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PEN PICTURES
of
STANDARD COTTON
GRADES

WILLIAMSON

N. J. McARTHUR

PEN PICTURES

—OF—

Standard Cotton Grades

DESIGNED

For Use as a Text Book in the Common
Schools of the

COTTON BELT

Combined with

“THE COTTON GRADER”

By N. J. McARTHUR.

Copyrighted October 1910

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INTRODUCTORY.

In May, 1908, I published the "Cotton Grader," intending it to be a full and complete text on the subject of Cotton Grading. Later I prepared and published the same matter in more elaborate form and detail, and made it supplemental to my first work, under the sub-title of "Grade Notes." My third effort now appears in this series of "Grading Lessons," which I conceive to be the most comprehensive and yet the simplest and clearest presentation of the subject to be offered. Anticipating the progressive idea which will inevitably introduce this topic into the curriculum of our common schools, these lessons have been prepared in the best form for a text work on the subject. A full theoretical knowledge of the question may be gained by a careful study of the **Pen Pictures** portrayed. In this portrayal, imaginary types are so vividly drawn, that the original **Real** may be easily known on sight. But with a set of **Real** samples in hand, the whole subject is placed within easy mental grasp. These samples are of mere nominal cost, and easily obtainable. The veil should be lifted. The manifest truth should be proclaimed that the mysterious intricacies of cotton manipulations by the commercial world have unnecessarily been made to include the simple process of grading or "saying what it is," while it is in the hands of the producer.

With the hope that it will accomplish great good the work is most respectfully submitted by

The Author.

PREFATORY

An Appeal to Southern Patriotism.

A man has been robbed of one hundred dollars. You read of the incident with a sort of indifferent sympathy for the sufferer. The robber and his victim, as you suppose, are both unknown to you. The money was not yours. The poor robber perhaps needed it. Later you learn that the victim was your debtor,—that he was bearing this, his only money, to you to cancel that debt. How changed now the view you take of the matter! Your indifferent sympathy becomes intense interest. The poor robber is now a vile wretch, and the whole circumstance becomes a matter demanding your personal attention.

From the illustrative let us go to the real. Though you may live in a cotton State in which as many as two million bales of cotton are annually produced and marketed, if you are not a farmer, you may argue that it is a matter of no concern to you what money or price this cotton may bring its producer. But let us suppose that these producers by a questionable system of grading have been made to lose at least one cent a pound or five dollars per bale on every bale sold. This means ten millions of dollars entirely removed from the money wealth, or as it is termed, the money circulation of your State. Let the term, circulation, apply in its fullest sense to the returns of your own business or profession, and let the State, which is ever your first debtor, be thus held up and robbed of the one hundred dollars, more or less, she may be bearing to you. What of the incident?

Three-fifths of the entire crop of all the States is sold by "advancing" country merchants, who know nothing of cotton grading, and with an apology to an excepted few, who care less. **Account Closing** is the paramount object attending all sales. A hasty settlement of all accounts must be made. The impatience of the Farmer Landlord, resident on farm or not, is no less than that of the merchant. He stands by to get his

acreage rent. He gets this and all other claims, except such as he kindheartedly "extends" his tenants to maintain "obligatory relations." He is perfectly satisfied though thousands of home-belonging dollars may have been taken away in this closing of accounts. The independent small farmer is no wiser. He is told by the resident or visiting expert that his cotton is of this or that grade, and worth so much. His decision is accepted unquestioned. He is told that "Colonel Landlord has sold to-day the same cotton at that figure." He lets his go, and perhaps, with each sale, he has let go from three to ten dollars that he might have retained in his own possession for his good, for the good of "Becky and the children," and for the higher building of the circulating wealth of his community. He does not know. He has been taught that he cannot mentally penetrate the unsolvable mysteries of cotton grading. Is it not written that to him it must be like an unknown tongue?

I say these things more to cite the fact that the condition is an abomination than to bring a charge against cotton classers. I do not declare that they take a "rake off" of several dollars; by undergrading each bale they may purchase, but I do say "The gap is down." **They can do it.** As business men they are in their line for business, and as a class, they may be rated **amazingly human.**

In formulating the predicate of this appeal it was not my intention to allude to the loss of any especial individual or class, but I will refer again to the several parties named as participants in account closing and selling day transactions, and leave deductions to the public that ought to be vitally interested. The advancing merchant closes his accounts. He is ready to pick up a few crippled cash dollars that may stagger his way, but as our colored linguists would say, "Most-ingly," he is ready for farming again—for "advancing" on the next crop. He is **satisfied.** The Landlord Farmer has had his legal enough—his acreage rent and other claims and he is

satisfied. The tenant farmer, the plow pusher, expected nothing and has received it. He accepts his few dollars, "obligatory" money, and the clean cleared annual family acquisition of a new baby as all sufficient grounds for mortal contentment. He returns to his home—that typical hotbed of a debased and degenerate Southern citizenship, **gloriously satisfied.** All resident ministers, lawyers, doctors, school teachers and other business men—including the bankers—who speak proudly of having "moved the crop,"—have been blind to the occurrence. They have seen no money go that should have remained at home. The one hundred dollars each, more or less, that would have been due them by the State, and promptly paid, has been canceled by a counter entry of "Public ignorance."

Is there a question as to where this money goes? I will answer that not one dollar in ten thousand of "cotton profit money" is circulated by direct regular depositing or reinvesting in any section of the cotton territory, unless perhaps it is the tip of reward given to the Expert Field Grader, for combining with that qualification the character of faithful and obedient servant. Resident holders of cotton mill stock also may be excepted, but it will be found that the greater number of our boasted home owned cotton mills are operated by the capital of non-residents. Apply this system to the whole cotton section, let it extend back over a period of ten years, and reduce the percentage of loss to a minimum figure, it would still reach the enormous sum of Two Hundred and Fifty Millions of dollars. This loss is sustained by all the people of the cotton States, as primary and secondary sufferers, in the order I have set forth. Yet we, all of us, like the hilarious, ignorant tenant farmer, are **satisfied.** I was born and reared in the South in the land of cotton. I am proud of it, but I do not know why, saving the fact that it makes me a **democrat**—whatever that may be. No, I am proud of my people—of our olden customs, and of all which

it has been our pride to boast. I know we are not slow-minded; that from our cross roads horse swappers to our largest bankers, merchants, and manufacturers we have money chasers and money getters of the shrewdest "dollar per cent." type. But cotton, what of cotton? Though it is the biggest known commercial proposition—the greatest single money bearing product in the whole world, and though we of the South have a monopoly of ownership, we have hitherto ignored all sources of loss, only looking with trembling anxiety to the settling of our domestic accounts and making an annual balance of our books. Our able financiers have not taken cognizance of the loss that **may** and therefore **does** exist as a result of undergrading, and strange to say, they have never manifested interest enough in the matter to look for that or any other money leak from our country, pertaining to the marketing of cotton. Consideration of this question has been left to the producer. Who is the producer? Let us look for him. It is not the landowner, who is **satisfied** with preserved lands and collected rents, though from his broad acered domain hundreds of bales may go to market. It is not the small independent grower. For though he sits in council with his fellows and adopts high-sounding resolutions, he feels "minority sensations." He knows that a majority of his fellows are like the tenant, bound to the advancing merchant. He feels helpless—he is helpless, and he knows that his high sounding resolutions are absolutely worthless except for the poetic beauty of their composition. The tenant farmer is not the producer, for he is but a cog in the general mechanism. Neither is the advancing merchant. True the landlord has **waived** his right **to do something directly** to this band of tenant plow pushers. He steps aside and yields this right to the advancing merchant, but the advancing merchant declines to become a producer beyond the point of ordering sales and closing accounts. If these the actors most nearly connected with this greatest field product of the world, lose each that proprietary interest which

would make him more than a mere factor or agent, then the **State, the Public, We, the People**, become the real producers. Have not we, the people, an interest in the market price of a Six Hundred Million Dollar yearly crop output grown upon **our soil**, that demands public attention, public promoting and public guarding? Is it not patent that the sale of this product calls for a little **Harmless State Regulating?** Harmless in that it means regulating through educational work. Should not we, the people, as a State, save this money waste by giving to the selling farmer that education which would enable him to know the grade of cotton he sells? It is this point of his **inexcusable lack of knowledge** which has made the Two Hundred and Fifty Million dollar loss possible within the last ten years to the whole people of the cotton section. It is a shame that they remain ignorant of that which may be so easily learned and that they continue to permit themselves to be hoodwinked with the story that a knowledge of cotton grading is an occult science—a compound enigmatical problem—that it can be possessed only by an elect few who gain acquaintance with this **special light** through a mysterious connection with the gift-source of superior endowments.

Why have our cotton producers believed this unreasonable statement? My people do not consider. Brother of the South, do not be offended when I tell you that if Connecticut, or any other of our so-called Yankee States were a cotton growing State, within its borders could not be found a farmer boy fourteen years of age who would not know well the grades of the cotton marketed from his father's farm. But how is it with us? We trust, we believe, we are deceived. We are mystified, we are inoculated, we are saturated, yes, we are literally "soaked," with the false teaching that **Cotton Grading** is a double-action, reverse-revolving, here it is, there it is, now you see it and now you don't see it, delusive science immeasurably beyond the scope of a farmer's comprehension. This is not so. Let my denial be emphasized.

I will place one thousand dollars as a forfeit—a like amount being placed for the same purpose by any taker of the opposite faith—that I can instruct a selected boy above fourteen years of age, resident of the cotton States, within a course of thirty days, so that he will be able to class one hundred bales of cotton by the side of any expert cotton classer, to be known as Classer No. 1, and not vary from his classing more than another expert classer to be known as Classer No. 2, would vary on the same grading. Acceptors to name a county in any one of the cotton States from which I am to select a youth—forfeit to be given by rightful custodian to the charity of his choosing. The sincerity of this proposition may be best determined by applying the test.

It is this character of common school country education that forms the basis of this appeal. We have our State commissioners of Agriculture, our Agricultural colleges and our Farm Journals. It is to be assumed that officials, faculties and editors are acceptably qualified for their respective lines of work, but it may be almost as safely assumed that not one of them, "from Cousin Pete to Uncle Plez," has any more knowledge of cotton grading than if he had been reared in the regions of Alaska and had never seen a bale of cotton. From these sources we are to expect but little, if any instruction of this character. At Clemson, S. C., at Athens, Ga., and at Auburn, Ala., small movements have been made to instruct as State Cotton Schools. This system is helpful, but it does not meet requirements. **We the People** need that form of **Protection** which would be afforded by making **Cotton Classing** one of the studies to be included in the Curriculum of our **Common Schools**.

Laws should be enacted in each State requiring Superintendents and Teachers of our common schools to understand this subject. It should be taught in every school. It would cost but little to put into operation this system of instruction. Teachers could easily qualify and both they and the pupils

instructed would find the work pleasingly interesting. And here let it be said that the acquiring and the imparting of this knowledge is an adaptability fitly belonging to our Lady Teachers. Innovation as it may be, only give them the opportunity, which is easy to do, and good will follow. She whose eye and touch readily finds the quality of a fabric would not be slow in giving the correct grading of any sample of cotton. A set of samples could be easily obtained for every school at a cost too small to be considered, and the accompanying Course of Instruction is a pen picture and explanatory discussion of every grade to be obtained. With such equipment results would attend bearing the fruit of remuneration—yea, return a hundred fold.

It is not claimed that in a short course of **sample study** anyone may learn all that pertains to cotton and its commercial travel from the field to the finished product. But it is reasonably claimed that the producer may easily learn to grade his own cotton and know its market value. This **Protects** him and it is enough for him to know. This he should know as easily and as well as he knows the grades of his pumpkins, peas, corn and other farm produce, or as he knows the relative value of any two specimens of live stock on his farm. Let him acquire the simple protective knowledge of Grading and leave all else to the Expert who comes out of the supposed dizzy labyrinths of mysteryland.

Bug Under the Chip.

If it is suspected that other than patriotic motives have inspired the writing of this appeal, in other words if it is thought there is a bug under the Chip, in respect to the economies do not waste any valuable time looking for him. Though the question "For Whose Good," should be answered a thousand times, "For the Good of All, for the Public Good," yet it is to be understood, if you so please, that the sale of

my Cotton Grading Lessons prompted the framing of this appeal. A better view for you to take of the matter, however, is to concede that the origin of Cotton Grading Lessons may be traced to a Public Need, and that they could have been prepared without a thought of personal gain. Cotton Grading should be taught in the common schools, as suggested, and sooner or later it will be so taught. The Cotton State that stands first in this line of legislation will have just cause to feel proud of her progressive step. But if it is thought by **You the People, or by You the Representatives of the People** that my bug under the chip should be killed and kept dead at an annual cost to the country of Twenty-Five Million Dollars, perhaps the wiser statesmanship will be to give no encouragement to Grading Lessons, and get in line with that great financier who spoke so broadly about the condemnation of common folks.

A direct appeal will be made to the several legislatures of the Cotton States to enact laws upon this question. As they may respond, so will the people be profited. Let every resident of the Cotton States become active. Let every one in City and Country urge that the weal of the whole people be guarded that his personal interests may thereby be promoted.

Respectfully submitted as a fit accompanying chapter to my several works on Cotton Grading.

N. J. McArthur.

ABOUT PREPARATION FOR STUDY.

If a **full board** of samples could be had for use in connection with this lesson, it would be better for the student. If only one sample of each of the **seven full** grades could be kept in the class room before students, comprehension of the intervening and surrounding half and quarter grades, as described in "**Pen Pictures**," would be much facilitated. As no real exhibit of samples could **possibly** accompany this work, as a part thereof, an imaginary exhibit has been presented. The language and arrangement of the lessons provide for either a **real** or a supposed exhibit. In case of a supposed exhibit, the lessons become purely theoretical, though the theoretical becomes practical as soon as real cotton is placed before the student. But why, in this land of cotton should poverty of supply exist? In any cotton warehouse in a cotton territory a partial, if not a full set of samples may be easily procured, and if not there, they may be obtained at small cost from other sources. As they may be had both easily and cheap, a full set of types should be kept before the student as he studies their minute description given herein. Procure your cotton samples wherever it may be convenient, of known or unknown grades. Examine each type carefully and look in **Pen Pictures** for its description. You will find it described and its **Grade** named. These **Pictures** you can soon transfer to your mind, and then wherever you find cotton and whatever cotton you may find you will know its grade.

LESSONS BEFORE CLASS.

CHAPTER I.

Assuming that you are familiar with the product as a field crop, we will discuss the varied conditions of cotton in its intermediate position, that is, between the field and the loom or factory. I will take the place of instructor, and you will interrogate, asking such questions as my answers may suggest, or that may otherwise present themselves to you. You may proceed now with your questioning.

Q. What is the subject-name of the proposed discussion?

Ans. Cotton Grading or Cotton Classing.

Q. What is its scope, or what utility is embraced in this subject?

Ans. It sets out and names the varied conditions just referred to. And cotton coming under the class condition of any particular grade is so named.

Q. Why is it so graded?

Ans. To separate into parts or parcels, according to condition, for commercial distinction, so that relative values may be assigned. Our subject, as we will discuss it, embraces in detail these conditions and separations.

Q. Into how many grades has cotton been classed for commercial rating?

Ans. Into about **thirty** distinct classifications. Of these there are **seven full grades, seven half grades, and six quarter grades.**

Q. Since these do not make all of the named number, what other grades are comprised?

Ans. Other distinct grade names, a dozen or more in number, refer to the color condition of the Full, Half and Quarter Grades.

Q. What are the names of these grades?

Ans. They will be taken up separately, and as their charac-

ter or distinction is considered and defined, to each its name will be assigned. You will later be furnished a list of the grade names as they appear consecutively.

Q. What is the basis of these distinctions?

Ans. It is the length, strength, and core, or diameter, of the fiber, to which is given the general name of **staple**. As this staple or body, may be good or bad, and as it may be **white**, or **colored** by shadings, tinges and stains, or as it may be affected by scaling, impurities so it is commercially graded.

Q. What are the impurities to which you refer?

Ans. They are trash, sand and notes.

Q. What is **trash** and its character of impurity?

Ans. Trash is usually a showing of broken cotton leaves, boll shucks, grass stems and other dried foliage and vegetable matter that may become mixed with the cotton. The cotton leaf is the principal form of trash, and the finer the particles or parts into which it is cut or broken by the ginning process, the greater the percentage of damage. I will later show you the relative damaging character of the forms of leaf trash.

Q. What of sand, and how as an impurity does it affect cotton?

Ans. Sand is sometimes lifted into the open bolls by strong winds, but the great bulk of the sand found in cotton, is that which adheres to locks of cotton that, after having fallen out of the burr, are picked up from the ground. Sand adds to the weight of cotton and injures machinery at the mills. Cotton carrying much sand is expected to bear an accompanying quota of trash and stain.

Q. What are notes?

Ans. Notes or neps are knotty developments of immature cotton that pass in whole seed form through the gin—or they may be seed ends and parts of seed hulls, cut into the mass of lint by too close, or sharp ginning. The latter kind

is known as shell motes and is usually accompanied by gin cut or a double cutting of the fiber by the gin. A trace or small showing of motes may be found in nearly all grades of cotton, but motes in quantity are highly injurious. They interlock with the general mass of fiber and become inseparable.

