/84, 8/82
ETTERS, HERSHEY R.D.
AREA

REVERSION

WILD GARLIC/ONION WEED

9/82
SWATARA, LOWER SWATARA
AREA

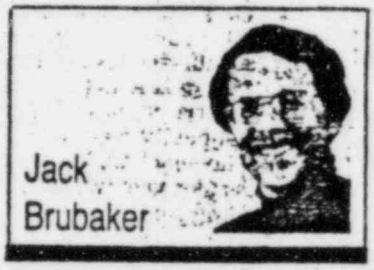
The Scribbler

Boy George Corn

Another Agricultural Oddity of the Season

We have reported on a few of the weird plants that issued from this most abundant of growing seasons, and we now have the 1984 garden winner. The envelope, please, Mellors.

And the winner is: sexually confused corn. This has been a ripe year for what ordinarily is a rare abnormality: tassels producing their own ears.



Lou Gable, a deputy game warden of Columbia R2, spotted some of this strange corn on a Mountville-area farm not long ago. He informed Penn State extension agent Arnold Lueck. Lueck has since heard about several other outbreaks.

A brief explanation for city slickers: Corn is bisexual. The tassel is the male organ. The ear is the female organ. The tassel sheds pollen on the ear, and the ear makes baby kernels.

That's what happens under normal circumstances. Abnormally, on rare occasions, male tassels change sex and produce their own miniature ears with kernels — as if they didn't need the regular ears at all.

Nobody knows precisely why this happens, Lueck says. All is speculation, especially this year when the abnormality is relatively widespread.

"The affected plants likely experienced some kind of environmental shock," he notes, "as extreme cold or a virus infection. Such conditions have been known to produce sex changes in corn plants."

Corn tassels that gave birth to their own ears

The corn Gable spotted, and which is pictured here, is field corn. Lueck says he has also seen the aberration in sweet corn. (The Scribbler once spied a mirage with one white, sequined glove dancing in his bowl of corn flakes, but we're not going to develop that theme.)

Lanc 10/84

—Patriot-News photo: Jim Bradley

Record find?

Erma and Donald Croce of Hershey hope their find will mushroom into a record breaker. The couple pulled the 55-pound specimen from a stump in a field along Route 322 just east of Hershey yesterday. They plan to have the mushroom — which they claim is edible — weighed and measured at Lebanon Valley College before submitting statistics for possible inclusion in the Guinness Book of World Records.

The Bulletin
of the Torrey Botanical Club

Editor-in-Chief: James E. Gunckel

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P — phosphorus
Zn^{65} — zinc
Ca^{45} — calcium

May 11, 1984

AFFIDAVIT 9

I have carefully examined a few specimens of common plants collected shortly after the accident at TMI and compared them with specimens collected more recently. The current abnormalities are probably carried forward by induced chromosomal aberrations. There were a number of anomalies entirely comparable to those induced by ionizing radiation -- stem fasciations, growth stimulation, induction of extra vegetative buds and stem tumors.

Most of the stem abnormalities described in the literature, and in my own experience, are induced by relatively high doses of X or gamma rays extending over a period of usually 2-3 months. Notable exceptions, however, are similar responses to beta ray exposure from radioisotopes (P^{32}, Zn^{65}, Ca^{45}) and for only 24 hours. In other words, it would have been possible for the types of plant abnormalities observed to have been induced by radioactive fallout on March 29, 1979.

In discussing the general biological effects of irradiation, some clarification may be helpful. In plants, the dose rate (e.g., mr/hr) is much more important than total dose (e.g., mr/yr) in inducing abnormalities. Further, the "quality factor" for gamma and beta radiation is not the same as generally assumed. In fact, I have incontrovertible experimental results to show that beta rays are at least a quality factor of two in plants.

I am the world authority on modifications of plant growth and development induced by ionizing radiations, having researched this area for 34 years at the Brookhaven National Laboratory and at Rutgers University. The three review papers appended attest to my expertise.

James E. Gunckel

James E. Gunckel

Publications of James E. Gunckel

IV. The Effects of Ionizing Radiation on Plants: Morphological Effects, The Quarterly Review of Biology, Vol 32, No. 1, March 1957

Modifications of Plant Growth and Development Induced by Ionizing Radiations, Encyclopedia of Plant Physiology, Vol XV/2, 1965

Aberrant Growth in Plants Induced by Ionizing Radiation, with Arnold H. Sparrow, Abnormal and Pathological Plant Growth, Brookhaven Symposia in Biology No. 6 (1954)

Ionizing Radiations: Biochemical, Physiological and Morphological Aspects of their Effects on Plants, with A. H. Sparrow, Encyclopedia of Plant Physiology, Vol XVI, 1961

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