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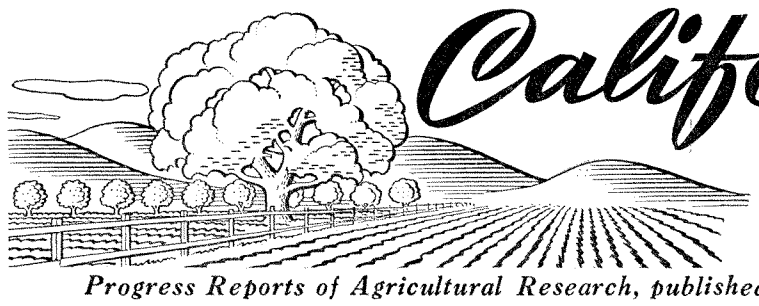

California AGRICULTURE

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New Program of Research On Olive Cultural Problems

H. T. Hartmann

One problem which has plagued olive growers since antiquity is the irregular bearing nature of olive trees.

Well cared for trees in apparently perfect condition often have a heavy bloom in the spring, but most or all the flowers drop soon after opening. This has been determined to be due to abortion of the pistil—female part of the flower—which occurs before the flowers open. To overcome this, various fertilizer treatments are being tried.

Spray applications of some of the new synthetic "hormones" are also being tested for their value in preventing this pistil abortion.

Flower-bud Formation

A study of the time of flower-bud formation in the olive has already revealed that it occurs about the middle of March. There seems to be little difference between varieties or between the various olive sections as to the time of flower-bud formation.

The time of occurrence of this phenomenon in the olive is in marked contrast to deciduous fruits in which it generally takes place during the summer or fall preceding the blooming period.

Rootstock Investigations

An investigation dealing with the response of olive varieties when grown on various rootstocks is being undertaken.

Five acres of land at the Wolfskill Experimental Orchard at Winters will be used for this study. Trees will be grown on a number of **Olea** species gathered from their native habitat all over the world.

Vigorous varieties used as rootstocks in some of the Mediterranean countries will also be tried as well as the rootstocks now being used in California.