Q. You refer to stain as a damage, why did you not include it with impurities?

Ans. All forms of damage are to be considered impurities, but stains and tinges are color conditions. The strength of the fiber is usually not affected by the ordinary foliage stain. The pod end or burr-sink stain has passed the stage of decomposition. It would clear or shake out in the carding process, but the pod of fibers to which it belonged would be shortened and injured. This character of stain is not found in the better grades to any harmful extent. It is easily recognized when found in the lower grades. Oil stain is the result of crushed seed and is rarely found in baled cotton. It is sometimes developed from the fatty ends that pass out with the ginned cotton, but more frequently it follows the crushing of these seed ends by mill machinery. It is glue-like in its nature and its origin, seed motes is considered a damaging impurity. There is another kind of oil stain that follows the heating and sweating of damp cotton in the seed. The exuding oil, instead of making a yellow stain, as with the crushed seed, passes uniformly into the body of the fiber, and gives to it a bluish tinge. If this decaying process is arrested in time and the cotton is dried and ginned, a sample will show in most instances, a dead staple of bluish tinge and musty odor. If the strength of the fiber has been preserved, it may be graded, but if the fiber shows the effect of rot, it is to be classed damaged. Frost stain is a cold blight affecting only late immature cotton. Its presence indicates a weak staple body.

Q. Are the general points of grading embraced in the

length and strength of the fiber, its color, and its condition as to impurities?

Ans. This is all that is to be considered in grading cotton, except the items of water damage, preparation, and inequality of fiber length.

Q. How does water damage manifest itself?

Ans. Water damage is simply rotten cotton. The wetting process is the only means of bringing cotton to a condition of rot—decay. Cotton in bale as in the seed (explained) may become heated and damaged to the extent of having its vitality (elasticity) destroyed, and yet have a commercial value. The extent of this damage is to be estimated by the classifier. The mere wetting of cotton, followed by immediate evaporation, does not affect its market value.

Q. What is Inequality as applied to grading?

Ans. As the word implies, it is a difference in the length of the fibers composing a bulk of cotton. To the average grower (though he should be wiser) all cotton is cotton, regardless of its color or staple. He mixes pickings from his best lands with the poorer quality gathered from thinner soils. Unequally developed crops of the same opening or picking or the natural varying development of different openings are often thrown together. This gives the result of Inequality. If graded by the bulk of the shorter staple element, a cut or discount would be made in the grade on account of this mixture. Manufacturers regard unequal fiber length as a purchase to be avoided.

Q. What is to be understood by Preparation?

Ans. In a general sense it includes the methods of gathering and subsequent effects from probable exposure, but its especial application refers to the process of ginning, compressing and wrapping.

Q. Why is cotton graded according to color?

Ans. Cotton is appreciated by manufacturers for its character, as it may give at least cost through processes of

manufacture, the highest grade of finished product. The whiter the cotton the nearer it approaches perfect uniformity. This uniformity is maintained in the process of bleaching, and notwithstanding the claim that some of the tinges and stains are easily eliminated, extra expense is involved, and the absence of uniformity is feared.

Q. Does this lack of uniformity appear following the dyeing processes?

Ans. That it does not or may not is due to treatment involving extra expense and to a thorough mixing of the fiber before manufacture.

Q. Before proceeding further will you again explain fully the general conditions named affecting the character of cotton as they may be applied in grading?

Ans. Yes; but I will do this in a separate lesson. I will therein discuss, in a general review, all the points of grading previously presented and by this repetition prepare you better to comprehend the imaginary sample exhibit, type by type, as they are unfolded to your imagination.

CHAPTER II.

A Discussion of Impurities, Stains, Trash and Other Demerits.

In entering upon this separate discussion of Impurities, I will first consider **Stains**, showing each as it appears as a damaging agent, and explain its origin, as well as its effect. I will first present

Boll Stain and Burr-Sink.

Boll stain is a slightly yellowish or brown discoloration caused by rain falling upon and entering into the open pod of cotton. The coloring matter of the inner burr is absorbed by the outer presented surface of the enclosed cotton, and this stain is the result. In minimum quantities it may be seen in the finest grades of cotton. Boll stain is to be found, therefore, more or less in the whole descent of grades. This stain is not to be confounded with the Burr-sink stain, though both result from similar causes. The Burr-Sink stain is the deep-seated decayed end of a lock or section of the boll of cotton, caused by water sipping to that position and there remaining till a sticky cementing form of decomposition is brought into action. The Burr-sink stain, where it appears in a sample exhibit, indicates that one of the several locks of cotton in its producing boll has been shortened. This shortening has for its effect, **Inequality** of fiber length, and though the feathery-like stain is easily beaten out of the general mass, and is therefore comparatively harmless as a stain, where it is seen in quantity, the element of **Inequality** is to be substituted as a grade reducing factor.

Foliage Stain.

Foliage Stain, next to be described, in its milder forms,

has been included with Boll Stain, but there is a marked distinction in their effect respectively, as the degree of great magnitude is approached by each. Exaggerated Boll Stain or its continuous formation would produce burr rot, and a consequent damage to the enclosed boll. As **Foliage Stain** is only the colored washings from the cotton leaf, these drippings upon the open boll dry away and leave a stain which has not affected the length or strength of the fiber. The coloring matter is originated by a puncture of the cotton leaf, coming from the feeding mouths of insects, nearly invisible in form, that may be found feasting thereon. These cut into the tissue of the leaf and, as stated, rain washings are colored, giving the result of Foliage Stain. While entomologists and botanists are left to harmonize their varying opinions as to whether **Cotton Rust** is a constitutional trouble coming from a diseased stalk body or whether it is caused by multiplied millions of foliage feeding fungi, we will pass on to results in the form of stain and in imagination view great fields of opening cotton that have been overspread by this blight. As the **Rust** works its devitalizing force, gentle rains may produce the above described effects till almost every fiber of developed cotton in those fields will bear the marks of **Foliage Stain**. The staple body would remain unaffected by this great dyeing of stain, and if cotton of this kind should show freedom from other impurities it would be given a good commercial classification.

Oil Stain.

Oil Stain proper, is the stain caused by crushed seed in the lint before ginning. It is of a greenish yellow cast and is easily distinguished from other stains. The circumstances would be indeed peculiar that would furnish a bale of cotton affected throughout by crushed seed Oil Stain. As a damaging impurity its appearance in cotton at the factory is regarded as being

almost equal to a similar distribution of ordinary mucilage of a like quantity. It glues the fibers together in such manner that they are not easily separated. This stain is rarely found in a cotton exhibit. But a nice stainless exhibit may carry concealed, in the form of fatty seed ends or whole seeds, the Oil Stain so much to be dreaded. As these pass through the mill machinery they are crushed and the exuding oil becomes absorbed by the surrounding fibers. **Oil Stain**, therefore, is not to be looked for, only as a sequent of patent causes. When these described causes are found in an exhibit, they are to be rated as **Oil Stain**. **Seed Oil Stain** is the effect of dampness causing its decay. The process of decomposition of the compact mass of stored damp cotton begins with the seed and the first step of dissolution is a parting with the oil they contain. This oil, as if cognizant of the fact that a new home must be found in place of the decaying shell it has occupied, begins to distribute itself evenly to the adjacent fiber. It is usually during this process of distribution that the cotton is shaken up, aired, dried out and ginned. One certain result is a general seed-sweat coloring of a combined yellow and bluish tint. A second result is that the fiber, though charged with oil seems devitalized, and it is this principle of absent vitality, as it is more or less to be noted, that determines how much has been the loss sustained by a cotton that has passed through this process. The stages range from a slightly colored, lightly affected fiber, to the opposite extreme of deep tinge and musty decay. Discoloration is the most frequent appearing damage, but an occasional dead stock of fiber is to be found in brighter exhibits. As long as the locking or intertwining twirl remains the fiber is good, when this quality of life is absent, the fiber is to be condemned. A mere novice could determine the difference between live and dead cotton, that is, know upon examination whether the sample exhibit was live and showed the spiral twirl, or was devoid of this principle.

Frost Stain.

All bolls of any late crop that are nipped by frost before maturity or before opening, show its blighting effect. If the frost is severe it reduces some of these younger bolls to a watery pulp. Others a little older escape this extreme, but open only in the form of hardened enclosed pods. Others still, which are nearer mature, react from the chill and open under effect of a warming sunshine. It is this process of reaction that causes the inner parts of the burr to dye or stain the pod of fiber. This character of stain is easily distinguished and indicates not only a short and immature fiber, but a weak staple. If such late pickings should be mixed in any appreciable proportion with better cotton the whole is reduced in grade thereby. If a part of the middling crop should be gathered with this **Frost Crop**, it would fall below the classification of **Low Middling**. Following this fact, the half grade, **Strict Good Ordinary**, is only a lower **Low Middling**, the body of which is supposed to have a high character of strength, therefore, if any weakness of staple should show as a result of the mixture, **Good Ordinary** would be its highest grade mark. This, however, does not point the limit of descent, as a predominating proportion of **Frost Stained** cotton in a mixture that also carries other damaging demerits might be borne down thereby below the scope of commercial estimate.

Mildew.

This form of defect is patent to any observer wherever it appears. It needs no particular description. A bale of cotton may become rotten on a part of its surface, and still have its interior sound. To separate these properly requires only the discriminating judgment of any careful examiner. This stain has also been called **Fungoid**, so named from the scientific causes attributable to vegetable decay.

Hoop Stain.

Hoop Stain is the result of damaging exposure to water, either from rains or from contact with the earth. Whether from mist, spray or rain, it is easy to judge how much cotton of a bale may be so damaged. If the jacket or cover should show signs of rot, a critical examination of the bale should be made, as an interior damage might possibly be traced from these indications. A closely compressed water-packed bale of cotton kept in a damp place would show **Hoop Stain**, as it might also show a badly damaged interior.

Soil Stain.

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Soil Stain is a coloring or shading imparted to cotton by loadings of dust gently deposited from the surrounding atmosphere, or more violently lifted and carried into the pod from adjacent soils and territory by stirring winds. The dust and soil bearing sand thus deposited permeate the open boll, and distribute an even shade of dust-color to all parts of the receiving pod. So insinuating is this form of light dust that it seems to lose its character as dust and to become part and parcel of the fiber where it is deposited. If the dust has been dark a corresponding shade of "off color" will show in the cotton affected. It is this shading from dark dust that gives to the **White Grades** of cotton, from **Good Middling** to **Low Middling**, as it may be but slight or of deep cast, their distinctive features or complexion. If a deeper shade than the face of **Low Middling** should show on a fairly clean standard staple the **color** would be placed in the category of **Tinges**. All red dust affecting cotton in the way I have just described, imparts a reddish color, and all grades so affected are denominated **Tinges**. **Soil Stain** as a result of storm or wind beaten cotton coming in contact with the soil direct is colored according as the soil may be colored. This field stain does not

affect the cotton only at and near the points of contact. In consequence the stains are not general, but appear in spots and "splotches," and give as an output the various gradings from the highest **Stain** to the lowest mark of **Stains** and **Tinges**, according as the staple body may be otherwise varyingly affected. Formerly a large percentage of the adhering sand went with the mass of cotton through the gin and into the bale, but modern improved methods of clearing from sand at the gin have in a great measure, eliminated sand as an impurity to be found in grading; yet it must be looked for, and if by exception to the rule it should appear, it must be measured first as to its estimated weight and secondly as to its injury to machinery at the mills. In every grade of cotton, from the highest to the lowest, small particles of grit or sand are to be found, however, it is only where sand is found in larger quantity that it is to be considered an impurity.

Tinges.

Natural tinges are little to be considered by the classifier. Variety, soil, sunshine and atmosphere are agents producing many different natural tinges. The **Brown Egyptian**, the **Red Peruvian**, the **Yellow Sea Island** and our own slightly reddish **Tinge** found on the red fields of the **Uplands** cotton belt could none of them be produced except in their present known indigenous soils and atmospheres. Of these it is only necessary to speak of:

Uplands Natural Red Tinge

This **Tinge** is with difficulty distinguished from the **Red Tinges** produced by dust discoloration. Its color is of a clear, pinkish red and is only yielded in the higher grades. Freakish as it may appear, the same stalks that yield a **Good Middling** grade of **Natural Red Tinge**, would produce a later crop of **White Middling**. In grading we can only apply the law

governing as to tinges, giving to it the benefit of all doubtful points of grade merit. The cream colored cotton of the high grades is also a **Natural Tinge**, but it is graded as a **White** product.

Red Tinge.

All **Soil Stain**, having red dust as a producing cause, is graded as a **Red Tinge**. It covers the entire list of commercial grades. In determining any grade the same law that governs where there is no tinge is to be observed. Except, however, that a tinged grading will carry a slight addition of impurities above that made for a corresponding **White** cotton. Too great a difference in assigned value is supposed to be the basic reason for this allowance.

Dark Tinge.

Again I will refer you to my remarks concerning **Soil Stain**. Therein I told you that it was this shading of Dark Tinge that, in part, gave complexion to the **Grade Face** of all the **Gradings**, from **Good Middling** to **Low Middling**. I did not include the grades of **Good Ordinary** and **Strict Good Ordinary** for the reason that, though it might in certain instances be aptly applied, other stains and tinges are more frequently found. After dealing with these colorings in that way we may take all soil-stains above that of a **Low Middling** in shade and class them as **Dark Tinges**. A popular prejudice against this "Off Color" keeps it in the lower grades of **Tinges**, **Middling Tinged** being about the highest limit allowed. A muddy appearing exhibit of otherwise good cotton has been classed locally, in name as "Only a Nigger," and in merit, everywhere, it is held down to the **Lower Middling Grades**.

Smoke Tinge

It is not impossible for the particles of coloring matter in

smoke to be wafted a distance as great as that from Pittsburgh in Pennsylvania to the cotton fields of Western Texas and Oklahoma. Mid-ocean is said to have its smoky days. These particles of coal smoke from different points often unite, and form great blanket-like clouds and in settling form a dark deposit on all material at the point of descent. For whole seasons, clouds such as these follow in succession and regulated by some unexplained law, settle in the same territory. More, the avenues of transit seem so routed that annual visitations of this kind succeed their preceding lead until we have a fixed territory from which we may expect to receive cotton to be graded as a **Smoke Tinge**. This territory includes a broken or irregular section, traversing the entire cotton belt, and included between the hill breaks above to points within fifty or sixty miles of the sea-coast. There may be long gaps in the line of its appearance, but wherever found it is the same, and traceable to the same character of cause.

Smoke Tinge is graded just the same as **Dark Tinge**. Growers have attributed this **Tinge** to local causes, such as having fields approximate to smoking furnaces, and near where many locomotives pass. It is possible thus to discolor a field of cotton without conflict with the general accepted law, which I have just set out.

Blue Puff.

Blue Puff or **Smutty Puff** as it is sometimes termed, is caused by gathering the whole pod together wherein there is or may be a perished and decayed lock of cotton. Blight of this kind is often found in a field and one boll thus affected to each fifty taken is sufficient to blacken the whole combination. This tinge or stain sometimes shows in limited quantities and is then to be estimated as a stain affecting the general **Sample Exhibit**. But if the tinge shows to be general, coloring the whole body of cotton presented, the cotton must be placed on a low grading, as low, at best, as **Low Middling Tinged**.

Trash.

We now come to consider **Trash** in its place as an **Impurity**. Foliage trash, that is, leaf and boll shuck crumbings, comprise the principal forms of trash found in cotton. Dry weeds and grasses may be in cotton where such trash is permitted to grow to maturity in the fields from which it has been taken. Foliage trash, (including the boll shuck) is more damaging in its broken parts, as it is crushed into small or fine pieces. The finer parts are known as **Pepper Trash**.

Pepper Trash has usually a dimension equal to from one thirty-second to one-sixteenth of an inch diameter. The smaller dust-like particles that sometimes mar the face of an exhibit, are simple forms of dust that may be shaken out easily in the processes of cleaning. A mere casual examination will show a distinctive difference in these forms of impurities. With the regular foliage **Pepper Trash** the fiber embraces these small parts in its mesh like hold, and it is next to impossible to effect their release. Larger bodies of leaf trash, sometimes designated Fleak trash, are not so difficult to remove. The locking fiber cannot grasp them in their entirety as is the case with the intermediate forms and the still smaller pepper trash. Of course the quantity of this trash as well as its quality is to be considered in **grading**.

Cotton gets its loading of trash frequently through carelessness of the gatherer, but often providential causes render such loadings unavoidable. A field of open cotton may be overrun by feeding worms. The result is, the worst forms of litter and trash are cut into the open bolls and separation would be a task too great to be undertaken. Again, cotton and decayed foliage from the stalk, and all other dried vegetation might be driven by winds and storms into an incongruous mixture of cotton and trash. The cotton must be saved and not unusually after being cleaned as carefully as possible it shows a loading of trash that places it below the scope of commercial

grading. As to the amount of trash allowable in different grades, I will take the subject up in this phase, in a separate consideration of the list of grades to be exhibited.

