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CITRUS FRUIT LAW RULES, REGULATIONS AND INSTRUCTIONS RELATIVE TO ITS ENFORCEMENT

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GEORGE B. TERRELL
Commissioner of Agriculture

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TEXAS DEPARTMENT OF AGRICULTURE
BULLETIN

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CITRUS BUILT LAW
RULES, REGULATIONS AND PENALTIES
FOR LIVE AND DEAD FRUIT

A. M. DEY, CHIEF
Chief of Bureau of Inspection
J. C. BOYER
April, 1929



GEORGE B. FERRILL
Commissioner of Agriculture

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CITRUS FRUIT LAW

PROHIBITING SALE OF UNRIPE OR UNWHOLESOME CITRUS FRUIT

CHAPTER 88

General and Special Laws
Passed by the
First Called Session of
The Fortieth Legislature

H. B. No. 63)

"An act declaring unlawful the sale or offer for sale, transportation, preparation, receiving or delivery for transportation or marketing of citrus fruit that is immature, unripe, overripe, frost damaged or otherwise unfit for consumption and the sale thereof declared to be a fraud upon the public; defining terms; providing for the inspection of citrus fruits and issuance of certificates of inspection thereof; providing for the purchase and affixing of stamps in connection with the marketing or transportation of such citrus fruits; providing for the appointment of persons to inspect the same and fixing their compensation; defining certain offenses; prescribing the power and duties of the Commissioner of Agriculture with regard to the provisions of this Act, providing for the enforcement thereof, and prescribing penalties for violation of any of the provisions of this Act, and declaring an emergency".

Be It Enacted by the Legislature of the State of Texas:

Section 1. That as used in this act the word "person" shall extend to and include persons, partnerships, associations and corporations; and the word "box" refers to the standard size containers now in common use in this State in the packing and shipping of citrus fruit, and the words "citrus fruit" shall extend to and include only the fruits of citrus grandis, osbeck, commonly and hereafter called grapefruit or Pomelo, and citrus sinensis, osbeck, commonly called sweet or round oranges and hereafter called oranges, and the words "packing house" shall extend to and include any structure or place prepared for and used for packing or otherwise preparing citrus fruit for market or transportation.

Section. 2. It shall be unlawful for any person to sell or offer for sale any citrus fruit that is immature, unripe, overripe, frozen, or frost damaged, or otherwise unfit for consumption, or to transport, prepare, receive, or deliver for transportation, or market, any citrus fruit between the 1st day of September and the next succeeding December 15th, both dates inclusive, in any year, unless such fruit is accompanied by a stamp or stamps as provided herein to evidence the certificate of inspection and maturity thereof as defined by this Act, issued by a duly authorized Citrus Fruit Inspector, or special Citrus Fruit Inspector, or State Chemist, or an assistant State Chemist, or an Inspector of the Chemical Division of the Department of Agriculture of this State, or a duly authorized Inspector of the United States Bureau of Agricultural Economics.

The certificates of inspection and maturity mentioned in this Act, shall be of such number, form, size, and character, as the Commissioner of Agriculture of this State may by rule or regulation prescribe, and shall be used in such manner as to identify the fruit to which they relate. All inspections shall be made at a regularly registered packing house as prescribed herein. Provided, that it shall be unlawful during the remaining period of from December 16th to August 31st following both dates inclusive, when inspection is not required by this Act, for any person to sell, offer for sale, transport, deliver, or prepare for sale or transportation, any citrus fruit which is immature or otherwise unfit for consumption, or for any

person to receive such fruits under a contract of sale, or for the purpose of sale, offering for sale, transportation or delivery for transportation thereof. Provided further, that the provisions of this Act shall not apply to sales of citrus fruit "on the trees," nor to common carriers or their agents when the fruit accepted for transportation or transported by such common carrier is accompanied by a proper certificate of maturity and inspection of such fruits, as hereinafter provided, or when accepted by them for transportation between the 16th day of December in any year and the 31st day of August, next thereafter, both dates inclusive, or transportation of the fruit from the grove to the packing house located within this State.

Section 3(a) That within the purpose and meaning of this Act, Pomeelos (grapefruit) shall be deemed to be mature only when the total soluble solids of the juice are not less than ten (10) per cent and when the minimum ratio of total soluble solids to anhydrous citric acid shall be seven to one (7 to 1).