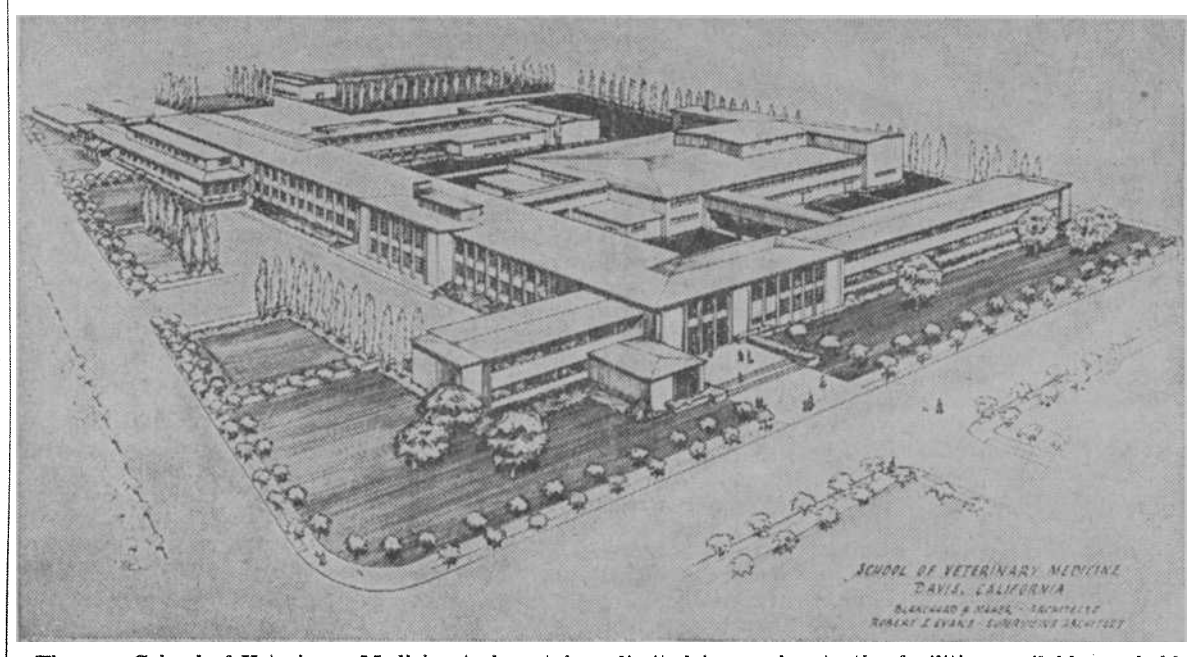
Collection of Varieties Under Study

A collection of olive varieties is being established at the Wolfskill Experimental Orchard. About fifty varieties are now growing there, most of these being secured from the United States Department of Agriculture Plant Introduction Garden at Chico.

In addition varieties which have never been grown in this country are being imported from the Mediterranean region. Scions of several

(Continued on page 4)

New University of California School of Veterinary Medicine On Davis Campus of College of Agriculture



The new School of Veterinary Medicine to be established by the University of California will be housed in a specially designed group of buildings on the Davis campus of the College of Agriculture, as shown in the above architect's drawing.

Professional training will be offered in the form of a four-year curriculum—in addition to the two-year pre-professional course—and the degree of Doctor of Veterinary Medicine will be conferred. Classes will be limited in number to the facilities available, probably in the neighborhood of 40 students per class.

The buildings will have facilities for research and for teaching. The main structure will provide 153,700 square feet of floor space, the infected animals building 68,500, the kennels 5,000, and the hospital barn, 10,000.

The earliest possible date when the facilities for the professional school might be ready would be September 1948, with a later date, a possibility.

Over 1100 Recognized Soil Types Represented in Twelve Regions Of State's 100,000,000 Acres

R. Earl Storie

To date in California 380 different soil series have been established, with over 1100 recognized soil types. In order to condense and make more understandable soils of the state, twelve soil regions have been set up.

Within each one of these general regions a certain zonal soil condition exists, modified to a considerable extent by local variations in parent material, topography, and drainage.

The important agricultural lands of California are composed of the azonal or alluvial soils. Of the total 100,000,000 acres in the state about 11,000,000 acres are classed as cropland with about 5,000,000 acres being irrigated.

I—Northwestern Coast Ranges

This part of California comprises about 10.4 per cent of the state.

The dominant upland or zonal soil is illustrated by Hugo loam, with its gray-brown podzolic characteristics.

The alluvial soils of the valleys, azonal in character, are well illustrated by Soquel loam which is very productive. Chemically, these soils are of acid reaction and usually low in available phosphorus.

II—Central and Northern Coast

This region, about two per cent of the state, takes in an area immediately bordering the coast composed of coastal terrace lands bordered on the east by uplands.

The upland soils have prairie-like characteristics of dark color and slightly acid reaction, as illustrated by Cayucos clay. Extensive areas of intrazonal soils of planosol character such as exhibited in the Watsonville loam occur on the coastal plain.

III—Sierra Nevada, Trinity, Cascade and Sierras of Southern California

The Sierras of California, 21.4 per cent of the state, consist of rugged mountainous topography occurring at elevations of 1,000 to 14,000 feet above sea level.

This region is of predominately igneous parent material. The soils are residual in character, of acid reaction, with the underlying bedrock generally occurring at a depth of two to five feet from the surface.

The two dominant soil types are Aiken clay loam and Holland sandy loam. Both are of podzolic character with Aiken clay loam being derived from lateritic material (basic igneous rocks). Holland sandy loam is derived from granitic rocks.

Chemically these soils are of acid reaction and low in available phosphorus.

IV—Sacramento Valley

The Sacramento Valley comprises about four per cent of the state.

Many of the soils on the east side are derived from igneous alluvium; those in the trough from alluvim of mixed origin, and those on the west side from sedimentary rock alluvium.