Motes or Neps.

Under the name of **Motes**, nearly all of the impurities following upon bad ginning have been grouped. Whole seeds, broken parts of seeds, seed ends and the fibers that become separated from the general mass to wind themselves about the heavier forms of trash, in fact all fibered masses detached from the smoother layer of the main body are to be designated **Motes**. These fibered masses may be cleared by the cleaning processes at the mills, but such separation involves the probable loss of other fibers or parts of fibers to be caught up in the severance. This latter probability leads us to presuppose the introduction of broken and shortened fibers into the cleared mass, by which it would be to some extent reduced in value. As to whole seeds and fatty seed ends I have just presented this phase of **Motes** in my discussion of **Oil Stain**. **Motes** are considered heavy impurities and because of their tenacity to the body of fibers about them, they have been classed to that extent, **Inseparable**. A small trace of Motes, an occasional immature seed, and the shell or split hull also, as incidentals, may be found in the higher grades. But **Motes** indicate bad ginning and when found in quantity are usually accompanied by gin cut. Therefore where **Motes** are found as a prominent impurity cotton is to be placed in the lower grades.

Sleek Heads.

Unripe and **Dead** fibers are to be found in all grades of cotton. If only a trace or small showing is presented, they are to be regarded harmless, but as their number or quantity increases, they begin to call for recognition as a damaging fea-

ture. Any cause that would hinder the development of a boll of cotton, or even one lock as a part of a boll, would give the result of half ripe, or as it might be dead fiber. Blight, such as rust or black root produces, might fall upon a field, carrying with its larger part of fully matured bolls a fair percentage of half-ripe as well as less developed bolls, the greater number of which would open, either wholly, or partially, but sufficiently to be gathered and mixed with the mass of full ripened fiber. In such a mixture we should see numbers of little thread-like fibers which had not fleeced out as they left the gin and which would now curl up into something like the form of an interrogation point, as they would present themselves in the general body of the fiber for observation. Again might be seen numbers of small flattened substances encased in the sleek folding of the immature part of the producing burr, for this is cotton to which has adhered the original pulpy part of the burr, that had fallen far short of maturity. These showings would lose in measure of both length and strength as compared with the general mass of the body bearing them. As a result the feature of inequality is presented to be estimated in grading, according to the quantity exhibited

Gin Cut.

This feature of demerit has been referred to in so many instances that it must be already well understood. It is the severed parts of fiber divided into two or more lengths by the gin as it may be too sharp or given too high a rate of speed. By the present mode of distributing the cotton of a single bale to a system of a half dozen or more gins, all moving at the same rate of speed, but no two, perhaps, regulated alike as to cutting capacity, it is remarkable that gin cut is not more generally encountered. It is unfortunate that the longer stapled cotton suffers most from this double cutting. It is relieving, however, to know that where only a few saws of one of a large system of gins may probably be doing this disastrous

work, the proportional part of Gin Cut falls to a consequent lower percentage of the whole. Gin Cut is a bad form of **Inequality**. It shows in a **Sample Exhibit** with the cut parts lying across the even general layer or standing out like the bristles of an angered animal. As before stated, in a small way, it appears in all saw-ginned cotton, but where it is found in marked quantity the grading descends accordingly.

Gin Roll.

Gin Roll is the rope like mass of wet cotton which does not leave the gin freely and is twirled into this form by the process of clearing the saws. It does not affect the value of the fiber but its presence usually points to Gin Cut.

Water Pack.

Cotton that has been ginned and compressed in an extremely wet (or steamed) condition is classed **Water Packed**. If by any means the avenues of evaporation should become closed and the included compressed air should find no means of escape, fermentation would follow and rot would be the result. If the Cotton has been "wet down" between the gin and the press, with the view of increasing weight, the dampness would be less generally distributed and, as a sequence of concentrated puddling, decay would be more probable. Much depends upon the age of the bale or the length of time intervening between the date of packing and that of its examination by a classer. If the bale is presented fresh from the press, he should grade with full allowance for the extreme conditions I have mentioned. But if the bale had that age which would allow it to present a dry surface, examination by deep boring or cutting would determine its state as to soundness. If no signs of water damage should appear, the cotton would show only a slight discount of grade on account of having been **Water Packed**. Otherwise such damage as

might appear would be estimated by its extent. **Water Pack** is evidenced by the wavy rolls or ropings on the sides of the compressed bale and by slightly colored lines between the edges of the layers, produced by the emission of water at these points. A sample exhibit from a restored bale of **Water Packed** cotton has the wrinkled appearance usually to be seen in a fabric that has been washed and left unironed. **Water Pack** is so rarely found under the present system of preparation, that I will leave the given description as sufficient.

Flexibility.

Flexibility is the elastic principle of cotton that enables the classifier to recognize by clasping in the hand the fine or coarse quality of a specimen exhibit. The response to his touch or clasp informs him quickly as to whether the exhibit is a live, responsive specimen of the higher grades or whether from brittleness, roughness and a sleepy or slow form of elasticity it is to be placed in the intermediate or lower grades. The extreme contrasts of the features of flexibility may be likened to the difference you would observe in the respective hand clasps of a fresh handed school boy or girl and that of the hard handed daily laborer. The vital principles of an exhibit are to be measured mainly by its flexibility, though loadings of trash and other affecting causes serve to reduce this quality.

Inequality.

If you have followed me closely in this discussion, you have heard frequent allusion to the character of **Inequality**. You doubtless know that it means unequal length or strength of fiber. In each reference I have made to this condition, I have mentioned the cause producing it. Mixed products from the fields, immature fiber, gin cut and other causes have been discussed, and your acquaintance with the subject should consequently be well established. Spinners desire fiber of nearly

uniform length. It is known that fibers of distorted length will not run or work out together, and that the cost and annoyance attending their separation at the mills is reckoned fully equal to the value of the shorter parts extracted. Therefore in an estimate of an exhibit carrying an objectionable quantity of short fiber, its comparative weight with that of the affected body would be considered a fair amount of loss to be estimated in depreciating its grade. In my published work on **Grading**, a copy of which you have before you, the full text of this discourse is treated. Read it carefully and you will find therein the full essence of the subject as I have here treated it orally.

Note.

The Author was recently called by its college board to give a short course of Grading Lessons to the graduating class of the Textile Department in one of our Southern Industrial Institutions. The foregoing with only a few changes is an exact reproduction of a preparatory address made before that class, in advance of a practical study of the subject to be made by examining and classifying a large array of samples, embracing many times over the full variety of grades. He has deemed it fitly appropriate to make it a part of this publication, considering that if it were an exact rehearsal of the matter to be found in **The Cotton Grader** and **Grade Notes**, it would be good just at this point in these lessons to emphasize all that is to be found therein. It is published as a part of these lessons and is given the exact position in point of presentation that it had in giving to actual students practical training in a course of cotton grading.

CHAPTER III.

Continuation of Grading Lessons

Q. We have listened attentively to your discourse on cotton and the various conditions affecting it, and now will you show us in a practical way the application of your lecture to the science of cotton classifying?

Ans. Yes, and to do this I place before you a pivotal or centrally characteristic type of each of the **Eighteen Current Commercial Grades.** (See Plates.)

Q. What are the names of these grades?

Ans. Taken in their descending scale from the highest to the lowest they are named Fair, Strict Middling Fair, Middling Fair, Strict Good Middling, Good Middling, Strict Middling, Middling, Strict Low Middling, Low Middling, Strict Good Ordinary and Good Ordinary. These are known as the **White Grades.** Then we have Strict Good Middling Tinged, Good Middling Tinged, Strict Middling Tinged, Middling Tinged, Strict Low Middling Tinged, Low Middling Tinged, and Middling stained, all comprising the eighteen Grades mentioned.

Q. Will you explain the terms "pivotal" and "centrally characteristic," as you have used them in referring to the types before us?

Ans. These terms refer to the complexion or face color of the types and to the faces themselves as each may be affected by a dissimilar showing of impurities or by other peculiar lines of difference. They show one opening or face of the sample exhibit only, and from this face, as presented to our view, we are to conclude other openings and faces to be the same. That is, we are to determine the character of the grade upon vision, or "How it looks."

Q. Is vision alone sufficient? Is appearance an infallible guide to a definite placing of grades?

Ans. While in the main, any type or grade of cotton may be recognized by its face, verification of a decision so made is established through the sense of **Touch**. What is known as "body" or staple character, the length and strength of the fiber must be determined by feeling. It is very rare, however, that "hand examination" fails to coincide with indications presented on the face of a sample exhibit.

Q. Shall we not be permitted to handle the sample exhibit before us?

Ans. Continuous handling would so wear the face of a sample that its characteristic features would be changed. It is better, therefore, that we use these only as guide types, preserving their faces intact for study and comparison.

Q. Are the several color casts or grade complexions, and the showing of **Impurities** as they appear in these types to be accepted as the exact allowance for each of these grades?

Ans. No; there may be slight variations of both **Color** and showing of **Impurities**. A little more or a little less of one or both might appear and still fall short of a quarter grade, above or below. This is a law of variance applied in grading, but it is usually found that the variations of **Color** and **Impurities** offset each other, an increase of shade being met by a compensating decrease of **Impurities**. As I have stated, however, these types are centrally characteristic, or pivotal, and no graded samples of cotton compared with them will be found to vary in any significant degree from the faces here displayed.

Fair.

Q. What is the first type in the line before us?

Ans. It is the highest grade of Uplands cotton and is designated **Fair**. You will see that it is almost purely white and that it is free from all the blemishes I have described as **Im-**

purities. At the foot of the type I have combed out a mass of fiber which shows a uniform measurement of one and one-eighth inches. It is not excessively long and fine, neither is it coarse and brittle. It is a good specimen of **Fair Cotton**.

Strict Middling Fair.

Q. What is the next type which seems to have exactly the face of the first?

Ans. It is to be graded **Strict Middling Fair**. The color and the staple are the same as for **Fair**, but you have overlooked the particles of trash that show upon close inspection. These reduce it in value to the descending half grade.

Middling Fair.

Q. And what is the next of these white types classed?

Ans. It is typed **Middling Fair**. You will observe that it is as bright in color as the first grades, although a faint shade of difference would be allowable. The fiber also shows a good character of staple, but an increased showing of trash and tracings of stain gives it the lower grading as typed.

Q. Do these three types constitute the entire grouping of the **Fair Grades**?

Ans. No; the complete group includes three **Quarter Grades**; viz., (1) **Barely Fair**, which is a close grading between **Fair** and **Strict Middling Fair**; (2) **Fully Middling Fair**, an intermediate between **Middling Fair** and **Strict Middling Fair**, and (3) **Barely Middling Fair**, a **Quarter Grade** below **Middling Fair**. The **Quarter Grades** are not at present used in classifying (see date of issue) but a return to this minuter classing may be expected at any time, according to the whims or purposes of the **American Cotton Exchanges**. In this connection it is proper here to state that the grade of **Middling Fair** is the highest grade now quoted in our domestic market.

SECOND GROUPING—MIDDLING GRADES.**Strict Good Middling.**

Q. We observe a change of color in the next sample exhibit. Where is it to be placed in the list of Grades?

Ans. We are next to consider the **Grouping of Middling Grades**. The type before us is **Strict Good Middling**. As a grade, generally, it is one of the strongest types of cotton both as to natural condition and cleanliness. It shows often a better body than the higher classed **Fair** grades, but on account of shade or color it is placed lower in classing. The type under consideration, as you see, is of a rich, whitish cream color; showing too little of the cream cast to be put into the list of tinges, and yet too deep a shade to admit of **Fair** classification. It is comparatively as clean as the higher grade of **Middling Fair**, and its combed fiber shows a strong staple, at least nine-eighths of an inch in length. This type embraces all gradings of this grouping above **Fully Good Middling**, and as a consequence, classifications of this title often show marked degrees of variation. This is explained by the statement that a cotton which might be classed higher than **Fully Good Middling** (a quarter grade) would be placed in this classing, while, with color debarring, the highest merit could not raise it above the grade of **Strict Good Middling**. The name **Strict Good Middling** implies a higher superior grading of **Good Middling**. Color is not an arbitrary or ruling characteristic of this Grade. The brightest and best bodied types of **Fair** cotton, if too badly "loaded" with trash, or if they should present other indications of demerit, would be classed down to this Grade. (Note previous remark on this subject.)

Good Middling.

Q. We see a very close resemblance of face in the next

type to the one we have just discussed. What is its classification?

Ans. It is to be classed **Good Middling**. The likeness you have observed could be appropriately termed parental, as this is the basic grade of the type we have just passed, and which on account of its better features as to impurities, we classed as a **Strict Good Middling**, thus placing it a half grade higher than the basic grade of **Good Middling**. If not already so understood, I will explain that the term "Strict," when used before any grade name defines that grade as being raised to the middle or highest point in ascent towards the Full Grade above. It is the term used to signify all half grades. Apropos to this explanation I will say that any commercial name given to a grading of cotton, though it should be designated whole, half or quarter, stamps the same as a full type of grading, and it is, therefore, to be estimated as a distinct grade regardless of the distance above or below a basic whole grade. In this typing of **Good Middling** you observe the same color and fiber length exhibited in the preceding type. It is a basic grade and you should give close attention to the face it presents. You observe two pieces of large or fleak trash (one smaller or intermediate in size, and only a few dottings of the finer parts of "pepper trash." There are two very small specks of foliage stain to be seen and we may also see indications of immature fiber. These impurities are allowable and the type is to be accepted as a standard **Good Middling**. I have elsewhere stated that the cream cast of color frequently found in the **Good Middling** types is a change or departure in color from the pure white of the first general opening, as it is also different from the paler white of succeeding openings. This does not apply as a universal rule. In many instances this creamy tinge does not appear. Therefore a shade of white falling below **Fair** may be taken also as the type-color of these grades.

Strict Middling.

Q. Now we come to a noticeable change of exhibit. By what name is it to be known?

Ans. It is a specimen type of **Strict Middling**. In its color you see a free white only slightly shaded by dust and stains. Unprotected by the greener and consequently denser foliage which shielded the higher grade openings it shows a slightly lower degree of complexion. Next we notice on its face increased showings of both trash and weather stain. This is due to dryer foliage and exposure to rain. We see, also, curling fibers or sleek-heads denoting a small falling off in uniformity of fiber length. This, however, does not show to a harmful degree in the combed fiber, which measures above an inch, and appears to be of fairly even length. It can be accepted as a full rounded type of **Strict Middling**. I will refer you to a characteristic description of this grade to be found in "The Cotton Grader."

Middling.

Q. What is the type we are next to consider?

Ans. It is the Grade of **Middling**. This is the basic or central grade with which all other gradings higher or lower are to be compared for assignment of degrees of variation, better or worse, that a consequent placing of name and value may be determined. It is a knowledge of the character of this grade and an acquaintance with the degrees of departure therefrom that enables the classer to name properly, or approximately near, the entire line of varyings comprising the system of cotton classing. Only know **Middling** and the scheme of grading may be easily comprehended. In this type you see a shading of the complexion which may be described as a "step down" from the type of **strict middling**. We observe on its face four of the intermediate breakings of fleak trash, besides numerous dottings of smaller breakings. There

is also a sprinkling of pepper trash which, if we are to be precise in our estimate, I should say, if generally distributed, would average about four forms to the square inch. There is a single small blur of stain to be seen. Next we see the indications of unripe fiber but not in sufficient quantity to establish a marked degree of **inequality**. Finally as we inspect we note that the combed fiber is a full inch in length, fairly uniform and of apparent perfect soundness. By comparing with the higher grade of **strict good middling** it is easy to see that its fiber layers are not so evenly presented, and that other graceful features of that type are not fully observable. It is, however, a substantial representation of the great middle bulk of the American uplands cotton crops as they are now gathered and prepared for market.

Taking this bulk of output for the last quarter of a century and we would see that there has been but little change in the appearance of its face as it reached the factory. Hence the original type of **middling** has remained unchanged, and it is patently plain that it must so remain—**Exchange** ruling and Government Standardization to the contrary, notwithstanding, until there is a change in the methods of producing, gathering, ginning and preserving the great central bulk known as **Middling**. An improved output would give us an improved **Middling**. Until such time and event middling **will** be Middling. It is not at all improbable that some system of gathering by machinery may be brought into vogue. In such case a lower type of bulk or middling crop might be presented. You are to remember that this type is given as a central or pivotal sample exhibit of middling. Variations allowable in both color and impurities will be discussed in a future reference to this **Basic Grade**.

Strict Low Middling.

Q. What is the type next in line?

Ans. It is **Strict Low Middling**. Its complexion is a degree lower than that of **Middling**. We see also heavier loadings of trash as well as increased showings of stains. This is a later picking of the Middling crop which has been darkened by a dust deposit to a shade, placing it below the limit allowable to a **Middling Variant**. It is also proscribed such entry by its increased quota of **Impurities**. Observe that the quantity is about double that shown on the face of Middling. Yet its combed fiber shows to be as long and nearly as uniform as that of the higher grade. The lower shading and increased loadings and stains are the natural results of delayed gatherings.