(b) That within the meaning and purpose of this Act, oranges shall be deemed to be mature when the juice thereof contains not less than eight (8) per centum of total soluble solids to each part of anhydrous citric acid.

(c) In determining the total soluble solids the Brix Hydrometer shall be used, and the reading of the Hydrometer corrected for temperature shall be considered as the per centum of total soluble solids. Anhydrous citric acid to be determined by titration of the juice, using standard alkali and phenolphthalein as the indicator, the total acidity being calculated as anhydrous citric.

(d) Any citrus fruit not conforming to the above standards shall be deemed and held to be immature within the meaning of this Act.

Section 4. The owner, manager, or operator of each packing House at which it is intended to pack or prepare citrus fruit for market or transportation during the then present or next ensuing citrus fruit shipping season, shall register such packing house and its location, shipping points, and Postoffice address with the Commissioner of Agriculture of this State, not less than ten (10) days before packing or otherwise preparing any citrus fruit for sale or transportation in or at such packing house; and he shall in addition to such registration give the said Commissioner of Agriculture not less than seven (7) days written notice of the date on which the packing, or other preparation for sale, or transportation between September 1st and December 16th both dates inclusive, of the citrus fruit of the then current or then next ensuing season's crop would be begun. And it shall be unlawful for any person to operate a citrus fruit packing house or to pack, or otherwise prepare for sale or transportation, any citrus fruit at such packing house without having previously registered said packing house and given notice herein required; provided, that no certificate of inspection and maturity of any fruit shall be issued by any authorized Inspector to any person who has not registered with the Commissioner of Agriculture of this State during the then current year or has not given to said Commissioner the notice as required by this Act, nor until after the payment of the inspection fee imposed by or under the provisions of this act such payment evidenced as herein required or authorized.

Section 5. Every vendor or shipper of citrus fruit between the dates of September 1st and December 15th, both inclusive, of each year shall pay to the Commissioner of Agriculture of this State a fee of one and one-half (1½) cents for every box of citrus fruit by him, it or them sold, transported, or delivered for transportation; or when such fruit is sold or transported

in bulk, or in containers other than standard size boxes shall pay one end and one-half (1½) cents for each two (2) cubic feet or fraction thereof, or each eighty (80) pounds or fraction thereof, of such fruit.

Such fee shall be due and payable when the fruit is prepared for market or transportation, and payment thereof shall be evidenced by stamps, as hereinafter provided. And it shall be unlawful to sell, deliver, transport, or deliver for transportation, or receive for transportation, any citrus fruit, payment of the fee for which is not evidenced by proper stamps to be provided by the Commissioner of Agriculture. Provided, however, that the provisions of this section shall not apply to the transportation or carriage of fruit from groves to packing houses within this State.

Section 6. It shall be the duty of the Commissioner of Agriculture to furnish vendors and shippers of citrus fruits with such stamps to be attached to the packages of fruit prepared for sale or delivery for transportation, or to be affixed to the bill of lading where shipment is in bulk.

Section 7. It shall be the duty of any vendor or shipper of citrus fruit to properly and securely affix and attach to each package of citrus fruit prepared for sale or delivery for transportation, or to the bill-of-lading or other shipping receipt therefor when shipment is in bulk, the necessary stamp or stamps to evidence payment of the inspection fee herein provided.

Section 8. It shall be unlawful for any authorized Inspector to make or issue any false certificate as to inspection, maturity, or payment of inspection fee.

Section 9. All citrus fruit prepared for sale or transportation, or which is being prepared for such purposes, or is being delivered for sale or transportation, that may be found to be immature or otherwise unfit for consumption upon inspection and testing, is hereby declared to be a public nuisance, detrimental to the public health, and the sale thereof declared to be a fraud upon the public, and shall be seized and destroyed by Citrus Fruit Inspectors, or by the Sheriff of the County where found; provided that the owner of such citrus fruit that is immature or otherwise unfit for consumption may be allowed to retain possession of the same, subject to such regulations as the Commissioner of Agriculture shall prescribe for the disposition thereof.