Over 80 different soil series have been mapped in the Sacramento Valley. Three have been picked as representing certain conditions or

(Continued on page 2)

Improved Forage Grasses To Be Put To Field Trials

G. L. Stebbins, Jr.

More than fifty new strains of forage grasses have been produced during the past five years by hybridizing valuable existing species. At least twenty of the new strains are potential new species.

The creation of these fifty odd new strains resulted from studies indicated by a survey made of the principal perennial grass species of California with reference to their cell structure, functions, multiplication, and life history.

Survey Findings

There is a predominance of winter growing annual plants in the forage areas of the state, and a scarcity of palatable perennial grasses or other plants which are active during the summer months.

There is a limited number of perennial grass species native to California and all of them have certain drawbacks. Various perennial forage plants have been introduced from other countries but they have not succeeded on a large scale.

The results of the cytological survey—the study of the plant cells—showed that the species most resistant to heat and drouth have high chromosome numbers as compared with other members of the same plant family. The evidence suggested that these species had originated in past geological ages through hybridization between previously existing species, followed by doubling of the chromosome number.

Hybridization Experiments

The suggestion that natural hybridization had originated the currently known species was strengthened by the results of hybridization experiments with certain species of brome grass.

The hybrids produced by these experiments were vigorous. Later work has shown that they can be made partly, or fully, fertile by doubling their chromosome number with the aid of colchicine, a chemical which affects the cell division in the growing plants.

Observations in the field have shown that vigorous hybrids often are formed by natural cross-pollination between different species. Such hybrids are completely sterile, but some of them may be rendered fer-

(Continued on page 4)

Further Improvements Needed Before Mechanization of Cotton Growing Reaches Full Efficiency

J. P. Fairbank

The mechanical cotton picker is the center piece of cotton mechanization, the hoped for answer to the current labor cost of 100 hours per acre for hand picking.

The cotton picker is not a new machine. One was patented way back in 1850. The Division of Agricultural Engineering made studies of cotton pickers in 1928-30. The present machines are larger, better built, pick more cotton and cost more, but the differences are not revolutionary.

Two Types

Cotton pickers are of either the stripper or the picker types.

The stripper is a simple machine which strips off the entire boll together with some of the plant. The lint is extracted at the gin.

The picker plucks the locks of seed cotton directly from the burrs which remain on the plant, as is done by hand. A multitude of revolving spindles traverse the cotton plants and when one of them touches an open boll, the fiber wraps around the spindle.

As the spindle retracts into a housing, the cotton is doffed into an air stream, thence into a hopper or a trailer.

The path followed by the spindles is such that the cotton plants are not raked or combed, thus injury to unopened bolls is avoided and the field can be picked again after the late bolls mature.

Operation

One manufacturer's picker runs at three miles an hour, closely. Another picker operates at two miles an hour in low gear, which, in 40-inch rows figures eight-tenths-acre per hour.

The time lost in turning, dumping and servicing, reduces the av-

(Continued on page 2)

Spring Management of Honeybee Colonies Determined By Colony Needs Rather Than By Calendar

J. E. Eckert

The condition of a honeybee colony during Springtime points to its probable usefulness in the next six or eight weeks.

The term "spring management" denotes the attention given to colonies during the period of their early activity following a quiescent period of winter. It is not a definite period in the calendar year.

Spring Requirements

The amount of spring manipulations can be reduced to a minimum if each colony is provided with certain essentials the preceding fall.

A colony that has a young queen, seven or more frames of bees, and sufficient stores of honey and pollen to supply the bees until they can secure surplus stores in the spring, will need little attention until they require additional room for the expansion of their brood nest and storage area.

The queen is the most important determining factor. A young queen can be provided in the fall and if sufficient natural honey is not available, additional food can be added in the form of a heavy sugar syrup. Besides honey, bees require pollen to enable the colony to develop normally in the spring and this must be in the combs in the fall to provide for early brood rearing.

Colonies Wintered in 1 or 2-Story Hives

Some beekeepers winter their colonies in one-story hives, but a majority leave two hive bodies with the bees. If the one-story method is used, the combs must be filled with at least 30 pounds of honey plus sufficient pollen to fill two combs in order to insure sufficient food for the colony from November through February in most parts of California.