Low Middling.

Q. We see that you present one other type of this group, what is this grade?

Ans. It is **Low Middling**. As its name implies it is another type of Middling Cotton reduced in grade. Observe that its color shows the regular and continuous "step down" in complexion. The increased measure of trash and stains are plainly visible and yet it, too, combs out a fiber only slightly below that of middling, in length and uniformity. I will call your attention especially to the facts that a cotton of this color could not be graded above **Low Middling** though comparatively clean; and that a cotton of any brighter color with loadings of the type before us could not be placed above that grade. Yet we find a pivotal type of **Low Middling** bearing the demerits of both dark color and impurities. This rule will apply to all central or pivotal grades, but we are not to understand that in the less pronounced types, offsets of color and impurities the one against the other are not to be reckoned. This concludes the line of Middling types and now we will consider others.

GROUP OF ORDINARY TYPES.**Strict Good Ordinary.**

Q. What is the next group; and what is the type we have first to consider?

Ans. The types before us are a part of the **Ordinary** group. There are only two taken and they mark the limit of descent in commercial grading and rating. The first is a type of **Strict Good Ordinary**. You will observe that it is a shade darker than the types of Low Middling, that it carries a slightly increased degree of **impurity** more than shows in that type and that its face is marred and blurred by knotty looking bulks of fiber. Its combed out fiber shows greater irregularity of length, ranging from seven-eighths to an inch in measure. This is due to a mixed gathering of the Middling crop with the shorter stapled later second or top crop. The Middling staple shows weather stains, and trash that has been unavoidably taken in the hand grasp of the picker, either from the ground or from dried plant foliage about the burr. The later opening of top or second crop cotton if separated would show a clean white exhibit. But the mixture before us shows a dark faced unclean type of cotton, the irregular fiber length of which gives it a small discount in value, but having a sound body of good "breaking strength," it is accepted on the market as a spinable cotton, lowered in worth by **inequality**, color and impurities.

Good Ordinary.

Q. What is the other type of this group?

Ans. It is classed **Good Ordinary**. With only a slight increase of shade there is a bolder showing of stain to distinguish this face from that of the preceding type. The material points of difference are the inequality of fiber length and falling off in fiber strength. This type is the output of gathering

that includes delayed and weather worn middling with all that follows in the form of late picking. A sufficient percentage of **Frost Stain** is presented to warrant a cut in grade and value on account of reduced fiber strength. A small introduction of **Frost Stain** is admissable in this grade, but where it predominates as an ingredient or even shows in excessive degree the cotton bearing it is reduced below a commercial **white grading**. This concludes the full classing of commercial white types and we will next consider the colored cottons.

Tinges.

Q. What is the array of types you have arranged for our inspection?

Ans. They are tinged type equivalents of the **White Grades** we have just inspected. Beginning with the highest type, which is **Strict Good Middling**, I have placed each opposite its equivalent in the line of white grades down to and including the grade of **Low Middling**. You will observe that the **Tinge** is the only characteristic point of difference in these gradings, as each of the named types corresponds in class. In this array the **Red Tinge** only is presented. I will quote from my opening lecture by remarking that the dark tinges are assigned to the grade of **Middling, Strict Low Middling and Low Middling**. The dark tinges of higher types than Middling are usually classed **Low Middling White**.

Middling Stained.

Q. What is the lone type yet remaining to be graded?

Ans. It is **Middling Stained**. It has an apparent cleaner face than its **White** equivalent. However, on account of its pronounced imprintings of **Foliage** or light **Boll** stains it is so classed. This closes our study, for the present, of these types. I will say to you that a familiar acquaintance with these exhibited types and a memory of my explanation as it has been

given relating to each separately will give to you, the student examiner, an open way to the field of cotton grading. A knowledge thus gained is like a light thrown over the whole field to be explored, as it may also be compared to a pool where the young swimmer has acquired such capability in the art of swimming that he may venture with confidence and safety into any nearby unexplored waters.

Rating and Classing.

Before parting with you at this time I will refer to the confusion of gradings so puzzling to the inexperienced classer, arising from the placing of entirely different cottons in the same grade. In such instances as where two different cottons have been assigned to the same grade, it is evident that one of them is a **Rating** and not a **Classing**. I will illustrate by taking in imagination a clear type of **Strict Middling** and "salting" or befouling it with trash till it is carried thereby below any of the Middling grades. Then its classification as **Strict Good Ordinary** would not be a **Type Classing** but a **Class Rating**. Do not let such grading confuse you. Learn the **Central Types** before you and all cotton so to be **Classed** will be found to have a close resemblance thereto.

Note: In this descriptive lesson I have kept before me a pivotal type of each grade. I have discussed them as if they were also before you, for the reason that any set of selected types of grades to be used could not vary far from those I have pictured.

CHAPTER IV.

OTHER PEN PICTURES—A DAY AT THE BOARD.

The class is now invited to go with me, in imagination, to a cotton warehouse in the interior where a large lot of cotton has been purchased and stored by a resident buyer. The purchaser has sold **on grades** the entire lot to a large firm of buyers, whose classing agent is on the ground to check out and assign grade values, bale by bale, to the shipment. Fresh samples have been boarded, two from each bale, representing the "show" of cotton on its respective sides. This is done for the reason that under the system of gang ginning where the cotton goes to the press from a series of several gins it is difficult to give to each bale an initial roll of its finished cotton. If not carefully handled and watched a thin facing of the previously ginned bale will show to change the natural type. When such a difference appears it becomes necessary to cut deeper into the bale on both sides to ascertain its actual grading. An experienced classer will know from the arrangement of the tie buckles on the bale which is its top or its under side, but he, too, usually takes the double sample.

The owner has assorted his cotton and has selected his best grades for first classification. All is in readiness, and the classing begins. The owner turns to his tally book and the classer opens the double sample of the first exhibit in the arranged row. It shows to be a perfectly clean body of the whitest cotton, with a staple only a little short of an inch and one-quarter inch in length. The fiber is fine and silken to the touch. It has been well prepared and as the classing agent closes his examination, he calls out "**Fair**" to be answered by the seller, "Check." The sample has an enclosed duplicate form of the tag attached to the bale. It shows the name and locality of the warehouse and the number and weight of the bale. The classer enters these points and the grading in his

note book and passes to the next examination. We see that he finds several bales having a like body to the first, but some of them show a slight fleck of stain and others a mere moiety of trash. He remarks that these are a little above the quarter grade of **Barely Fair** and they, too, are checked by the seller on his original grading of **Fair**. The next grading is of a shorter, coarser, and less elastic staple body than the first, but it is white, clean and well prepared. This too is checked **Fair**, but the classer notes in his book, by a private mark, that it is the coarser and stronger stapled quality of that grade. Others of the same type follow, bearing similar flecks of stain and specks of trash to those of the first types graded **Fair**, but on account of the coarser body he declines to place them above the grade of:

Strict Middling Fair.

This grading is accepted by the seller. A mixed lot of both these white stapled bodies, showing in each sample a few particles of trash or a trace of early light colored foliage stain is next presented. These are, one by one, passed into the grade of **Strict Middling Fair**, as they have shown face, color and staple body higher than **Fully Middling Fair**, but a few classing about **Fully Middling Fair**, or a little lower, have by agreement been dropped to the grade of:

Middling Fair.

A line is now presented which shows specimens of both the white stapled cotton you have just seen, changed only in the matter of presenting on their faces several particles of trash of the intermediate form, a dim showing, of an occasional small stain with here and there a sleek head indicating a more marked degree of **inequality**. These are checked out as pivotal types of **Middling Fair**. A few others, not quite so good, but patently higher than the quarter grades of **Barely Middling**

Fair, have also been assigned this classing. Again there is a "lay out" of specimens, comparing favorably in staple, body and cleanliness with the higher named types, but although there is a suspicion of shade in their color, these, too, are placed in the grade of **Middling Fair**. Other specimens of the last-named cotton, showing a greater degree of the several kinds of impurities named are scaled to the grade of

Strict Good Middling.

The board is now cleared for a new exhibit of samples. We see the classer take from a line of samples one of a creamy white color which shows a perfectly smooth face, with only a slight dotting of trash. Its staple will measure uniformly fully one and one-eighth inches. He classes it **Strict Good Middling**. He must hold it here on account of its color. Others in the line not so good in character, varying in face and staple quality, none alike, yet all a little higher than the quarter grade of **Fully Good Middling**, he also checks with the owner as **Strict Good Middling**. A similar line of samples of a slightly shaded white, embracing a like showing of variants, we see also that he checks out on the grade of **Strict Good Middling**. Next we see him take up and open a specimen from another line. He sees that in color and staple it is the same as the preceeding classification, but he perceives a marked increase of **Impurities**. He observes two of the larger forms of fleak trash, one of the intermediate variety, and a few conspicuous particles of pepper trash. He sees also a greenish colored seed end or mote, but this he regards as incidental. A trace of foliage stain is observable. Only a few indications of unripe cotton are present, though a sufficient number to point to the objection of **Inequality**. He clasps the sample a second time and its elasticity he finds to be standard. He calls out the grade of

Good Middling,

and is checked by the owner's answer, "O. K." Others in this line, of both the cream cast of color and the whiter cotton as appeared in the preceding type of **Strict Good Middling**, are examined. They show variants of the first type, ranging from just below the quarter grade of **Fully Good Middling** above to a point just within the limits of **Barely Good Middling** below. All of these he and the seller place in the grade of **Good Middling**.

In the next line he first finds a few samples of **Good Middling** color and body, but on account of increased loadings they are taken beyond the quarter grade of **Barely Good Middling** to the classing of

Strict Middling.

Next he examines a sample showing a degree of dark shade below that of the white type of **Good Middling**. He opens the sample and finds its face not so smooth as the previous types examined. He sees sleekheads, several pieces of trash of each of the larger forms and also a showing of pepper trash. A stain spot and a fugitive mote are to be seen. It shows a fairly uniform fiber length of one inch, and he grades it, and the line of slight variants grouped with it, **Strict Middling**.

Middling.

The board is now cleared and made ready for a very large array of samples. We see that in these there is a deeper or darker shade, just enough to mark a color distinction, when compared with those of the preceding lot, yet they could not properly be described as falling below a semi-bright pale white cast. A single specimen being taken for examination, the classer sees that the smoothness of its face is marred by several pieces of broken fleak trash, and that similar pieces

have been rebroken into finer parts and show plainly, but not to a damagingly conspicuous degree, in the form of pepper trash. The curling forms of immature cotton and one or more small flecks of stain are in evidence, but he sees that these have not weakened the fiber, nor established the character of **inequality** to a hurtful extent. He passes on in his examination till the entire lot has been classed. In all he finds some slight variations in color or impurities from that first examined, as each of the lot differs, in some respects, from all the others. You see, as he does, that the first specimen examined is approximately near a central or pivotal type, and that others are its admissable variants. As the classer calls and the owner checks, this entire lot is graded **Middling**. The variants have maintained their approximate relationships to the central type, by keeping within the limits of the quarter grades, **Fully Middling** and **Barely Middling**, as they show to be better or worse than the mean types.

Strict Low Middling.

The next "boarding" presents a line showing another drop in shade. With only one or two exceptions, none of them can be graded as high as **Middling** on forbidding color alone. A specimen sample shows that in addition to a darker color, it carries heavy loadings of trash, nearly or quite double that allowed on a **Middling** grade, other impurities are noted in a corresponding increased degree. The suspicion of the classer is aroused, and he now begins an examination of body. He finds by breaking and measuring that the staple has a standard length of about one inch, that its **inequality** is not excessively great, and that the brittleness shown in hand clasp is due to overloadings of impurities. Some of the lot are brighter than the specimen first taken, yet bear the same showing of loadings. Others are slightly darker but are much cleaner. One by one as the lot passes the inspection of the classer, his call of **Strict Low Middling** is accepted by the seller.

Low Middling.

Now a yet darker line of samples is presented. Except as to a deeper shade of duskiness and a slightly increased measure of impurities, there is nothing to distinguish this line from the preceding lot. There is, however, a greater uniformity of color, and color is to be taken as a ruling characteristic of this grade. With perfect agreement, classer and seller place this lot in the grade of **Low Middling**.

Strict Good Ordinary.

A smaller lot is now presented. He selects a sample which shows a still lower shade of color than that of the preceding exhibit. It has a rough face badly marked by stains and trash. Its staple he examines closely, and finds it to be from seven-eighths of an inch to one inch in length. He finds its breaking strength unimpaired, but that the objections of **Inequality** and impurities take it below the **Middling** grades. He classes it **Strict Good Ordinary**. Others of the exhibit, though varying somewhat in appearance from the first, are placed in the same grade, which classing is accepted by the seller.

Good Ordinary.

A few other samples are offered. These all alike, in addition to low color and trash, show signs of frost stain and other forms of affected fiber length and strength. The staple body, however, is not so badly affected as to reduce it below the grading of **Good Ordinary**. It is so classed and accepted.

Storm Cotton.

A lot of storm cotton is now presented. Several samples of white standard stapled cotton are examined. They are found to be so loaded with trash that the grading of the cotton becomes a secondary matter. He places them, severally, according to their appearance and **rate value**, in the grades of **Strict Low Middling**, **Low Middling** and **Strict Good Ordinary**.

Inferior.

Two other samples only remain to be examined. They are very bulky, two or three times the usual size, and upon being opened they look little like a cotton exhibit. They fall far below the grading of **Good Ordinary**. The classer prefers not to take them, but his principals have purchased the lot, and these two bales are a part thereof. We see a bulk composed of fibers of different length, varying from one-half inch to one inch, in part sound and strong, but with this rough presenting is a large mixture of frost stained and other unclean and damaged fiber.

Such cotton can not be graded. It can only be rated. Classer and seller agree that it would clean out at the mills about forty per cent long and strong staple, and that the remaining sixty per cent. of waste would not more than balance in value the cost of carriage and cleaning. Upon this basis of agreement the two bales are taken at forty per cent. of their weight, and classed **Good Ordinary**, or the lowest commercial grade. And now the several hundred bales we have seen classed, stand lined up, each having the consignment mark of the purchaser, ready for immediate shipment. We will retire and think of the interesting work we have witnessed.

THE Cotton Grader

OR How to Classify Cotton

The above titled work is here reproduced as published in 1908. It is made a part of these lessons. The following pages, including Preface, are with only a few slight changes, identical with the original publication. The student will find all therein that may be taken as supplemental and explanatory of Pen Pictures. (Used by consent of lessee.)

PREFACE

This Book is intended to give a clear, comprehensive idea of the **Art of Cotton Grading and Classifying**. As to whether or not that work has been accomplished, he who reads it with the view of learning the **Art** will be rewarded. The **Fiber** is made the unit of classification. Every form and variety of **Fiber** is described and every character of impurity that might affect it is discussed. As these conditions are shown and explained, the grade or class to which that particular sample or kind of cotton belongs is given. The way of examining is made so plain that any one can understand it.

This is the First Work of the kind ever published. Writers, like buyers, have seemingly considered the subject beyond the comprehension of an ordinary **Farmer**. At least for some reason they have acquiesced in the buyers' opinion that **grading** and naming the price of Cotton was something of which the Farmer should exercise no **primary judgment**. Just a little agitation has aroused the Farmers to a sense of their helplessness in this respect, and when they are told that it requires, in connection with a very short treatise on the subject, only a limited course of practical application in their own homes to make them fairly proficient, they will doubtless profit by the opportunity presented in this small yet complete exposition of the subject. Every Farmer should know how to grade his own cotton.

The Author.

COTTON

As to variety of subjects and quantity of matter, much has been written about Cotton. We have books and volumes or books that tell us about its antiquity, the countries where it may grow, the various kinds of Cotton grown, how and where it is manufactured and how the farmer should plant, fertilize, cultivate, gather, gin and haul it to market. We have books that tell us about machinery for manufacturing the By-Products, others full of statistical and other information, touching upon the future labor to be used in its production, or giving the great Exchange system of fixing its price. In fact, everything from the planting of the seed to the problem of transportation has been written about without limit.

Not Everything.

No; there is one thing about which, as a subject, no line has ever yet been written. If this effort shall go out to the public, it will be the **First** to appear as a written thesis upon the question of **Grading and Classifying Cotton**

The farmer has been instructed in the way best to plant, cultivate and gather, but only by chance has he ever learned the difference between the grades of "Fair" and "Inferior" cotton. He has been educated to hold his cotton for a higher price, but he, the average farmer, does not know whether he is holding "Good Middling" or "Low Ordinary."

It is contended that no valuable instruction of a theoretical character can be given upon the subject of **Grading Cotton**. This is not true, only as it may mean that a thorough knowledge of the art must combine the practical with the theoretical. It could as reasonably be claimed that a man who is not a college graduate does not know anything, and that no acquaintance with a subject short of a perfect knowledge has any real worth. The idea is absurd. If an expert classifier should say to you that a sample of cotton is of a certain grade and class

because its staple is of a given dimension, its color is white, it feels live, flexible and elastic to the touch, its fiber is uniformly good, it shows no injury from previous dampness, it is not stained and it is comparatively clean, could you not see these several and various points of classification as he mentioned them? Suppose next that instead of having the sample in hand, he should simply describe one of that kind, and ask you to select from a lot of cotton before you a bale that would correspond with the described grade, could you not on first trial, perform the assigned task? Again, if instead of communicating with you orally, he should write out this description, could you not as well, or better, comply with his request? Could you not soon return to him and say: "Here, Mr. Classifier, is your bale of Middling Cotton"? Assuredly any intelligent man could do this, and what he could do in selecting this grade he could do in selecting any other.