Section. 10. Upon recommendation of the Commissioner of Agriculture, the Governor may in each year appoint and commission as many Citrus Fruit Inspectors for such period or periods, not exceeding one year, as said Commissioner shall deem to be necessary for the effective enforcement of this Act. Such Inspectors shall make and file in the office of the Secretary of State, the oath required by the Constitution of this State, and shall give a good and sufficient bond in the sum of One Thousand (\$1,000) Dollars, payable to the Governor of the State of Texas, and conditioned for the faithful performance of the duties of such office. All persons authorized under the provisions of this Act to inspect and certify to the maturity of citrus fruit shall be governed in the discharge of their duties as such Inspectors by the provisions of this Act, and by the rules and regulations pursuant thereto prescribed by the Commissioner of Agriculture as herein authorized, and shall perform their duties under his direction and supervision.

Section 11. The salary of each Citrus Fruit Inspector or "Special Citrus Fruit Inspector" shall be at the rate of One Hundred and Fifty (\$150.00) Dollars per month and in addition thereto shall receive his or her necessary traveling and other expenses incurred by him or her in the discharge of his

or her duties as such Inspector, which shall be paid upon approval of accounts therefor by the Commissioner of Agriculture. The Commissioner is hereby authorized to employ such additional field and other agents and clerical assistance, at such times and for such periods, and to incur and pay any other expenses including the traveling expenses of the Commissioner of Agriculture during the citrus fruit season, as may be necessary for the effective enforcement of this Act, and to secure the payment of the inspection fees hereby imposed or that may be imposed under the authority of this Act.

In cases of emergency or necessity when no Citrus Fruit Inspector is available for the inspection of citrus fruit in any particular locality in this State, the Commissioner of Agriculture may designate some fit and competent individual to inspect, test, and certify as to such fruit offered for sale or transportation in such locality. Certificate made or issued by such designated individual shall be signed by him or her as "Special Citrus Fruit Inspector;" he or she shall not be required to give bond, but shall be subject to the penalties imposed by this Act for violation of any of the provisions thereof.

Section 12. Inspectors shall draw samples for analysis in the presence of the owner, manager, agent, or custodian of any packing house where grape fruit or oranges are packed for shipment or sale. Three samples of fifteen average grape fruit or oranges each, fairly representative of all the fruit at the time of being inspected, may be drawn by the inspector, witnessed by either the owner, manager, agent, or custodian of the fruit. The mixing of Royal or other low acid grape fruit-orange hybrids with the ordinary varieties of grape fruit in order to secure the passing of a lot of fruit as mature of which a large part is immature and readily distinguishable from the maturer fruit is unlawful. Likewise the mixing of mature fruit from one grove with immature fruit from another grove for the purpose of securing a lot of fruit that will pass the test as mature fruit is unlawful.

Section 13. No Inspector, State Chemist, Assistant State Chemist, duly authorized Inspector of the United States Bureau of Economics, or individual designated by the Commissioner of Agriculture as "Special Citrus Fruit Inspector," shall be authorized to inspect, test, or issue a certificate of inspection and maturity, or give any expression of opinion relating to the maturity or quality of any fruit, either express or implied, except at a regularly registered packing house as herein defined and provided.

Section 14. It shall be unlawful for any person to obstruct or resist any authorized Inspector in the performance or discharge of any duty imposed or required by him or her by the provisions of this Act.

Section 15. Any person who shall violate any of the provisions of this Act, or do, or commit any act herein declared to be unlawful, shall be guilty of a misdemeanor and upon conviction shall be fined in any sum not less than Twenty-five (\$25.00) Dollars nor more than Five Hundred (\$500.00) Dollars or by imprisonment for not to exceed six months, or both such fine and imprisonment, in the discretion of the court.

Section 16. All money received by the Commissioner of Agriculture for inspection fees and certificates of inspection and maturity shall be paid by him to the State Treasurer who shall deposit said money to the account of "Citrus Fruit Inspection Fund." All salaries and other expenses incurred in the execution and enforcement of the provisions of this Act shall

be paid out of such "Citrus Fruit Inspection Fund" (except as provided in the next succeeding section) by vouchers approved by the Commissioner of Agriculture and warrant issued thereon by the Comptroller.

Section 17. Vetoed.

Section 18. That all laws and parts of laws in conflict with the provisions of this Act are hereby repealed.

Section 19. The fact that there is no law at present in this State to make unlawful the sale or marketing of immature, unripe, overripe, or frost damaged citrus fruit, creates an emergency and an imperative public necessity that the Constitutional Rule requiring bills to be read on three several days in each House be suspended, and said Rule is hereby suspended, and this Act shall take effect and be in force from and after its passage, and it is so enacted.