Usually by the first of March, a normal colony has brood in several frames and is occupying the greater portion of a two-story hive. Col-

(Continued on page 2)

Over 1100 Recognized Soil Types Represented in Twelve Regions Of State's 100,000,000 Acres

(Continued from page 1)

groups of soils which are of importance.

Sacramento clay is a dark-colored, fine-textured, productive basin soil having a neutral surface and calcareous subsoil which is widely used for rice.

Redding gravelly loam is a very old, gravelly red terrace soil having a cobbly iron and silicia cemented hardpan which is of low value for cultivated crops.

Yolo loam represents the group of recent alluvial fan soils of brown color and neutral reaction. The Yolo and related soils are of high agricultural value for a wide range of crops.

V—Central Coast Range and Valleys

Approximately 8.6 per cent of the state is within this region, lying between the San Francisco Bay and Santa Barbara.

Parent material consists principally of sedimentary rocks on the hills and sedimentary rock alluvium in the valleys.

A large part of the soils have neutral surface with calcareous subsoils. Altamont clay loam is the dominant upland zonal soil of this region. Huerhuero fine sandy loam and Sorrento loam occur on the alluvial areas. Nitrogen appears to be needed in fertilizer practice.

VI—Lava Plateau

Comprising about 5.1 per cent of the state, the lava plateau is in the extreme northeastern part of the state.

Parent material is basic igneous rocks for the upland soils and basic igneous rock alluvium in the intermountain valleys. The upland soils that are developed on lavas are fairly shallow and usually stony.

The dominant upland soil is Lassen stony clay, a shallow stony soil of dark brown color and slightly basic reaction having a calcareous subsoil.

The alluvial fan soils are represented by Surprise loam, a dark brown, deep alluvial soil of slightly basic reaction.

VII—Southern California

About 8.9 per cent of the state is in this area south of Santa Barbara to the Mexican border and east to the mountains.

Granite rocks comprise a large part of the foothill area along with sandstone and shale rocks.

Valley soils are derived from alluvium from both granitic and sedimentary rocks sources.

The dominant upland soil from granite is Vista sandy loam, a brown sandy loam soil of about neutral reaction resting on granitic bedrock at a depth of two to four feet. This soil occupies rolling to hilly topography with erosion being a problem.

Upland soils derived from sedimentary rocks generally have surface soils of clay loam or clay texture and of a neutral to basic reaction and often with calcareous subsoils.

Altamont clay loam and Altamont clay are soils of occurrence in Southern California.

One of the best known alluvial fan soils of the Southern California valleys is Hanford sandy loam which is of brown or light brown color and about neutral in reaction.

Considerable areas of old alluvial terrace soils classified as Ramona loam which have denser subsoils than Hanford sandy loam occur.

Nitrogen appears to be the limiting plant food element in all these Southern California soils.

VIII—Eastern Foothills of San Joaquin Valley

This is a long narrow strip—about 2.8 per cent of the state—extending along the east side of the San Joaquin Valley.

The dominant parent material is granite. Soils are of residual origin of about neutral reaction and often stony and shallow. Vista sandy loam is the dominant soil type.

IX—San Joaquin Valley

Somewhat over 5.1 per cent of the lands of the state are in the San Joaquin Valley.

Parent material consists of granitic rock alluvium on the east side and heavier textured alluvium of mixed origin in the trough.

Large areas of red-iron hardpan soils occur along the eastern edge.

Flatter, poorer drained lands on the east side of the valley are characterized by light colored "alkali" (Solonchak) soils. Chief among these "alkali" soils is Fresno loam, a soil which has calcium carbonate hardpan lenses in the subsoil. Because of its high salt concentration, poor drainage, and hardpan condition, Fresno loam has low crop suitability.

There are extensive areas of well drained alluvial fan soils of high agricultural value.

At the north end of the valley there is a fairly large area of wind modified sand and loamy sand.

Trough soils are of clay loam or clay texture, of dark color, high in organic matter, and often poorly drained.

X—Western Foothills and Western Alluvial Fans of San Joaquin Valley

On the west side of the valley there is a strip about 10 to 20 miles wide and 225 miles in length comprising a little over 3.1 per cent of the state.