We are creatures of custom. Often men fight, bleed and die, zealously, heroically and patriotically, defending causes, which, in so far as they may know through personal investigation, might prove unworthy the name. Custom is a tyrant. It is a ruler whose sway is never abated by age. Precedent is a despot, unfeeling, exacting and domineering. "In the way our fathers trod" is a commendable sentiment of veneration, and as a guide for our steps may have many shining exceptions, but, in the main, the path which should have been lighted by experience remains darkened, and leads us often over a rough and stony road. Who declares that the farmer of the South, he that grows annually twenty bales of cotton, is utterly disqualified, under any character of preparatory effort, to grade his own cotton and know what it is worth? The answer is, "Custom." How is it, the intelligent farmer, man or boy, can not do this, when almost any city lad with a half season's warehouse experience can do it? The answer is, "Precedent has arranged it so, and precedent must be observed." Why is it these selfsame cotton growers make no

effort to set aside those customs and precedents which are so detrimental to their financial interests? The only answer seems to be that, though it should be quite expensive, they prefer to "Walk in the way our fathers trod." It is presumptuously assumed by the cotton buyer, both agent and principal, that no one else connected with the transaction but the buyer is capable of judging the grade and value of the cotton to be sold and bought. This is tacitly conceded to be a proper assumption by the farmer's commercial neighbor's and friends, and by him is helplessly agreed to, all because it has been a custom so to do. So strongly has habit or precedent established itself in relation to the question of **Cotton Classification**, that the idea of "special professional acquirement or gift" seems to prevail in the face of all logic and argument to the contrary. In a conversation with an old cotton buyer friend the fact was mentioned that this **Guide to Cotton Classifying** was being prepared. He expressed surprise that such a work should be undertaken, declaring it wholly impracticable. He went so far as to declare he would not be willing to go upon record and risk his future reputation by making a written description of any grade of cotton. When questioned closely, as to why not, he could not in answer go beyond the illogical word, "unprecedented." However, he admitted that a very great deal of "valuable theoretical" information could be given. "Theoretical" information is exactly the kind proposed to be given, and it is offered with the honest hope that it may prove "valuable." Until the seller and the buyer can meet upon common ground, both knowing the grade and market value of the article to be sold, the man who does not know is wholly at the mercy of the man who does know.

Classification Basis.

Cotton is classified, not according to variety, but by Grades and Types as indicated by the staple and its condition.

Variety means kind, and its designating name refers, pri-

cipally, to the place, country, or part of the country, where the soil and climate are adapted to the growth of that particular kind of Cotton. Or a variety name may be given to an improved species.

Grade embraces staple, color, condition and quality.

Staple is the measure of the fiber, as to whether it may be long or short, fine or coarse, strong or weak, with or without natural twist, uniform or irregular, dead or live, elastic or brittle—the whole comprising the qualities of **length** and **strength**.

Color in grading applies to white, as a base, and to all the regular shades from that to the brown or Nankin. It does not include stains, fleck-marks, spots or other discolorations.

Condition follows upon a multiplicity of causes.

(1) **SOUNDNESS**—as indicated by strength of fiber, or by freedom from the effects of present or previous dampness.

(2) **FIRMNESS**—as it may feel responsively live or dead to the touch—elastic and flexible.

(3) **CLEANLINESS**—as it may have more or less trash or "dirt."

(4) **DISCOLORATION**—as from boll stain—from dampness in seed—from possible soil stain—from the dry burr marks of late picking—from hoop stain and from oil stain.

(5) **MOTES**—as from faulty ginning or from immature seed and seed ends.

(6) **INEQUALITY**—as from mixing different kinds or varieties of seed cotton.

(7) **SPOTS**—as from mildew or fungoid or from foliage rust-stain; and,

(8) **NON-DEVELOPMENT**—as shown by the lack of spiral form or natural twist in the fiber and by the unequal length and strength of the fiber resulting from a mixture of ripe, half-ripe and dead staple.

Quality is that estimate of rating which is based upon the

combination of staple, color and condition. To tell the quality is to name the grade or classification.

Type.

Type is more properly a manufacturing term as applied to grades, but it is one with which the field classifier must be acquainted. It is a selected grade of cotton about which and with which other approximate grades, higher and lower, may be combined in harmonious blending. This produces a mixture differing from all its component parts, better than the lower but not so good as the higher, and, of course, unlike the original type grade. By this method, classifying by the manufacturer is reduced from the broad range of diversified grades, to a few types which embrace the better part of these grades. The economy attending this order of arrangement gives, from the several grades selected, a uniform finished product; whereas, if each were taken separately, it would, in itself, constitute a specific type. It also enables the manufacturer the more easily to supply himself with stock, as a large bulk of cotton of any given classification is not always readily obtainable.

Types are made up at, or as it may be for, the mills and factories by qualified expert cotton graders. Here you will find an artist who knows his profession. He does not know, necessarily, and he need not care, whether the cotton he must examine so closely is worth in the market one dollar per pound or only one cent per pound, but he does know that the several lots or parcels of cotton he has selected, varying in weight and classification, after being mixed and taken through all the preparatory processes, must produce a combination which shall give, as a finished product, one without noticeable difference from that resulting from a previous combination of a similar character, and, likewise, from others he must make in future to fill a uniform large order.

A knowledge of this kind has been the professional capital

of the field cotton buyer, as a lack of its possession by the cotton producer has long kept him on the roll of the victimized. Ye buyer understands well the art of "putting up" types, and though there could be no harm in "putting up" an honest type, it is barely fair to work the damaging "average up" plan on the farmer, when in most cases it means "average down." Under our present system of handling cotton, the buyer is entitled to his comission or his rightful speculative profits, but the "average up" plan should be stopped by the seller till he, himself, learns how to "average up." Every farmer who grows cotton should know how to grade, classify and type or average up any assorted lot or number of bales he may offer to sell. In the sense here discussed the term type means to average, or to combine different grades for marketing at a "lump figure."

Type is also a term of distinction used by manufacturers to indicate variety. In the American mills' classification we have the Sea Island, some foreign, and the several Uplands varieties each constituting a type.

Varieties of Cotton.

Many exhaustive treatises have been written upon the Botany of Cotton. For a history of the plant these works are referred to, but in this effort no attempt will be made to go beyond the naming of the different foreign and home varieties and showing their textile comparison.

Foreign Cottons.

The Brown Egyptian is a very fine fibered long stapled cotton. It is used in the manufacture of high grade yarns and fabrics, and a considerable quantity is annually imported into the United States for that purpose. All other varieties of Egyptian Cotton are considered inferior.

The China and India cottons are both of very low grade.

The China is consumed entirely at home, but India exports a large part of her raw product to Europe.

The South American cottons are of many varieties. The principal two are the Brazilian and the Peruvian. The Brazilian goes chiefly to Europe, but our American manufacturers use a great deal of the Peruvian (red) in the manufacture of special lines and in the making up of types. Other varieties of the South American cotton are classed with the Mexican product and are considered unimportant both in bulk and quality.

American Cotton.

This designation applies only to the product of the United States of North America and the adjacent islands.

Sea Island is considered an American product. It is grown principally on the islands off the South Atlantic coast. All points of merit considered, it ranks highest in the grades of cotton the world over. Sea Island cotton is grown also on the main land of Florida, Georgia and South Carolina, that of Florida being the best, but still distinguishable as a lower grade than that of the island product.

The American mainland cotton and its many classes or kinds, both native and improved, is next to be mentioned. The quantity of this general variety is greater than that produced by all other parts of the world combined, and the value set upon its middle or basic grade controls the price of cotton in all commercial quarters of the globe.

Sub-Divisions.

The most important of the several divisions or varieties of the American mainland cotton is that known as the Orleans or Gulf. These names embrace a number of included varieties, all, in the market, being understood as virtually the same. Its staple is both long and strong, measuring in

length from one inch to one and one-half inches, and having a tensile capacity highly valued by spinners.

Products from the fields of the higher inland river valley lands of Mississippi, Louisiana, Alabama, Arkansas and Tennessee are only slightly inferior to the Orleans, but they constitute a marketable variety.

Texas cotton stands alone as a separate variety. It varies from seven-eighths to one inch in length of staple. The product of the Brazos Valley, however, ranks above this rating and is appreciated in both the home and foreign markets, much above the commonly accepted Texas variety.

Uplands embraces all that yield coming from the territory not designated as the home of the several special sub-varieties mentioned. Uplands cotton has a staple from three-fourths of an inch to one and one-eighth inches in standard length.

HOW TO CLASSIFY COTTON.

A carefully grown, well developed, cleanly gathered, properly ginned and wrapped bale of white Uplands cotton forms the basic center from which all higher or lower grades are determined. Uplands has its many "Improved" varieties, and its sub-varieties are almost as numerous as the varied characters of the soil, the latitude and the altitude of the fields where they are severally grown. Uplands, however varied is Uplands and a classifier who may be able to grade one of its varieties may as easily grade all of them.

The Principle of Cotton Grading.

In every development there is a basic point from which growth begins. It is well known that a proper solution of any mathematical question depends upon a careful starting with its unit. As applied in mathematics so the rule must

be made to operate in all things. If we wish to understand by investigation any given proposition, we must work out from its initial point. We must go to its base for our first and only correct comprehension of its parts. Again, there is a law governing the economy of action which prohibits the attempted performance of two different acts at one and the same time. "Do one thing and do it well, then do the second thing and do it better" is a nice old proverb. If you wish to learn the art of **grading cotton**, you should take up the study alone, and let every non-essential collateral element of cotton be put aside for the time. From this preliminary it might be argued that in the cotton seed is the germ, the unit, the initial point from which to move out in the start to study cotton. I have before told you that volumes and volumes have been written upon cotton with our subject **Cotton Grading**, left out. These writers begin with the seed and have taken you everywhere else but to a knowledge of classifying the staple about which, otherwise, they have written so much.

Our subject, **Cotton Grading**, has its unit, an initial point, a starting place, that is wholly and entirely its own. If from a bale, or any large bulk of cotton, you should take away, part by part, the smallest quantity you could separate from the general mass, in the course of time, though it should be a long time, you would come to a last small part, a little filament, and this is your Cotton Grading Unit. It is a simple.

Fiber.

To learn to classify cotton here your study begins. You must know all about the single fiber and its combinations with other fibers of the same or of different kinds. Despire not the study of small things if you would undertake the consideration of the cotton fiber, for you are to take only one and it is so small that it would require one hundred and forty millions like it to weigh one pound.

The cotton fiber casually observed presents a deceptive appearance. Viewed thus it looks to be a small, long, solid and perfectly round body, but upon closer observation it shows itself as a narrow flattened tube, twisted in form, and in this respect, resembling somewhat a spirally curled hair. The fiber has its tip extremity closed but its base is fastened like a mouth to its mother seed, from which it feeds itself by a capillary process to maturity. Fiber does not taper in form. It has the same diameter in all the parts of its length. It has a large or small cavity, and is flat, or retains more nearly its apparent cylindrical form, according to its full or its imperfect development. A perfect fiber is covered by a thin clinging dustlike membrane, called by botanists the "cuticula" or skin. This covering sometimes goes with the fiber through the factory into yarns or other products, but oftener it disappears in the form of gin dust or mill dust. It is comparatively weightless and neither adds to nor detracts from the value of the staple.

Fiber may be fully developed and still be short or long according to its parent variety. The range of length is from one-half inch to two inches. This measure of fiber length is designated its staple and is the first item to be considered in grading or assigning value. Other items, however, relating to the fiber construction are to be reckoned. They are the core or diameter and their strength or tensile power of resistance.

The following shows the relative diameter, length, and strength of the fiber belonging to the several varieties presented:

	Length Inches	Diameter in.	Breaking strain, grains
Sea Island	1.61	.000640	83.9
Orleans	1.02	.000775	147.7
Texas	1.00	.000765	109.5
Uplands	.93	.000763	104.5
Egyptian	1.41	.000665	127.2
Indian	.89	.000894	160.7

This table is given to show that the fiber with the greatest diameter is the strongest and that usually the coarser grades of fiber belong to the shorter staples.

The measure of tension or breaking strain of a single fiber is estimated by spinners to be from five to ten grams or from eighty to one hundred and sixty grains, or an average of about fifty fibers to sustain a pound.

A Closer Study of the Fiber.

Again let the fact be emphasized that the cotton classifier must be perfectly familiar with the unit of classification. Impurities found in cotton are to him a secondary matter. They are usually easily traced and their causes located. Never let any appearance or condition of a cotton sample take you away from a study of the fiber as the part most affected by that condition.

After the cotton boll fully matures and opens, a few days of exposure to air and sunlight are beneficial, in the way of giving to the slower maturing parts of the pod mature development, and to the whole spiral individuality of fiber. But if left longer than this, exposed to heat and air, the fiber will tend to become harsh and brittle, and the longer so left the more perceptible these injuries become. Besides, if strong winds prevail, dust and sand will be blown into the open cotton, and if it should rain much, water stain will follow.

Natural Twist.

The **Natural twist** of the cotton fiber varies from about two hundred turns to the inch in good grade Uplands to three hundred turns per inch or more in the best Sea Island product. In connection with its length the value of the fiber hinges upon this quality, as in manufacturing the joining process with other fibers depends upon this as an interlocking principle. Manufacturers use the microscope to ascertain ex-

act spiral character, but this does not imply that the ordinary grading classifier, with his natural vision, holding a sample section in hand, could not determine quite well enough for practical purposes the presence or absence of this quality, just in the same way he would form conclusive opinion as to length, strength, and other special characteristics of the fiber under examination. **Natural Twist** is not to be confounded with the **Elastic Twist** of a live healthy fiber. It is the vital force, however, of **Natural Twist** that gives the kinky form of **Elastic Twist**.

Unripe Fibers.

In every sample of cotton, from the highest to the lowest grade, half-ripe and totally dead fibers may be found. Nature in many instances may be able to parade its lines of perfection, but as small a quantity as a single pound of perfectly developed and matured lint cotton is not included on its list. In a single pound of cotton there are about one hundred and forty million separate and distinct developments of independent fiber. In a bale of cotton there are about five hundred pounds. Then, though a bale of cotton may be classed "Fair" or "Extra" or "Good," terms representing the highest classification of the leading three varieties, we are not to look for a **total absence** of any of the defects upon which such classification is based. As to half-ripe and dead fibers, their presence is natural. Blights may fall upon the bearing plant after one-half the bolls have matured in a healthful form. In like manner the bruising or breaking of limbs on a part of the stalk would cause a similar order of variable ripening. Fibers in the same boll do not all mature simultaneously, yet the boll opens to accommodate the ripe and presents the unripe to the picker in its undeveloped state. Therefore, half-ripe and dead fibers are to be looked for naturally in every sample of cotton. Of course, if they should form too great a percentage of the general bulk, which is sometimes the case, a corresponding

lower estimate should be made of the grade, but you should know that "Dead Cotton" is a favorite term used by unscrupulous buyers who seek to undergrade. We do not need the microscope to detect the presence of half-ripe or dead fibers in a specimen sample. The half-ripe is shorter than the mature staple and has less spiral turns in proportion to its length. The dead fiber is like a lifeless parasite winding around and clinging to the mature and the half-ripe fibers. A careful examination, suggested by lacking elasticity and flexibility, will show the grader these qualities. If only the normal quantity is found they may be passed unnoticed, but if they appear in exaggerated form the grade is to be correspondingly lowered.

Broken Fiber.

The inferior or unfit condition of a gin, or the rapidity of its revolution causes the saw-gin to double cut the fiber, taking it from the seed in two sections or leaving a part of the fiber with the seed. This does not occur with the use of the roller gin, used for long staple cotton, but sometimes, with it, there is a rude rupture of the fiber noticeable. With a saw-gin this defect would almost certainly go through the entire bale under examination, and perhaps through many others. It is easily discovered and detracts considerably from the otherwise good grade of cotton.

Stained Fiber.

One drop of ink in a glass of clear water utterly mars the purity of its appearance. A less proportionate part of stained cotton in any sized sample would indicate a greater apparent departure from perfection. One stained fiber in a small pinch of cotton, pulled through the fingers of the examiner shows like a multitude of wriggling rainbows circling a section of clearly outlined horizon. Stains, whether important or unim-

portant, are good capital for the decrying buyer, who would take advantage, in a purchase from the uniformed producer. Under the head of "Conditions," on a preceding page, are enumerated and named the different kinds of lint-stain, considered by the field buyer, in his deals with the farmer and the country merchant. Here I shall refer to the commercial stain only.

Boll Stain.