**RULES AND REGULATIONS FOR THE ENFORCEMENT
OF THE CITRUS FRUIT LAW—CHAPTER 88, LAWS
OF TEXAS. ACTS OF 1927**

Regulation No. 1—Definition of Citrus Fruit

The words "Citrus Fruit" shall extend to and include only the fruits of Citrus Grandis Osbeck, commonly called grapefruit or pomelo, and Citrus Seninses Osbeck, commonly called sweet or round oranges.

Regulation No. 2—Packing House Defined

A packing house shall be construed to be any structure or shelter prepared for and used for packing or otherwise preparing citrus fruit for market or transportation.

Regulation No. 3—Inspection Certificate Authority

Certificates of Inspection shall be issued only by duly authorized inspectors of the State Department of Agriculture. Chemist of the State Board of Health, State Chemist, or a duly authorized inspector of the U. S. Department of Agriculture economics.

Regulation No. 4—Authorization for Official Test and Certificate

The certificates of inspection and maturity mentioned in the act shall be of such form, size and character as herein illustrated.

STATE OF TEXAS

DEPARTMENT OF AGRICULTURE
CITRUS FRUIT INSPECTION DIVISION

GEO. B. TERRELL, Commissioner
J. M. DEL CURTO, Plant Pathologist

Certificate of Maturity of Citrus Fruit No. _____
(Void if not signed by the Inspector)

To Whom it May Concern:

THIS IS TO CERTIFY THAT:—

Official Analysis No. _____ was made on _____, 19____,
at the packing house of _____, at
(Name of person or firm)
_____, Texas, representing _____
(Address)

boxes of _____
(Oranges or grapefruit)

Brix Reading _____

Temperature _____ + or - _____

Total Soluble Solids _____ %

Burette Reading _____

| ACID % | Total Solids | Ratio |
|--------|--------------|-------|
| | | |
| | | |

Inspector.

Witnesses to tests and other facts recited:

_____, of _____, Texas
_____, of _____, Texas

Regulation No. 4—Where Inspections May Be Made

No Inspector, Chemist or Assistant State Chemist shall be authorized to inspect, test or issue a certificate of maturity or give any expression of opinion relating to the maturity or quality of any fruit, either expressed or implied, except at a regularly licensed packing house as defined.

Regulation No. 5—Apparatus to Be Used

In determining the total soluble solids the Brix Hydrometer shall be used, and the reading of the Hydrometer corrected for temperature shall be considered as the percentum of total soluble solids. Anhydrous citric acid shall be determined by titration of the juice, using standard alkali and Phenolphthalein as the indicator, the total acidity being calculated as anhydrous citric acid. All alkali used in official test shall be approved by the Commissioner of Agriculture.

Regulation No. 6—Standards of Maturity

(a) That within the purpose and meaning of this act, pomelos (grape fruit) shall be deemed to be mature only when the total soluble solids of the juice are not less than ten (10) per cent and when the minimum ratio of total soluble solids to anhydrous citric acid shall be seven to one (7 to 1).

(b). That within the meaning and purpose of this act, oranges shall be deemed to be mature when the juice thereof contains not less than eight (8) per centum of total soluble solids to each part of anhydrous citric acid.

Regulation No. 7—Registration and Notice of Operation

The owner, manager, or operator of each packing house at which it is intended to pack or prepare citrus fruit for market or transportation during the then present or next ensuing citrus fruit shipping season, shall register such packing house and its location, shipping points, and postoffice address with the Commissioner of Agriculture of this State, not less than ten (10) days before packing or otherwise preparing any citrus fruit for sale or transportation in or at such packing house; and he shall in addition to such registration give the said Commissioner of Agriculture not less than seven (7) days written notice of the date on which the packing, or other preparation for sale, or transportation between September 1st and December 15th both dates inclusive, of the citrus fruit of the then current or then next ensuing season's crop would be begun.