Parent material in the foothills consists of sedimentary rocks high in lime. The alluvial fan soils are composed of outwash from this same material.

All the soils are of light color, low in organic matter and generally high in lime. The dominant upland soil is Kettleman clay loam and the dominant alluvial fan soil is Panoche loam.

The heavier textured poorly drained soils occurring along the lower part of the fan have a high salt concentration which restricts their agricultural use.

XI—Great Basin

That portion of California east of the Sierra Nevada Mountains constitutes a part of the Great Basin region and comprises 10.8 per cent of the state.

Soils are generally of light gray color, high in lime, and low in organic matter. Flat, poorly drained soils contain a high concentration of salts and belong to the Solonchak group.

Elna sandy loam shows the regional characteristics of light gray color and high content of lime.

XII—Colorado and Mojave Deserts

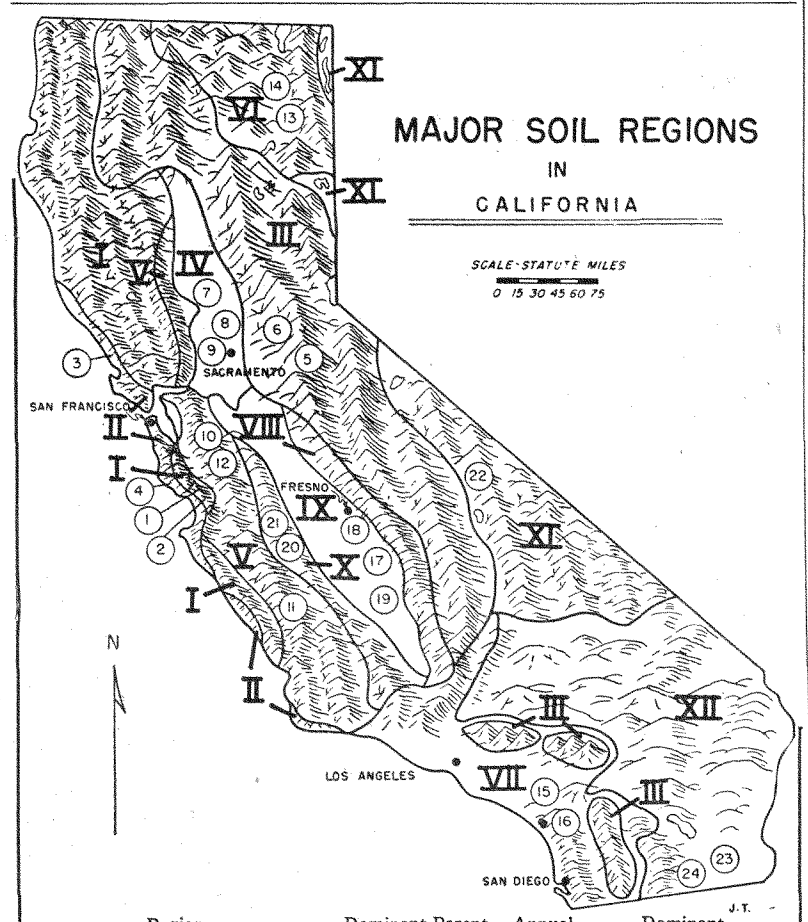
The Colorado and Mojave desert region in the southeastern part of the state comprises 17.8 per cent of the lands of the state or nearly 18 million acres.

Fine textured alluvium of mixed origin occur in the valleys and very sandy alluvium of mixed origin with very low organic and high lime content on the mesas. Most of the soils have a pinkish cast.

One of the dominant valley soils is Holtville silty clay loam.

All these desert soils are low in nitrogen. Although well supplied with phosphorus, is is not readily available for plant use.