Boll Stain is caused by water that has entered a partly opened boll and saturated the inner pod. The coloring matter from the inner membrane is washed into the general lower body of the pod and gives to it a red or brown shade. This is considered of not much importance, as in the manufacturing process of dyeing and sizing such stains would disappear.

Hoop Stain.

Hoop Stain is nothing more or less than iron band rust and really, in itself, amounts to only the loss of a few ounces of cotton to the bale. However, it suggests a character of neglect or want of care pointing to other impurities, and forms of damage, and furnishes a good excuse or cause for lowering a grade.

Oil Stain.

Oil Stain is caused by the crushing of the seed in the gin; the exuding oil giving to the fiber a yellowish color. If this staining should be general throughout the parts of a bale of cotton its value would be much reduced. Its waxy and glue-like nature retards the process of carding and spinning, and such cotton is often wholly rejected by spinners. A second kind of oil stain is only a **probable stain** manifesting its almost certain future appearance in the form of immature seed in the meshes of baled cotton. Separation at the mills is a task too

difficult to be undertaken, and if left in, they are crushed by the mill machinery and regular oil stain is the result. "Seeded lint," as it is called and oil stained cotton are to be graded alike.

Fungoid Stain.

Fungoid Stain is but another name for mildewed cotton. It may follow as a result from a number of causes. It ranks with "Damaged Cotton," and there is no special grade to which it may be assigned.

Fiber in Bulk.

Fiber in bulk is cotton lint in large or small quantity, or a mass of fibers taken in aggregate form. In treating fiber in bulk, the single fiber is supposed to have passed examination as the basis of staple, or as it is to be considered the representative of the general class of fibers forming the larger mass to be graded as a whole. Cleanliness and soundness are now the points to be considered.

Broken Leaves.

The leaves of the cotton plant, and sometimes bearded or hard stemmed grasses in badly cultivated fields, are **natural** factors in reducing the variety and grade of cotton. A dry leaf in close proximity to the open boll is very frequently included in the hand grasp of the hurrying picker. If it is not **removed**, it goes with the mass of seed cotton through the gin and is broken or cut into small fragments. The smaller these particles of leaf are made by the gin, the more thoroughly they become mixed with the fiber, and the more difficult they are to remove in the preparatory processes at the mills. The larger pieces may fall out of their own weight, and on this account are not considered so injurious to the grade, but the smaller ones remain, and, if very fine, are considered a clinging and

inseparable impurity. The skeleton of the leaf, too, a stick-like tissue, often becomes a part of the foreign mass. It is classed "inseparable," and is, therefore, correspondingly objectionable. These impurities, as you see, are themselves to be graded. If the cotton sample shows leaf trash in large pieces without the stem or skeleton accompaniment, its grade is not badly affected, but, if the trash shows in the form of small, pepper-like particles, or has the stick cuttings, a careful grader will mark it down.

Broken Seeds.

This constitutes what is known as one of the "Heavy Impurities" of cotton. Broken seeds are usually covered with lint or fiber ends, and these becoming interlocked with other fibers are difficult to remove. In **Grading**, these impurities are called "Shell" or "Bearded Notes." The surplus parts of body or fatty ends of seed are often cut into the lint roll by close ginning. These pieces are also called "shell," and rank with heavy impurities. Cotton affected by these impurities is to be graded with the lower type of "Broken Leaf" cotton.

(Note if the fungus end above mentioned should carry a part of the main body of the seed. In such case, oil stain would result.)

Sand and Soil.

The winds sometimes fill, or, as it is termed, "load," open cotton in the burr with sand, and again, often it is blown or knocked out upon the ground and becomes impregnated, more or less, with sand and other earth matter. This affects only the weight of the cotton and not its quality, unless soil stain or mildew should follow. Spinners, however, claim that the extra frictional wear to machinery and danger incurred from fire render it less desirable, and, therefore, it is brought to a lower grade.

Dampness.

Dampness or **moisture** is not to be considered an impurity, only as it may become the possible producing agent of mildew or rot. To form these there must be a meeting of the damp part of a bale of cotton with the air from without. Such meeting would afford the needed means of evaporation, and thereby the cause of decay or rot would, in the main, be removed. Cotton dry enough to gin, if immediately compressed, would be safe from serious harm to be occasioned by dampness. Even cotton "wet down" in the compressing or baling process would suffer little injury therefrom, as evaporation would be very rapid. If, however, the place of storage should be damp, or if by constant exposure to water and exterior dampness, evaporation should be prevented, **mildew** would follow and **rot** would be the result. Cotton is a great absorbent. A bale of cotton placed over an evaporating pool will drink in dampness like a thirsty animal drinking water. Continued absorption with the avenues of evaporation closed would soon reduce the fiber and deaden its twist. With its quality of elasticity thus destroyed it is in the first stage of decomposition.

In grading a bale of damp cotton, if the moisture is found to be only near the surface, produce a specimen sample below the damp part and classify as if no water had been observed. In weighing, the proper deduction for water-weight can be made. If the dampness should extend into the interior of the bale, the classifier is placed in a dilemma. Excessive dampness disturbs normal elasticity and he will be able to judge of this quality only as a collateral adjunct of the length and strength of the staple under examination. He will be able easily to know whether this dampness is new or fresh or whether it is an old water sob. If the latter, the form and strength of the staple, besides the changes before mentioned, will show rank abnormal differences in fibers of apparently even development. Parts of the same staple will show differ-

ent degrees of elasticity, and an unmistakeable odor of mustiness will manifest itself. Cotton in this condition, no matter what it once may have been, is now to be graded "Inferior." If, on the contrary the bale should appear to be generally damp, and otherwise sound, its grade is not affected and a deduction for water-weight from the bulk weight of the bale is all that need be done in fairness to seller and buyer.

Structural Composition.

In a work on Grading and Classifying it is not necessary to go into the "Chemistry" of the cotton staple. However, as the laws of Fermentation, Decomposition, Fungi, etc., operate with more or less force according to the physical stability of the substance to be acted on, any one desiring thus further to investigate is referred to chemistry as applied to these questions, and in that connection, the following structural analysis of cotton is given:

Fiber	83.71 per cent
Water	6.74 per cent.
Free Nitrogen	5.79 per cent.
Ash	1.65 per cent.
Protein	1.50 per cent.
Fat	.61 per cent.

100.

Porosity is a general property of matter, but the surface pores of a single fiber of cotton are too nearly allied in magnitude to the atomic nature of their surroundings to give passage way to the combined elements composing water. Hence moisture of cotton is due wholly to fiber-layer and capillary avenues of ingress.

Dryness.

In connection with Dampness is to be considered a principle

of Dryness, that affects the worth of cotton. A sample of cotton of average high grade, in its normal state, contains nearly seven per cent. water. Immerse it in a vessel of water till it becomes thoroughly saturated, then expose it to the air and sun for a few hours and it would show only its normal quantity or part of water. Subject it next to a heating process. Confine it in a bake-oven or other drying place till, as nearly as possible all moisture is driven out, expose it again to the air and from that element it would soon absorb moisture enough to have its original normal quantity. It is this quality of dampness that enables the classifier to judge, through its character of elasticity and flexibility, the presence or absence of the necessary **vitality** in a sample under examination. A healthful well developed capillary state of the staple gives a normal condition of dampness. This in turn through the elasticity and flexibility of a sample containing it proves and shows the origin of its presence.

Flexibility.

As a rule flexibility indicates strength of fiber, though short, coarse and strong staples are rather more harsh than flexible. A sample of the latter kind, in response to the touch or clasp of the hand, will show sufficient capillary (cavity) force to indicate its right position in the line of grades. If from any cause a sample staple should show a quality of dryness below that of the normally damp stage, it would be indicated by a harsh, brittle yielding to the touch, and upon closer examination it would be found wanting in some of the characteristic essential points of good grade.

Grades of Cotton.

In an American cotton crop of twelve million bales, if graded by the bale, it may be truthfully asserted that twelve million different and varying grades would be found. In other words, no two bales could be found that would sample

"through and through" or "out and out" in exact likeness. Notwithstanding this fact, there might be found, say, one-third of this number of bales that would be so nearly alike as to be classed together as one type or grade. Another small fractional lot, better or worse, higher or lower, finer or coarser, might be found that could be placed in another grade. And so on, another fractional part of the twelve million bales might be found having a general bulk likeness and similar grade quality, till the whole could be embraced in about twenty of these fractional divisional parts. These twenty or more parts might again be sub-grouped into seven or eight distinct quality divisions, designated "Full Grades," with which higher or lower approximately similar grades may be typed, to compose a bulk lot of cotton of a required given classification. These approximates are designated "Half" and "Quarter" grades

The American Exchange Market.

As an American proposition, both the classification of cotton and the price to be paid for it are regulated by a class who have no interest, whatever, either in its production or its manufacture. We have two great commercial or market "Exchanges," located respectively in New York and New Orleans. Seats in these "Exchanges" are of high commercial value, and are of a limited number. The membership composing them is supposed to be "strictly" American, but it may be remarked, *soto voce*, that the supposition is "strictly" a supposition. From these places the men who have no part in producing, hauling or manufacturing cotton, designate the terms by which its differing grades shall be known, and dictatorially declare what the market price shall be. This is only another way of showing our American disposition to bow to "custom," respect established "precedents," and "walk in the way our fathers trod." But the right or wrong of this custom is not a matter to be discussed here.

Grade Classification.

According to American Classification there are seven full **grades** of the mainland varieties with which, however, neither the Florida nor the Georgia and South Carolina long or Sea Island staples are to be included. These seven grades are: **Fair, Middling Fair, Good Middling, Middling, Low Middling, Good Ordinary and Ordinary.** Fair is the highest and best grade and, therefore, there can be no half or quarter grades above it, but, descending, all other grades have half or quarter grades both above and below them. The complete table of American grades used until recently by the commercial world is as follows:

- (1) **FAIR**, Barely Fair, Strict Middling Fair and Fully Middling Fair.
- (2) **MIDDLING FAIR**, Barely Middling Fair, Strict Good Middling and Fully Good Middling.
- (3) **GOOD MIDDLING**, Barely Good Middling, Strict Middling and Fully Middling.
- (4) **MIDDLING**, Barely Middling, Strict Low Middling and Fully Low Middling.
- (5) **LOW MIDDLING**, Barely Low Middling. Strict Good Ordinary and Fully Good Ordinary.
- (6) **GOOD ORDINARY**, Barely Good Ordinary and Strict Ordinary.
- (7) **ORDINARY**, Low Ordinary and Inferior.

This system, or catalog, of classifying terms is as old almost as the American cotton market itself. When the American cotton exchanges first were established, about thirty-five years ago, they adopted and used the old classifying terms. But within recent years they have dropped out the five grades below **Good Ordinary**, and have substituted or added thirteen new terms. These added terms are: (1) **Strict Good Middling Tinged.** (2) **Good Middling Tinged.** (3) **Strict Middling**

Tinged. (4) Middling Tinged. (5) Strict Low Middling Tinged. (6) Low Middling Tinged. (7) Strict Good Ordinary Tinged. (8) Fully Middling Stained. (9) Middling Stained. (10) Barely Middling Stained. (11) Strict Low Middling Stained. (12) Fully Low Middling Stained, and (13) Low Middling Stained. Middling is still made the basis of value, and Good Middling Tinged is placed on a par with it. The regular classification in its revised form, showing the 1907-1908 variation of values is given on the next page. The difference in value therein quoted is rather more basic than arbitrary, and is changed as the demand may increase for a specific type of cotton.

Note: the given print referred to above is not much at variance with the present differences. The matter is therefore kept before you only as a guide to the method of determining grade valuations.

New York Differences in Grade.

	Cents.	
Fair	1.75	on
Strict Middling Fair	1.50	"
Middling Fair	1.25	"
Barely Middling Fair	1.00	"
Strict Good Middling	.75	"
Fully Good Middling	.62	"
Good Middling	.50	"
Barely Good Middling	.37	"
Strict Middling	.25	"
Middling	Basis	
Strict Low Middling	.30	off
Fully Low Middling	.65	"
Low Middling	1.00	"
Barely Low Middling	1.25	"
Strict Good Ordinary	1.50	"
Fully Good Ordinary	1.75	"
Good Ordinary	2.00	"
Strict Good Middling Tinged	.35	on
Good Middling Tinged	Value of Mid.	
Strict Middling Tinged	.20	off
Middling Tinged	.30	"
Strict Low Middling Tinged	1.00	"
Low Middling Tinged	1.50	"
Strict Good Ordinary Tinged	2.00	"
Fully Middling Stained	1.00	"
Middling Stained	1.25	"
Barely Middling Stained	1.75	"
Strict Low Middling Stained	2.25	"
Fully Low Middling Stained	2.62	"
Low Middling Stained	3.00	"

Tinge.

The term "Tinge" or "Tinged" as applied in this classification refers to natural color only, and not to any stain or dye from extraneous causes. The color of cotton is strongly marked by the character of the soil upon which it is produced. Dingy, gray, cream, yellowish brown and other shades are common departures from **white**, which is the color quality of the best grades.

Sea Island Cotton.

Sea Island cotton is classed in only two (American) varieties and seven grades. The varieties are the Island proper and the Mainland. A distinction between the Florida product and that of Georgia and Carolina is sometimes made. This would give a third variety. The grades are: **Extra Fine, Fine, Medium Fine, Good Medium, Medium, Common and Ordinary.**

Egyptian and India cotton, and the South American product have each a large number of varieties, but a limited order of grade classifications. In this work it is not at all necessary to quote these points specifically, as its scope is intended to embrace only the American classification.

Grading and Light.

Again we are brought to the unit of classification, the fiber. To judge properly the character of a sample staple, we must be able to see it under favorable conditions. Since it is a reflection of the direct ray of light falling upon an object that brings it to view, the best view is to be obtained by making the line of vision and the line of direct ray to coincide. That is, in homely parlance, we must look at an object from the direction the light comes. In this, the latitude of the American cotton-belt, the sun in his path of apparent travel from east to west, sheds an inclining or direct ray from the south. In the open, that is, at the wagon or on the street, the bulk of the cotton

crop is first sampled. Here the experienced buyer, if the day is cloudless, will turn his back to the sun, and proceed with his inspection. But if the day should be partly cloudy, so that direct rays from the sun would be obstructed, he would turn from the sun to the largest belt of open skylight presented, to obtain its reflected rays as a best light for examination. On the outside, however, the eye of the experienced or inexperienced examiner would doubtless accommodate itself to the best light conditions, the only difference being that the examiner with experience would take his position naturally and quickly, whereas the other might move in the line of experiment. Off the street—within walls or under shelter—with samples on the board, the item of good light is all important. Light openings admitting direct rays from the south southeast or southwest, are usually too beaming. Similar objection may be raised to the overhead light, on account of its "borrowed" glare. The best light, then, is that to be reflected on a bright day from an open clear expanse of northern skylight. This affords a soft mellow light, such as enables the examiner to discern the shades of color.

Color.

The highest grade of cotton is naturally bleached and must be perfectly **white**. Cotton having a corresponding quality of staple, cleanliness, flexibility and general purity, but showing a gray, cream, or brownish cast, would be considered "off color," or, as it is termed in the newer classification, "Tinged." Cotton that is tinged cannot be classed with any one of the highest four grades—that is, with Fair, Strict Middling Fair, Middling Fair and Barely Middling Fair. The name, "Fair," being given to these grades, as we may understand, precludes the possibility of "**Tinge**." Cottons of equivalent grade in every particular, except color, vary about one-half cent per pound in favor of the white grade. In the "Grade List" issued by the New York Cotton Exchange September, 1907, Good Middling was rated one-half cent higher than Middling. On

the same list Good Middling Tinged is given the same value as Middling Untinged. This order of difference in value prevails throughout the list and is to be accepted as a law which fixes the color variation of value at about one half cent per pound.

Vision and Touch. --

Vision and touch are the co-operative agents in the work of classification. The eye and the hand move in harmony to a quick and practical decision. A representative sample is procured by the examiner. He plucks from the larger parcel a smaller quantity in a seemingly careless manner, yet he gives the very closest observation to the particles of fiber as they may kink, twist about, cling together, and show such other characteristic resistance or yielding to separation as would indicate certain points of grade. He compresses the detached smaller part in his single hand, noting the easy pliability, velvety softness, naturally live moist touch, or, as it may be their opposites, harshness, dryness and brittleness, judging in a moment the presence or absence of that flexibility, elasticity and responsiveness which give vigor and strength to the staple body. He turns again to the staple. With thumb and finger he separates or pulls apart a smaller portion that he may see the length of the fiber, and judge by its resistance to separation its general quality of strength. He will note that the fiber is of uniform length or not; that it is coarse or fine, that the layers lie in parallel line or departing angle, the presence or absence of gin cut and dead fibers, and particularly will he note the spirality of movement and the quick or slow action of the ends of the separated fibers, as they coil and move back to the bulk which has retained them. Again he will turn to the general sample. Of its dampness and soundness he has already judged. He looks for impurities. He sees broken leaves, sticks, shells and stains, or does not see them. He may find much foreign substance and impurity, and he may find only the few that are termed natural. In the

meantime color has been determined, and the whole question of classifying that grade has been settled.