Form 1

APPLICATION BLANK FOR REGISTRATION AND SHIP-
PER OF CITRUS FRUIT AS PROVIDED FOR BY
CHAPTER 88, GENERAL AND SPECIAL LAWS OF
TEXAS PASSED BY THE FIRST CALLED
SESSION OF THE FORTIETH
LEGISLATURE

1. Name and address of applicant _____

2. Location of packing houses _____

3. State nature of business—whether applicant is an association, indepen-
dent buyer, or individual grower and packer _____
4. State the approximate amount of citrus fruit handled last year _____

5. Approximate amount of fruit expected to be handled during the period
from August 31st, to December 15th of the present year _____

Give information in detail as to nature of handling fruit, and state
whether shipments are made in small amounts or in car lots, and general
method of shipment. (Express, freight, etc.) _____

(Signature) _____

(Office) _____

Note:—Address application to J. C. Powell, Chief Inspector, Citrus Fruit
Inspection Office, Harlingen, Texas.

Official Form for Registration

STATE OF TEXAS

DEPARTMENT OF AGRICULTURE

CERTIFICATE OF REGISTRATION

CITRUS PACKING PLANT

THIS IS TO CERTIFY that the citrus packing plant known

as -----

located at -----

has been duly registered by -----

with the Commissioner of Agriculture, as provided for by Chapter 88, General Laws of the First Called Session of the Fortieth Legislature.

All citrus fruit packed or offered for sale under authority of this Certificate shall be subject to official inspection and the release of such fruit for transportation during the period from September 1st to December 15th, inclusive, shall be evidenced by official stamps as provided for by law.

Certificate void after September 1st, -----.

Signed: Austin, Texas, -----

Commissioner of Agriculture

Plant Pathologist

Regulation No. 8—Payment of Inspection Tax

Every vendor or shipper of citrus fruit between the dates of September 1st and December 15th, both inclusive of each year shall pay to the Commissioner of Agriculture of this State a fee of one and one-half ($1\frac{1}{2}$) cents for every box of citrus fruit by him, or them sold, transported, or delivered for transportation; or when such fruit is sold or transported in bulk, or in containers other than standard size boxes shall pay one and one-half ($1\frac{1}{2}$) cents for each two (2) cubic feet or fraction thereof, or each eighty (80) pounds or fraction thereof, of such fruit.

Such fee shall be due and payable when the fruit is prepared for market or transportation, and payment thereof shall be evidenced by stamps as hereinafter provided. And it shall be unlawful to sell, deliver, transport, or deliver for transportation, or receive for transportation, any citrus fruit, payment of the fee for which is not evidenced by proper stamps to be provided by the Commissioner of Agriculture. Provided however, that the provisions of this section shall not apply to the transportation or carriage of fruit from groves to packing houses within this State.

Regulation No. 9—Affixing Stamps

It shall be the duty of any vendor or shipper of citrus fruit to properly and securely affix and attach to each package of citrus fruit prepared for sale or delivery for transportation, or to the bill of lading or other shipping receipt therefor when shipment is in bulk, the necessary stamp or stamps to evidence payment of the inspection fee herein provided.

Regulation No. 10—Drawing and Preparation of Samples

Inspectors shall draw samples for analysis in the presence of the owner, manager, agent, or custodian of any packing house where grape fruit or oranges are packed for shipment or sale. Three samples of fifteen average grape fruit or oranges fairly representative of all the fruit at the time of being inspected, may be drawn by the inspector, witnessed by either the owner, manager, agent, or custodian of the fruit.

Regulation No. 11—Mixing Fruit for Purposes of Passing Test Prohibited

The mixing of royal or other low acid grapefruit-orange hybrids with the ordinary varieties of grapefruit in order to secure

the passing of a lot of fruit as mature of which a large part is immature and readily distinguishable from the mature fruit is unlawful. Likewise the mixing of mature fruit from one grove with immature fruit from another grove for the purpose of securing a lot of fruit that will pass the test as mature fruit is unlawful.

Regulation No. 12—Final Determination of Immature Fruit

No lot of citrus fruit shall be condemned on the first test. If the first and second tests fail to show maturity, a third test shall be made, and in case either of the three tests shows the lot of fruit represented by such tests to be mature, a certificate of maturity shall, in such cases, be issued only on the result of the average of the three tests, which must indicate maturity as fixed by law.

Regulation No. 13—Disposition of Immature Fruit

All citrus fruit prepared for sale or transportation, or which is being prepared for such purposes, or is being delivered for sale or transportation, that may be found to be immature or otherwise unfit for consumption upon inspection and testing, is hereby declared to be a public nuisance, detrimental to the public health, and the sale thereof declared to be a fraud upon the public and shall be seized and destroyed by citrus fruit inspectors, or by the sheriff of the county where found; provided, that the owner of such citrus fruit that is immature or otherwise unfit for consumption may be allowed to retain possession of the same, subject to such regulations as the Commissioner of Agriculture shall prescribe for the disposition thereof.