R. Earl Storie is Lecturer in Soil Technology and Soil Technologist in the Experiment Station.



Region	Dominant Parent Material	Annual Rainfall	Dominant Soil Types
I. NORTHWESTERN COAST RANGES	Sedimentary Rocks and Sedimentary Rock Alluvium	30-70"	1. Hugo loam. 2. Soquel loam.
II. CENTRAL AND NORTHERN COAST	Sedimentary Rocks	20-30"	3. Cayucos clay. 4. Watsonville loam.
III. SIERRA NEVADA MTS. TRINITY, CASCADE AND SIERRAS OF SOUTHERN CALIF.	Igneous Rocks	25-60"	5. Aiken clay loam. 6. Holland sandy loam.
IV. SACRAMENTO VALLEY	Igneous Alluvium on East Side, Mixed Alluvium in Trough, Sedimentary Alluvium on West Side	15-35"	7. Sacramento clay. 8. Redding gravelly loam. 9. Yolo loam.
V. CENTRAL COAST RANGE AND VALLEYS	Sedimentary Rocks and Sedimentary Rock Alluvium	15-25"	10. Altamont clay loam. 11. Huerhuero fine sandy loam. 12. Sorrento loam.
VI. LAVA PLATEAU	Basic Igneous Rocks, and Basic Igneous Rock Alluvium	10-25"	13. Lassen stony clay. 14. Surprise loam.
VII. SOUTHERN CALIFORNIA	Granitic and Sedimentary Rocks, Alluvium	9-17"	15. Vista sandy loam. 16. Hanford sandy loam.
VIII. EASTERN FOOTHILLS OF SAN JOAQUIN VALLEY	Granitic Rocks	9-17"	15. Vista sandy loam.
IX. SAN JOAQUIN VALLEY	Granitic Rock Alluvium on East Side, Mixed Alluvium in Trough	5-12"	17. San Joaquin loam. 18. Fresno loam. 19. Hesperia sandy loam.
X. WESTERN FOOTHILLS AND WESTERN ALLUVIAL FANS OF SAN JOAQUIN VALLEY	Sedimentary Rocks and Sedimentary Rock Alluvium	5- 7"	20. Kettleman clay loam. 21. Panoche loam.
XI. GREAT BASIN	Mixed Secondary Materials	1-10"	22. Elna sandy loam.
XII. COLORADO AND MOJAVE DESERTS	Mixed Alluvium	1- 5"	23. Superstition loamy sand. 24. Holtville silty clay loam.

Spring Management Of Honeybees Not Governed by Dates

(Continued from page 1)

onies wintered in single stories will generally require the addition of a second set of drawn combs on or before March first.

If the super that is added contains some honey and pollen it will serve as a reserve food chamber and insure the proper development of the colony. This reserve of space and food is usually provided in the second story of a two-story hive by those who prefer to winter their colonies in two stories.

Each Colony Checked

As soon as the bees begin active flight in the spring, each colony should be carefully checked to determine whether it has adequate stores, a normal queen and the brood should be inspected for disease.

The cause of any abnormal condition of the brood should be determined and remedial measures applied at the time of the examination.

If the colony is normal in every way and has sufficient stores—from 30 to 60 pounds of honey and pollen—there is little to be done to the colony after the first inspection until it needs additional room for brood rearing or storage of honey.

A reserve supply of five or more frames of honey, either left on the hive in the fall of the year or given to the colony in the spring, is generally considered as good insurance for the general welfare of the colony.

Queenless colonies should be united with normal colonies and any with poor queens should be requeened as soon as possible.

Desirable Spring Conditions

Colonies are usually at their lowest numerical strength during the month of January in most parts of California, and especially in the valley locations.

The most desirable conditions for the rapid development of colony strength in the spring will be found in a location in which the bees have access to an early supply of pollen and nectar from the willows, mustards, filaree, eucalyptus, fruit bloom or other early blooming plants.

Pollination Service

Since bees perform essential pollination services for at least 50 of our major fruit, seed, nut, vegetable and pasture crops, one very important function of spring management is to locate the hives where the colonies can perform these services.

This work of properly locating colonies can be done in the fall.

J. E. Eckert is Professor of Entomology and Apiculturist in the Experiment Station, Davis.

* * *

If the beekeeper, at the time of the spring colony check, cannot diagnose the cause of any abnormal brood in his hives, he should get in touch with his county apiary inspector or send a description of the symptoms to Professor J. E. Eckert, Division of Entomology, College of Agriculture, University of California, Davis, California.