In the matter of Grading cotton the governing principle is the character of the staple. With good vision and touch it is easy to know its quality. Then, as a rule, first locate the exact Grade of the staple, and place it in that classification regardless of whatever defects it may carry. Next, proceed to list its impurities. If it has no impurities or defects, it belongs in the grade assigned to its staple, but if it has, note them, one by one, and reduce the classification accordingly.

Where the Farmer Stands.

You will observe that under the present classification the white grades range from "Fair," the highest, to "Good Ordinary," the lowest, embracing in number seventeen grades. The quoted difference in value of the extreme grades is three and three-quarters cents, or an average of nearly one-quarter of a cent per grade. Grading cotton, in so far as the farmer is concerned, is either a ridiculous farce, or cotton buyers, as a class, are superior morally to ordinary humanity. There are doubtless many honest grading buyers, but many does not mean all by a great number. The opportunity is afforded, and the temptation is great. The farmer does not know, and if he is willing to prove his satisfaction with a "top of the market" sale by "setting up" dinner to the buyer after the transaction, all conscience twinges are alleviated. Let us take a good "Uplands" producing county in any one of the states and from September and October clean pickings of well matured good stapled white cotton suppose 2,000 bales should be marketed. According to these conditions 1,500 of these bales ought to be graded "Strict Good Middling," some of them higher. The chance would be, however, that not one in the entire lot would be graded above "Middling" and many of them below that grade. Middling is the basis of the market quotation, and the farmer who gets the highest quoted price and returns to

his neighbors with the boast, "I got the top of the market for the most of mine," is the victim. In such a case the actual loss to this one county of cotton growers would exceed \$5,000. Yet, year after year it is done, and thus it has become a **custom**. While digressing in this line it is proper to state that the spinner—the manufacturer—is not a party to this one-sided deal. When the cotton is presented to him every grade and type is priced according to its value—no more and no less. In this latter transaction all parties are equally well informed. **But the poor farmer! Where was he?** In all his long life he has not had even one little short week to give to

A Study of Classification.

Keeping in mind the fact that perfect staple and absolute freedom from impurities are not to be expected in the highest typed bale of cotton, we have none the less a standard highest grade. From this grade to the basis, the middle or medium grade between the highest and the lowest, including "Strict Good Middling Tinged," there are ten steps of descent. If we should take a bale of our best stapled and cleanest white cotton and grade it "Fair," there must be some falling off either in quality of staple or character of purity, or both, to make the first descending step to "Strict Middling Fair." There might not appear any additional impurity and the staple might be as good, yet different, and the grade is not the same. The long fibered more fragile but finer filament would take precedence over the shorter, coarser and stronger staple with which it would be compared. As we would come down the line, at each step we should find changes in the classification occurring from difference in length and strength, lack of uniformity and other previously mentioned inequalities of the staple.

The Basis.

"Middling," the medium or middle quality between "Fair" and "Ordinary," is the basis of classification. Given a sample of white, firm elastic and flexible bulk fiber having staple of

uniform measure from above three-fourths of an inch to one inch or more in length, with a minimum showing of broken leaf, and without stain or any of the heavy impurities of shell, motes, etc., and we should have an accepted grade of "Middling." Observe there is a difference between "broken" leaf and "peppered" leaf. The latter in its pulverized form is considered a very objectionable impurity, as previously explained. No sample carrying powered leaf in quantity, or stem trash could be classed "Middling."

All classifications, higher than Middling, are supposed to be unaffected by any slight impurities they may carry. But from "Middling" through the descending grades impurities are an important consideration. Staple still holds its priority. But even a good staple loses its finer character when associated with impurities. The quality of the staple falls off, or the impurities increase, or both, in the old classification, from "Middling" to "Inferior." "Inferior" grades are usually from late pickings of short-developed or half-open frost-bitten bolls. The staple is of the lowest type, and the fiber is nearly always stained. "Inferior" has its descending grades through a varying line from bad to worse, known as "Dog-tails."

All strict commercial classification lies between the grades of from "Fair" to "Good Ordinary." These represent the extreme variations in value of about four cents. Below the grade of Ordinary, "Tinge," or the natural color of the cotton, does not affect its grade. From this point it is purely a question of staple and impurity. In this matter, if the staple is comparatively good or bad the accompanying impurities would govern its valuation. The whole list of impurities has been given on a preceding page, as well as their respective degrees of damaging character. A careful study of the question of **Impurities** should be made. "The last of the crop," is supposed to be **gradeless**, but not so; it is only gradeless as it affords the buyer an opportunity to place his knowledge against the inexperience of the seller. Where one knows and the

other guesses, the guesser loses. The shrewd buyer not only grades this kind of cotton, but he also grades the man who offers it for sale. That is, he sizes up the one and undergrades the other, much to his own satisfaction and profit.

Codes.

We have only a few very large cotton firms who buy directly from the producer, yet the whole field is covered by them. Instead of the usual terms of commercial classification, each of these firms has a "Code" made up of letters or figures to represent the different classifications. These "Codes" are used only in one way, and that is in the deal between these same buyers, or their agents, and the farmers or producers. When the turn is made by them to the regular market these "Code" classifications are dropped, and the regular market terms are employed. Imagine the blank look that would shade the face of any regular market buyer if you should offer him a lot of cotton and tell him that it ought to class all around, fours or fives or Bs or Ds. He would no more understand you than if you were to address him in Chinese. These "Codes" are admitted to be variable; that is, subject to change, as to the precise grades represented at all times. In several of the states, the State of Georgia for instance, the arbitrary "Code" of one firm of cotton buyers is the only classification known.

Granting the probability that no imposition has been practiced through this method of grading, still a uniform basis of classification, understood by all, would be better. Then again, if, say, "fours" in Alabama is not "fours" in South Carolina, what would be "fours" in Georgia? If I should fix a "Code" grading "Fours" as Middling and you should so understand it, and, later for my convenience, I should change "Fours" to "Good Middling," to say the least, you would not have a clear conception of the market grades. It is generally conceded that a uniform universally accepted system of grading by number would be better than the present, but until such time as this may be done, let us cling to the old system. In the present

system of private Codes in use the numbers range from one for "Fair" to four for "Middling," and eights and tens for the ordinary and inferior grades. The numbers employed, however, run much higher, as the lower grades are to be designated.

A Quotation.

Charles William Burkett, Professor of Agriculture in the State College of North Carolina, in his work entitled "**Cotton**," published in 1906, comments on the respective situations of producer and buyer as follows:

"Ordinarily the judgment rests solely with the buyer. He classes fiber as he thinks it should be classed, or as he chooses to class it, and offers a market price for that grade of cotton. You can readily see that where only a single buyer is present, and especially if that one be unscrupulous to some degree, a considerable loss may come to the producer and a corresponding gain to the buyer. Naturally there are tricks in buying cotton as there are tricks in other trades, and honesty and business integrity find recognition in the cotton market as they do elsewhere in life.

"The most satisfactory selling is done where several buyers are on hand, and this competition, as a rule, means the highest price will be offered. Of course even in this case buyers may join hands and one do the most of the buying one day, another a second day, and so on, each taking his turn and getting his cotton at the lowest price. But the daily paper now gives the farmer the prices in the leading markets of the world, and with the railways making transportation to better markets easy, he usually secures what the product is worth, or at least the market value of the grade in which it is classed."

The "**But**" above, referring to daily papers and railways, loses all its force in the concluding words of the paragraph, which are, "Or at least the market value of the grade in which it is classed." Yes, **classed by the buyer and not the seller.**

TYPE EXAMINATION—SAMPLING

A sample of cotton is, or should be, a fair representative type of the bulk or bale from which it is taken. It should be procured from a part of the bale that has not been affected by contact with the compressing machinery; that is, away from the ends or sides of the bale, and from beneath the outer layers composing the bulk. A good sample should weigh about three ounces. The first work of the examiner is to determine the body quality of the type in hand; that is, to learn, through its showing of elasticity, flexibility and yielding to the touch, whether it belongs to the higher, the middle or the lower grades. This he may do almost unconsciously, as he grasps the sample in first clasp of hand, or later separates a part of it into staple length and then "opens up" the layers to look for such impurities as may be found affecting the body as it has presented itself to him.

In the examination of a type, as a rule, its high or low grade is indicated by the smooth or rough character of its face. If the cotton is of a low grade the face of the type will be naturally rough. On the contrary, high grades show a smooth face. There is a lacking smoothness, however, indicated by bad "preparation" that should not affect to any great extent the grade of an otherwise smooth type.

This is caused by ginning damp cotton or compressing it while in a damp state. In such cases the fibers are often massed or rolled together. The staple is not injured thereby, except in appearance, but bad ginning thus affecting the face of a type would cause it to be dropped at least a half grade below its standard worth. In the fair grades the fibers lie low, close together and give the face of the type a clean and perfectly smooth appearance, except, as stated, in the case of gin roll, which may show in the form of small rope like ridges.

Both the hand and the eye are used to determine smoothness. The sense of touch co-operates with that of vision, and

whatever the decision may be, it should always follow as a result of the joint action of these agencies. As the grades descend the faces of their various types grow rougher. Brittleness, showing the lower character of staple, manifests itself in upturned fiber ends, small opening lines, and irregular swellings and depressions. Dead and half-ripe fibers, white and sleek, show themselves like little bow-backed worms or curling blisters. Trash adds its quota, both in appearance and to the touch. Stains show their natural tendency to kink the fibers carrying them. These, including motes, neps, shell, seed-ends and every other kind of impurity—all—as they may show themselves in small or great degree in the various type faces, show at the same time the smooth or rough face of the type affected by them. Then after a general estimate of the body of the type, made in the manner suggested, proceed to pass upon its quality of smoothness, and your decision of grade thus found is now to be verified or corrected by a closer inspection made through “opening up.”

Types or samples of cotton lie in folds or layers. As they “open up” the true type of cotton is revealed. As the parts are separated every impurity seems to stand up for recognition. Particles of trash, stains, sleekheads, and other forms of perished or immature fiber, including the knotty burr-sink; motes, shell, seed ends and other indications of bad ginning, if they should be present, each and all appear fully conspicuous as the bat or layer “opens up.” Color also is seen anew, and an estimate of the finish or smoothness is again taken. Three “opens” of a sample or type are usually made by the classer and “How It Opens” is the basis of his grading estimate.

GRADE NOTES.

Fair.

This is the best grade of the several varieties of American

short-stapled cotton. It is commercially described as being purely white with staple, if coarse and short, ranging from seven-eighths of an inch to one inch in length; or, if fine and long, from one inch to one and one-quarter inches in length. It should have in either case natural twist, denoting mature development, or so nearly mature that but few dead and half-ripe fibers would appear to mar the face of the type and change its character of perfect smoothness. This grade is commercially supposed to be absolutely free from impurities, yet, as "purity" in cotton-grading is only a "nearest pure," it may carry a bare trace of the slightest offsets to perfect cleanliness. If more than a merely perceptible trace is shown, of course, the grade should be scaled, as it is termed, that is, dropped to a lower classing. This scaling has two points of limit. If the type is placed upon the market upon the basis of a single bale or small lot sale any descent from Fair would necessarily go to the next regular commercial grade, Strict Middling Fair. But the same cotton, while it could not be graded Fair, might so nearly approach that grade that it would be better even than Barely Fair. In which case, if marketed with a type lot of cotton centering near any given grade, its face worth, irrespective of commercial grade stations, would be estimated by the classer. "Climbers" and "Sliders" are terms carried in the mind of the classer as he recognizes the variations, up and down, from any full, half or quarter grade. In typing, these exact variations stand as merits and demerits affecting an amalgamation or mixture forming a basic type. This basis of mixture is named by that simple process of mathematical calculation known as allegation. A type body is worth the sum of its component parts. That is all. This system of grading prevails only in large lot sales between dealer and dealer, and between dealers and manufacturers. The whole cotton crop is graded, first from the wagon of the producer by the single bale, or, as is most usually the case, in lots of from two to four bales. The classer buys mostly by

the merit of the bale, or, in some instances, he may make a lump purchase. In either case he buys, as he should buy, safely. He grades by a strict commercial grading. With him, the first classer, barelys and fullys and climbers and sliders have no day.

All such margins are his legitimately if he has so graded. He may sell to a dealer, classing as he has bought, or he may possess the necessary means and business sagacity to type out his purchases on highly improved grading. If he has represented a principal his purchases will surely take this course, and the second grading of this cotton will always be higher than the first. This reference is here made to the drop or descent of any commercial grade, because it applies in the descriptions of all other grades as will be noted.

Strict Middling Fair.

This is a half grade between Fair and Middling Fair. Its commercial description is the same as for Fair, except that the trace of impurities becomes a degree more pronounced. As these impurities bring it below the grade of Fair it must take its place in the next lower commercial grading. If it should have higher merit, by reason of having just a small showing of impurities, such merit could receive credit only as it would give higher character to a type to be made up of slightly varying approximate grades. A buyer in small lots buying on a basis of commercial grading, could make special types from his accumulation of purchases that would give to him the margin of profit between the commercial grade and the strict value above that grade.

Middling Fair.

This is the second full grade descending from Fair. Its presentation of color is too slight to be called a shade, and still it is sufficiently distinct to mark a change. Its staple and gen-

eral body must be as good as that of Fair, but it will carry a showing of the lighter and less injurious impurities easily observable. A slightly greater departure from white or an additional showing of impurities would type it Barely Middling Fair, but in commercial grading it would descend to the half grade below.

Strict Good Middling.

This is a half grade between Middling Fair and Good Middling. In its general appearance there may be seen a slight increase of shade, a small loss of staple character and a noticeable increase of non-injurious stains and light impurities. This grade is an improved Good Middling, and is the highest point to which that grade can be taken, however free from impurities. Grade is first determined by staple and color, then cotton that is not fair can not be graded above Strict Good Middling. It is not to be forgotten however, that grade first established on staple and color, may be materially affected by condition. Strict Good Middling, Fully Good Middling, Good Middling and Barely Good Middling are virtually the same except as to condition. Strict Good Middling, like other grades, may be typed on the next lowest quarter grade, but if condition will not sustain a full classing it would descend to the next lower commercial grade.

Good Middling.

This is the third grade below Fair. It has just been referred to as the basic type of a group of ascending and descending quarter and half grades.

Good Middling does not mean a superior cast of Middling; it means an independent type or grade better than Middling and differing materially from Middling. The staple ranges from full seven-eighths of an inch to above a full inch in measure of length. Its color varies from the white of nearly Fair

down through the wavings of white to a rich creamy cast, readily distinguished from the colorings known as tinges, and brighter in luster than the pallor-like whiteness belonging to the grade of Middling. Good Middling, bodied on its basic color and staple, will carry on its face and in its openings only a very small quantity of pepper-trash, a slight showing of sheet trash, a bare sprinkling of sleekheads, or perished cotton, a minimum showing of non-injurious stains and an occasional fugitive mote or seed-end. A noticeable decrease of these impurities, with fair preparation (ginning) would type this grade a quarter higher to Fully Good Middling—a still greater disappearance and improvement would raise it to the grade of Strict Good Middling. As previously stated it could not be classed higher though every vestige of impurity should be removed. Any buyer or classer, however, would show his appreciation of so rare a type of cotton, and credit such cleanliness with its market worth. Again, if the color should be a shade deeper or the impurities a degree more marked the grade for typing would drop a quarter to Barely Good Middling, but as a single bale or in small lot sale it would be classed Strict Middling only. Added impurities might bring it to this grade as, in fact, it could by loadings be taken by degrees down through the several grades to Low Middling. It is to be observed, however, that a Good Middling body, color and staple, in each grade that it may be reduced to by loadings, will admit of more impurities than would be allowed the same grades on their own respective natural bodies. That is, a Good Middling reduced by impurities to a Middling, would open to more trash, stain, etc., than would be allowable in a Middling proper.

Strict Middling.

This is the half grade between Good Middling and Middling. Strict Middling has been partially described under Good Middling, but only as that grade reduced. Strict Middling proper

is not so bright in color as Good Middling, but lighter than its basic grade, Middling. It will be mentioned again in the grades grouped around Middling. It is to be noted that Strict Middling bodied on Middling or on Good Middling, as it may be raised from the one or reduced to the other, would be allowed more or less impurities according as its color and staple approached the higher or lower grade. It has been claimed that the white of Strict Middling is a distinct grade color, but this play of mergings from both Middling below and Good Middling above would seem to annul such assumption. Strict Middling as an independent grade in body, color and impurity is to be treated as other grades in typing and scaling down for grade

Middling.

This grade is the basis of all cotton classification throughout the commercial world. (See Cotton Grader.) Its standard staple is from above three-fourths of an inch to one inch or more in length, and its defined color is a pale, clean, uniform white—not so bright as the higher grades, but yet a pure untinged white. In this central grade-color many minute degrees of variation are embraced, ascending and descending each a half grade. These variations in ten thousand or more specimen types of Middling would show, probably, no two exactly the same, still the color quality of Middling would be manifest in each. Of course, this standard of color does not apply in case of reduced higher grades, as a Fair type could be brought to the grade of Middling through loadings. Middling is the representative type of the bulk of the American cotton crop. Its name implies the “most of the kind,” as cotton is considered a kind of product. It is not the average grade, as supposed, but it is so called for the reason that in point of body, color, and cleanliness it shows the character of the bulk of cotton gathered and prepared for the market. This being the case, it would seem that as no two seasons produce

exactly the same Middling crop we should have no standard Middling grade. But a standard has been established by averaging the output of varying seasons, and though this varying may sometimes be much above and at others much below the average, the standard is maintained.