Regulation No. 14—Governing Repacking of Texas-Grown Oranges and Grapefruit for Transportation

The owner, manager, or operator of each packing house at which it is intended to repack or prepare Texas-grown Citrus fruit for market or transportation during the then present or next ensuing citrus fruit shipping season, shall register such packing house and its location, shipping points, and postoffice address with the Commissioner of Agriculture of this State, not less than ten (10) days before repacking or otherwise preparing any citrus fruit for sale or transportation in or at such packing house; and he shall in addition to such registration present the Commissioner with a signed and properly executed affidavit to the effect that the authority to repack and ship Texas citrus

fruit during the above prescribed period will only be used on such citrus fruit as has previously been officially stamped with state maturity stamps.

Each package of Texas-grown grapefruit or oranges repacked for shipment shall be marked with an impression from a rubber stamp bearing the registration number of the repacker's certificate with the following wording, provided, however that this regulation does not apply to repacked shipments of less than (3) boxes made from counties other than Cameron, Hidalgo, Willacy, Star, Webb, Zapata, Jim Wells and Kenedy:

“Texas Repeater’s Registration Certificate No.-----.
Repacked From Inspected and Approved Texas-grown
Oranges and Grapefruit.”

Reg. Citrus Fruit Repeater.

Given under my hand and seal of office this the 22nd day of October, A. D. 1927.

GEO. B. TERRELL.

NECESSARY EQUIPMENT AND DIRECTIONS FOR MAKING TESTS FOR MATURITY OF ORANGES AND GRAPEFRUIT

Apparatus Required

1. A Brix hydrometer with a scale of from 0° to 15° graduated in 0.1 degrees.
2. A Centigrade thermometer with a scale of from 0° to 110° graduated in degrees.
3. A 25 cubic centimeter pipette.
4. A 50 cubic centimeter burette, graduated in 0.1 cubic centimeters, or 25 cubic centimeters when double strength solution is used.
5. A burette support.
6. A glass cylinder, approximately 1.5 inches in diameter by 12 inches in height.
7. A small funnel, approximately 2 inches in diameter.
8. Two 250 cubic centimeter Erlenmeyer flasks for titrations.
9. A squeezer, preferably of glass.
10. A beaker or graniteware cup or pan of 1 gallon capacity.
11. Pieces of cheese cloth for straining the juice.
12. Directions.

Chemicals Required

1. A standard solution of sodium hydroxide or potassium hydroxide.
2. A solution of phenolphthalein (fe-nol-thal-in) for use as an indicator, best contained in a two-ounce dropping bottle.

Preparation of Samples

In order to make the samples as representative as possible, not less than 15 oranges or grapefruit are used, taken in the manner prescribed in Section 12. In the case of oranges the juice is extracted as thoroughly as possible from all portions of the fruit. In the case of grapefruit, the fruit shall first be halved by cutting from stem to blossom end, after which the juice from one-half of each fruit shall be extracted as thoroughly as possible. The juice shall then be strained through the cheese cloth.

Determination of the Total Solids

1. The glass cylinder is filled three-quarters full of the strained and mixed juice and the Brix hydrometer placed in it. A sufficient amount is then added to overflow the cylinder. The hydrometer is allowed to remain for a few minutes, in order to allow the air in the juice to escape, care being taken to see that the hydrometer reading does not touch the sides of the cylinder. The reading is then taken with the eye on the level with the top of the liquid and the line at the top of the liquid is read.

2. The temperature of the solution is now noted, the bulb of the thermometer being placed in the juice and gently tapped against the sides of the container until the mercury column becomes stationary.