If dead brood is present, a smear of a dead larvae placed on a piece of parafined paper, folded to protect the smear, should be included in the letter for microscopic examination. Do not include any bees or whole larvae.

Further Improvements Needed Before Mechanization of Cotton Growing Reaches Full Efficiency

(Continued from page 1)

erage rate to a conservative figure of one-half acre an hour, with good chances of somewhat better performance. The machines can be run in second gear in light yields or second picking.

One thousand pounds of seed cotton per hour in a field running one and a half bales to the acre can be expected.

The going rate for hand picking in 1946 was $3.00 per hundred pounds. Figuring the total machine cost to be $5.00 per hour, leaves $25.00 per hour, or $50.00 per acre, advantage in favor of the machine. This isn't a true picture of course, because the machine leaves some cotton in the field and the grade of lint is usually less than that of cotton picked by hand on the same date. These losses are chargeable to machine methods.

The field loss is the sum of the mature lint left on the plants and dropped on the ground by the machines. Some entire bolls are left untouched, usually near the ground.

Tags are numerous and discredit the performance of the machine in the eyes of the casual observer. A tag may be only one-fifth of a boll, but five of them appear to be several bolls.

Grade Reduction

Reduction in grade is due mainly to foreign matter. Trash, such as small pieces of leaves, may have become so entangled with the lint that the particles can not be removed by the cleaners at the gin or the mill.

There may be stain from the green leaves or weeds, and some twisting because of the picking spindle action. This twisting tends to be worse in wet cotton which is hard to prepare at the gins.

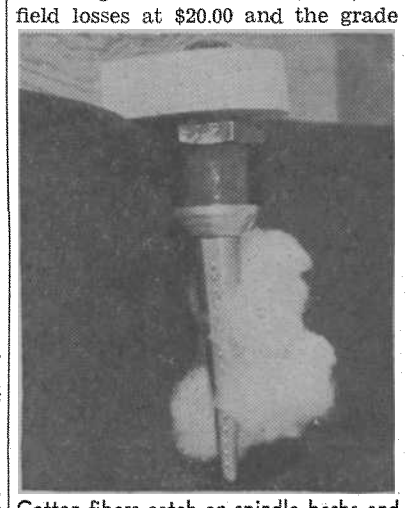
Items of Cost

The relative importance of the three major items of cost—the machine charges, field loss and grade reduction—varies.

When seedcotton is worth ten cents a pound field losses are very important; a ten per cent field loss can mean $20.00 an acre. A reduction of one grade might be only $2.00 per bale or it could be $10.00 per bale, depending upon the market.

Supposing the machine-picked cotton is reduced two grades, and the field yields one and one half bales per acre, the loss from grade reduction might be $6.00 or $30.00 per acre.

Taking machine costs at $10.00, the field losses at $20.00 and the grade reduction at $30.00, the total amounts to $60.00 per acre, just equal to the hand picking charge at $3.00 per hundredweight, assuming a yield of 2,000 pounds of seedcotton per acre.



Cotton fibers catch on spindle barbs and wrap around the whirling spindle traveling at 2,000 rpm.

A profit would be shown by reducing any of the three cost items. At the present time the grade loss would be under $10.00, instead of the $30.00 assumed, hence the machine shows a substantial saving.

The price of cotton pickers has increased 50 per cent since this material was prepared. This increase reduces the economic advantage of the machine to some extent if the other factors remain the same.—J. P. F.

The Job Ahead

The development of commercially successful cotton pickers is an accomplishment. The task now is to reduce losses and improve quality.

The breeder must produce strains of cotton plants well adapted to machine harvesting, yet give good yields of high quality lint.

The growers and agronomists must learn how to plant, cultivate and defoliate cotton to gain the full advantages of the machines.

The ginners and the gin manufacturers must develop equipment and methods best to dry, clean, and prepare machine-picked cotton.

The picker manufacturers must further improve their machines to pick cleaner with less repair and maintenance cost.

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