3. The total solids is now found by looking up the corrected reading for the Brix hydrometer under the temperature column of the juice in the following Table No. 1:

Correction for Total Solids by Brix Hydrometer from C° to 40°C.

| <i>Temperature</i> | <i>Subtract from Brix Reading</i> |
|--------------------|-----------------------------------|
| 0 Freezing | 0.72 |
| 1 | 0.70 |
| 2 | 0.68 |
| 3 | 0.65 |
| 4 | 0.62 |
| 5 | 0.59 |
| 6 | 0.55 |
| 7 | 0.51 |
| 8 | 0.47 |
| 9 | 0.43 |
| 10 | 0.39 |
| 11 | 0.34 |
| 12 | 0.29 |
| 13 | 0.24 |
| 14 | 0.19 |
| 15 | 0.15 |
| 16 | 0.10 |
| 17 | 0.05 |
| | <i>Add to Brix Reading</i> |
| 18 | 0.05 |
| 19 | 0.10 |
| 20 | 0.15 |
| 21 | 0.20 |
| 22 | 0.30 |
| 23 | 0.35 |
| 24 | 0.40 |
| 25 | 0.50 |
| 26 | 0.55 |
| 27 | 0.60 |
| 28 | 0.70 |
| 29 | 0.75 |
| 30 | 0.80 |
| 31 | 0.90 |
| 32 | 0.98 |
| 33 | 1.06 |
| 34 | 1.12 |
| 35 | 1.20 |
| 36 | 1.29 |
| 37 | 1.38 |
| 38 | 1.47 |
| 39 | 1.56 |
| 40 | 1.65 |

Determination of Acid

1. To obtain the percentage of acid in the juice, fill the 25 cubic centimeter pipette by drawing it full of juice, and allow the excess to flow back into the container until the top of the juice is opposite graduation mark held on a level with the eye. Now permit the contents of the pipette to flow into one Erlenmeyer flask. Do not hurry by blowing into the pipette.

2. Add 3 to 5 drops of the phenolphthalein indicator solution

from the dropping bottle or with a medicine dropper to the juice.

3. Fill the burette with the standard alkaline solution until the top of the liquid is level with the zero mark.

4. Add the solution from the burette, small quantity at a time, to the juice in the Erlenmeyer flask, placed on a sheet of white paper, shaking the flask constantly.

5. The juice will gradually assume a yellow color, and finally a pinkish tint.

6. When the latter is observed, stop the flow of the solution from the burette and take the reading, using the figure at the point opposite the solution.

7. The per cent of acid is found by reference to the following Table:

Ratio

To determine the ratio divide the percentage of soluble solids by the percentage of acid.

Example:

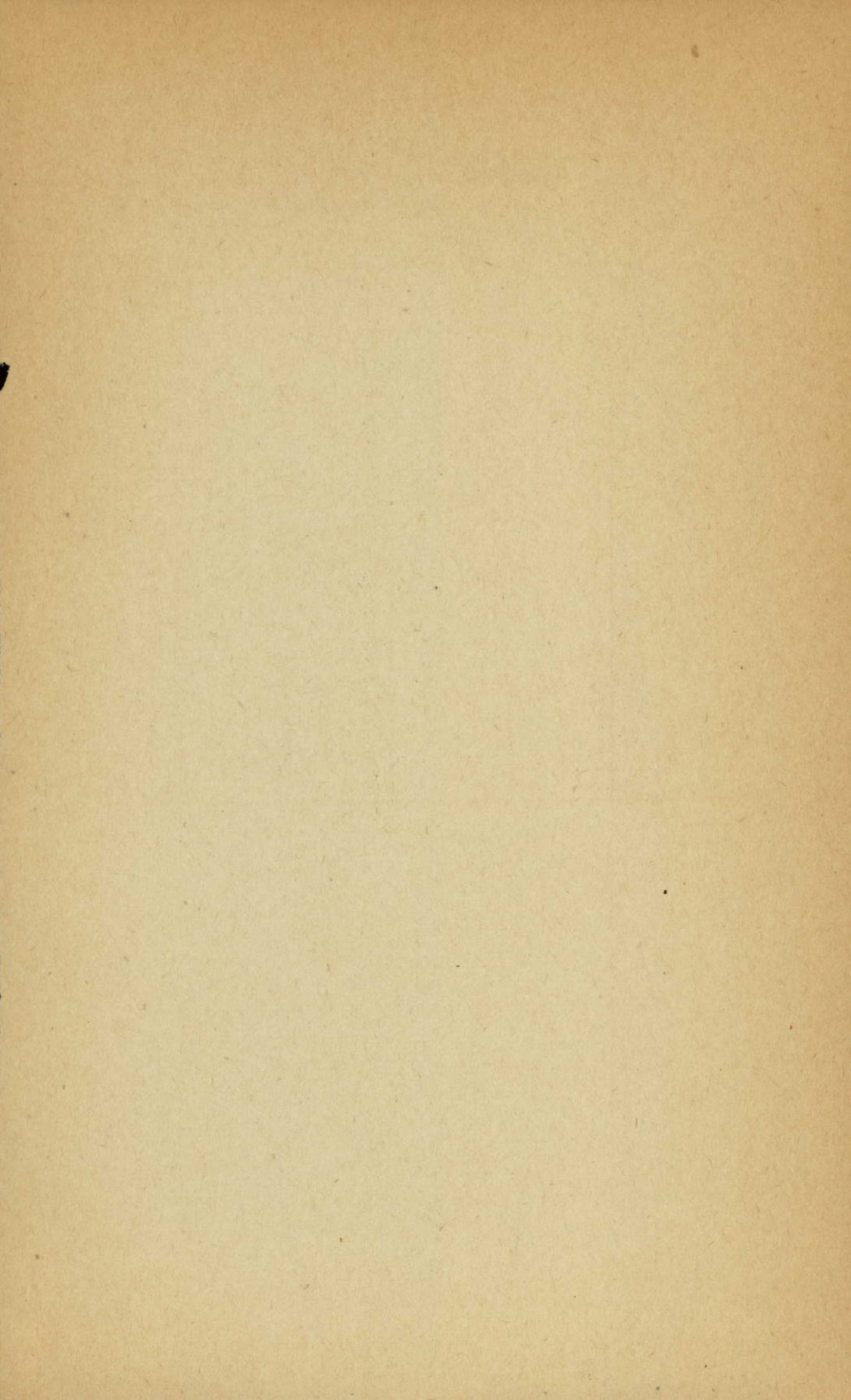
Percentage of soluble solids.....10.15

Percentage of acid.....1.14

10.1500 divided by 1.14 equals 8.9, or 1 to 8.9

Table showing Double Strength Alkaline Solution, with Per Cent of Acid Corresponding to Cubic Centimeters of Alkaline Solution. 1cc. Alkaline Solution = BJ milligrams anhydrous Citric Acid.

| cc. Alkaline Solution | Per cent Acid | cc. Alkaline Solution | Per cent Acid | cc. Alkaline Solution | Per cent Acid |
|-----------------------------|------------------|-----------------------------|------------------|-----------------------------|------------------|
| 1 | .076 | 14 | 1.08 | 27 | 2.06 |
| 1.5 | .114 | 14.5 | 1.11 | 27.5 | 2.10 |
| 2 | .152 | 15 | 1.14 | 28 | 2.14 |
| 2.5 | .192 | 15.5 | 1.18 | 28.5 | 2.18 |
| 3 | .230 | 16 | 1.22 | 29 | 2.22 |
| 3.5 | .268 | 16.5 | 1.26 | 29.5 | 2.26 |
| 4 | .306 | 17 | 1.30 | 30 | 2.30 |
| 4.5 | .344 | 17.5 | 1.34 | 30.5 | 2.34 |
| 5 | .382 | 18 | 1.38 | 31 | 2.38 |
| 5.5 | .420 | 18.5 | 1.42 | 31.5 | 2.41 |
| 6 | .458 | 19 | 1.46 | 32 | 2.44 |
| 6.5 | .498 | 19.5 | 1.49 | 32.5 | 2.48 |
| 7 | .536 | 20 | 1.52 | 33 | 2.52 |
| 7.5 | .574 | 20.5 | 1.56 | 33.5 | 2.56 |
| 8 | .612 | 21 | 1.60 | 34 | 2.60 |
| 8.5 | .650 | 21.5 | 1.64 | 34.5 | 2.64 |
| 9 | .690 | 22 | 1.68 | 35 | 2.68 |
| 9.5 | .728 | 22.5 | 1.72 | 35.5 | 2.72 |
| 10 | .76 | 23 | 1.76 | 36 | 2.76 |
| 10.5 | .80 | 23.5 | 1.80 | 36.5 | 2.79 |
| 11 | .84 | 24 | 1.84 | 37 | 2.82 |
| 11.5 | .88 | 24.5 | 1.88 | 37.5 | 2.86 |
| 12 | .92 | 25 | 1.92 | 38 | 2.90 |
| 12.5 | .96 | 25.5 | 1.95 | 38.5 | 2.94 |
| 13 | 1.00 | 26 | 1.98 | 39 | 2.98 |
| 13.5 | 1.04 | 26.5 | 2.02 | 39.5 | 3.02 |



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