With a good type of Middling in hand, after proving its body and color, observe closely the quantity and the kind of loadings to be allowed. Particles of peppered trash will show here and there, not in quantity, but sufficient to be passed upon in grading, as "too much" or "allowable" as its quantity may measure. With a type to guide, it will be seen that a bare pronounced presence is all that is allowable. Sheet trash or larger parts of leaf trash, being less harmful, may show a little more boldly conspicuous. Slekheads or immature staple and a little bad ginning are to be looked for; but if too much of the former is seen it would suggest a second and more careful examination of the body. Stains, just enough not to mar the white face of the type, may be passed over. An extra clean grade of Middling may be classed with Strict Middling; likewise if the type is found below the standard it should be classed Strict Low Middling. Middling, in typing, will embrace these two grades, but under no circumstances will the smutty puff or blue tinge be carried in a white Middling type.

Strict Low Middling.

This is a half grade below Middling, and has just been partially described. In staple and color it is below Middling. It, of course, carries a larger quota of impurities. Often this grade is found comparatively clean, but on account of its body and color it can not be graded above Barely Middling. A small showing of smutty puff, blue tinge, or what is in some localities termed "smoky cotton," can be carried in this grade.

Low Middling.

This grade has a similar staple and body to that of Strict

Low Middling, but with this grade the darker tinges, deeper stains and heavier impurities show their presence. It is an easy grade to place; its color and staple raising it above the ordinary grades, and its impurities dropping it to the lowest of the Middling grades.

Strict Good Ordinary.

While this is classed as a half grade, it has the independent characteristics of a full grade. It may show comparatively good staple and basic color as good as Middling, and yet by stains, trash and other impurities be graded down. It is generally a body of late pickings of good cotton stained by field exposure, mixed with the later immature openings that have been affected by frost. When little of the latter named mixture appears, and the type shows no blue tinge, and is otherwise fairly clean, classers sometimes place it in the grade of Middling Stained.

Good Ordinary.

This is, at present (season 1908-1909), the lowest commercial White Grade. It carries the darkest shade of white mingled with the full list of stains. It is only required that its staple shall be sound, by not being overloaded with decayed lower pod ends, known as sink stains, or by other indications of damaged fiber. It embraces the former commercial grades below it, and is, therefore, now a lower type than it was formerly. But there is a limit to its loadings and after this limit is passed, "tailings" or "dog-tails" is the assigned classification.

Inferior Cotton.

A surprisingly large percentage of the American cotton crop falls below the commercial grades. Many firms of buyers and single buyers deal only in these low grades. The largest profits are made and a season of storms or a late and bad har-

vest means a bonanza of financial prosperity to them. The knowledge of the experienced cotton-classer is good capital in this field.

Tinges and Stains.

In recent classification we have only six grades of Tinged and one of Stained. The tinges range from Strict Good Middling to Low Middling, including all half grades. Middling is the only grade of stained. It is a cleanly-gathered, well-ginned, neatly-prepared output of cotton that has been left ungathered too long after maturity. The stain is principally a burr and foliage weather mark. It will carry a greater degree of loadings than Middling white, though it is often found much cleaner.

In the lower grades of tinges harmless stains are often allowed to such a degree that the grade would appear to be misnamed, but the character of tinge may be easily determined. The same quantity of stain on a white base would show a more pronounced character of color. The lightest tinge is (supposedly) seen in Strict Good Middling. Of course, no tinge could be classed higher. From this type the shades of tinge deepen by degrees to Low Middling. The parenthetic word (supposedly) may be thus explained: A good bodied type of deep tinge may be graded higher than a lighter type of poorer quality.

Any grade body of tinged or stained cotton will carry a greater degree of impurities than a similar grade body on a white base—a difference of about a half grade being allowed. For instance, a Strict Middling white, with its poorer body and allowed quota of impurities, if tinged, could be graded a Good Middling. This is done to compensate for the difference made in the market value of whites and tinges. Thus, Strict Middling white is worth one-quarter of a cent above the basis value—the same grade, tinged, though raised to the grade of Good Middling, would have the basis value only.

This undervaluation is in part offset by overgrading. The system is wrong, but it is an established custom. Actual grades should not be changed to regulate valuation.

About Shipping.

This note is added, not in ridicule of the advertised work of a so-called cotton college, for the tricky notices it sends out to snare the unwary youth of the country are self-sufficient in the way of procuring amusement. It proposes to teach the boys how to buy and sell, and how to export. Moreover young men who learn to "export" are given "jobs" exporting." These notices bring to us indirectly many inquiries relative to the subject, hence, this general answer to all.

Cotton must be moved from warehouses, and whatever stops it may make or devious turns it may take, the factory is its ultimate destination. An American shipment of cotton to an American factory or to any other American destination would be termed a domestic shipment. American shipments to other countries are called foreign and are classed as exports.

All carriers by land or sea issue invoice receipts, bills of lading or manifests to shippers, showing the kind, the quantity, the condition and, in most instances, the value, of the goods received. These receipts are usually issued in triplicate, one for the consignee, one for the shipper, and one to be retained by the carrier.

An interior buyer may buy for himself and ship to an "order to buy" from another, or he may buy for the order direct. He may buy and consign to a factor for selling. He may export through a factor, or he may export directly. The bankable value of any cotton consignment exhibit depends upon the character of the shipment and the known commercial standing of the consignor and consignee. A domestic shipment of good character will usually command a bank advance of three-fourths of its stated value.

The holder of a large lot of cotton, when he wishes to sell, gives notice to a line of buyers, making an exact descriptive exhibit of the types he may have. The best prospects are selected and actual types, usually a very small specimen sample of the different grades, are furnished. Upon this a deal may be closed. The same system applies to exporting. A manifest of the shipment is issued to be used by the shipper just as he would use a domestic bill of lading, the various lines of consignment, sale, etc., being virtually the same. Any well-stocked bookstore can furnish a directory of every cotton buyer, both domestic and foreign, on the globe. From this list a shipper may select as he may choose for correspondents, filing with each his business address, his bank references and his field of purchase. A book might be filled with unimportant details, as to forms of orders, commissions, advances, exchange, freight, insurance, etc., but there is but one important statement to be made and that is: "Establish yourself as a man (or firm) of business integrity, stand on a good commercial rating and prove yourself a safe buyer." After which all the other things will be added unto you, including exporting in its details.

It is easy to get a complete list of all responsible foreign buyers. (See Kelley's Directory.)

WARNING!

Every page, every line, every word and every syllable comprising the contents of this little book, "The Cotton Grader, or How to Classify Cotton," is protected by copyright. To a majority of those into whose hands it may fall this announcement will have no significance. But there are others. It is contemplated that the information it may convey shall go out directly from its author to the individuals to be benefited thereby. This does not mean that any person desiring to possess a copy would be barred from obtaining it from the publishers or through the legitimate channels of trade. It means that any appropriation of the work, in parts or as a whole, to be used, **secondarily**, for the promotion of private educational enterprises would be an infringement. Let those concerned be governed accordingly.

N. J. McARTHUR.

CHAPTER VI.

IN THE SPINNING ROOM OF A COTTON MILL.

On a recent visit to the Georgia School of Technology the author desiring to follow the course of fiber from its introduction into the opening room to its form as finished yarn or thread, was referred by Prof. W. N. Randle, the efficient Director of the Textile Department, to one of his assistants, Prof. E. A. Camp, superintendent of the spinning processes. Prof. Camp being informed that the especial object of the visit was to note the methods of cleaning and have him explain the general effects of **Impurities**, very courteously responded.

Many books with explanatory plates are to be had, defining all of this work, but such an illustration is not so satisfactorily edifying as to have an expert Supervisor go with you from machine to machine and explain as each was doing its successive part in the measure of completion.

The department is equipped with the latest improved machinery, and though as compared with large mill plants, it presents only a miniature appearance, nearly all can be seen in operation here that may be found in the large factories.

Prof. Camp was asked to write out in the same homely language of his explanations all that he had so courteously told. This he kindly agreed to do and complying, his written statement is herewith given, with the hope that it will prove instructive to those who may read it.

Cotton Manufacturing.

By Prof. E. A. Camp.

Cotton manufacturing comprises a great number of processes; and these vary, according to the product desired, so much that it will be impossible to give them to fit all cases. I therefore will mention only those most generally used. In

the yarn mills (those which do not contain looms) the cotton passes through about as follows:

The ties and bagging being removed the cotton is mixed; contents of several bales placed together, so that there will be uniformity in staple and color. It is very necessary that there will be uniformity in staple (length) as it is impossible to set the drawing rolls of the machines to work different lengths of staple at the same time. If set for the long, many of the short fibers fall out as waste; and, if set for the short, the long ones will be broken and then fall out.

There are means provided for the adjustment or setting of these rolls in the various machines, but it is a rather difficult operation. Therefore when properly set, it is advisable to run about the same average length of staple, and not alter the settings. The cotton is taken from the mixing bin or room and passed through a machine to open it up thoroughly and feed it to the Lapper. The object of the Lapper is to separate the fibers, remove many of the impurities (in the form of dust, motes, leaf, stem, sand, etc.) and to get the cotton into a lap (or roll) that is uniform in weight per yard.

This lap is made by rolling up a sheet of cotton that is from forty to forty-five inches in width and about fifty yards long. The weight per yard varies from about eight to sixteen ozs. depending upon the product into which it is to be converted.

There are usually three lapping processes used, viz.: breaker, intermediate, and finisher. Often though, the intermediate is omitted on the better stapled cottons.

On leaving the finished Lapper (or Picker, as termed in some localities), the cotton is taken to the Revolving Top Flat Card. This carding operation removes impurities, neps, motes, short fibers, etc., left by Lappers, combs or cards the fibers, and converts the cotton into a Sliver (rope form). Six card slivers are placed at the back of the first drawing frame, and passed through, side by side, converging at the front of

the machine into one strand or Sliver. The weight per yard of the latter is about equal to the weight of a single strand at the back of a machine; or as received from the card. This reduction in weight is accomplished by Roller Drafting, i. e., having the successive lines of rollers through which the cotton passes accelerated in speed.

The above drafting or drawing out tends to lay the fibers parallel. Another very important object of this machine is to get a Sliver which is uniform; this being accomplished by the doubling of six at the back of the machine.

There are usually two processes of drawing used; the second being further to accomplish objects sought for in first process.

The Sliver is now passed through the Slubber, the objects of which are further to attenuate, to insert a small amount of twist, and to wind on bobbin the small strand of roving or slubbing. The drafting on this and succeeding machines is for the purpose of reducing the weight per yard and not for getting the fibers more parallel. The slubbing is fed doubly to the intermediate **Fly Frame**, which is the next process. The objects for this machine are the same as for previous machines. Of course the doubling here tends to make more even or uniform work.

The intermediate roving is fed double to the **fine frame**, the objects of which are the same as those for the two preceding machines.

The roving has now been drawn down sufficiently fine so that the balance of drafting necessary to give the required number for yarns can be obtained on **Spinning Frame**. The twist imparted here is very hard as compared to that of the slubber intermediate and fine frame; the latter being only sufficient to give strength enough to enable it to be unwound on next machine.

The yarn is spun with different amounts of twist, depend-

ing upon its future use. Warp yarns requiring more twist than **Filling** and **Filling**, more than **Hosiery** yarns.

The number of the yarn is the number of hanks, of 840 yards each in one pound.

The processes given above are generally used for medium numbers, but for coarse numbers, the **Fine Roving Frame** is usually omitted, and the roving carried direct to spinning frame from the Intermediate **Fly Frame**. This roving is often fed singly into the **Spinning Frame**. For the higher numbers the **Jack Frame** is used. This machine follows the **Fine Roving Frame** and of course precedes the spinning frame. Combed yarns and all fine numbers pass through the machines already given, and sometimes others. These yarns are made from medium to long staple cotton. To make a superior yarn it is necessary that the **Fibers** be of **Equal Length**, and this condition cannot be obtained by carding alone; therefore the **Comber**, which takes out, as waste, all fibers below a certain length, all impurities, and gets the remaining fibers parallel, has to be resorted to. The card slivers are passed through the **Sliver Lap** machine with fourteen doublings and a low draft, and are made into a small narrow lap. These laps are fed into the **Ribbon Lapper**, whose objects are the same as the drawing frame, but working Laps instead of Slivers. The cotton in the form of small narrow laps is next passed through the Comber. The combed slivers are passed through the drawing frame (six doublings) from draw frame to **Slubber** and so on as previously given. In working the better staple cotton usually there are only two lapping processes used; omitting the intermediate machine.

The filling yarns are taken from the spinning frame direct to the looms to be placed into the shuttle, but the warp has several other processes through which it has to go. The warp yarn is spooled, i. e., contents of several spinning bobbins are placed (wound) on a large spool. These spools have the yarn

withdrawn or unwound from them and rewound on to a large beam, holding 400 pounds or more. This machine is known as a **Warper** or **Beamer**. Several of the above beams are unwound and the yarn passed through a **Slasher** or Sizing machine. The starch or size tends to glue the fibers composing the yarn together so that the yarn will not chafe in weaving. The yarn is wound on to a small or **Loom Beam** at the front of the slasher. After the threads have been drawn through the harness and reeded the beam is ready to be carried to the loom.

Many mills take the yarn from spools to the **Twisting** (doubling) machine, where two or more threads are twisted together. From the twister the yarn is carried to the cone-winder reel, etc., depending on its future use.

CHAPTER VII.

A FRIENDLY CRITICISM.

The latest issue of a work on Cotton emanates from Mr. T. S. Miller, Sr., a Texas author. The title of his work is, "**The American Cotton System.**" It is an excellent arrangement of the quoted opinions of more than a half dozen eminently prominent Americans, including congressmen, exchange officials, and large firms of cotton dealers, combined with a neat and accurate compilation of matter from a full dozen written authorities upon the subject. Notwithstanding this array of **Quotings**, there is sufficient presentation of the author's individuality to stamp the work "**original.**"

It contains much useful information not to be found in any **one** previously published work. Mr. Miller devotes a long chapter to the subject of **Cotton Classification**, hence this notice. He names and gives the (market price), grade differences of the eighteen current commercial grades, and in the same line of paragraphs asserts that there can be no standard type, nor as he terms it, 'mechanical measurement,' by which one of these gradings may be distinguished from another, especially those bearing near semblance of feature. A **Standard Type** is a **Mechanical Measurement**, a **Guide** whether imprinted on the memory of an experienced classer or given for comparison into the hands of the less expert novitiate. In the name of reason, if not from the study of original **Standard Types** or **Mechanical Measurements**, where, oh where, did the gifted expert receive his knowledge of classing? The fact that classers sometimes differ from each other, and that a classer not infrequently differs in a second grading from his first, is no argument that **Standard Types** or **Mechanical Measurements** do not form the basis of all cotton classification. Let us take a sample of the **Grade Good Middling**. The face shows it to be a standard type, and without further exam-

ination, novice and expert alike would so grade it. But there is to be a further examination. It opens to increased loadings of trash, and besides stains and cut fiber are presented to view. The expert classer rates it **Strict Middling**, and the beginner, of any common sense, would not do otherwise. Again a similar sample of the same **Standard Type, Good Middling**, shows on its openings to be so clean and well prepared that both alike rate it, **Strict Good Middling**. Both are **Good Middling Types on Grade** but they have been rated, one lower and the other higher than that standard. This **Rating** is the great mysterious "bugaboo" that has placed cotton classing in the category of inspired work. The highest **Standard Type** of animal life graded in the lines of creation is **Man**. All of this Type are not alike. We have cripples, blind men, deaf men, and men both **Inferior** and **Superior**. They are all graded "Man," but are to be **Rated** according to their several degrees of gifts or infirmities. No one would make the mistake to **Grade** a man as some other type of animal, though his rating might scale him down to the commercial worth of a monkey. Neither would any one having even a half familiar acquaintance with cotton make the mistake to place any sample exhibit elsewhere than in line with its **Standard Type of Mechanical Measurement**. If openings showed it to be higher or lower, he would so **Rate it**. The baseless, absurd opinion that cotton classing cannot be learned and be as well known to any man of ordinary intelligence within a very short period of time, as it may be known to any other man, is an inheritance bequeathed to believing, uninvestigating producers who have all along accepted this "Pumpkin and Rock" doctrine and method of doing business as their whole ancestral lines for generations before them have accepted it. Not many dollars of cotton money except that paid the producers (Southern cotton mills operated on Eastern capital not excepted) remain in the section of country where it is produced. This fact should be an appealing argument influencing every resi-

dent of that section to feel an interest in common with the producer. Millions upon millions of dollars have been lost to the farmer as a consequence of his ignorance of grading and these millions have been indirectly a loss to all the people of his section. It is a deplorable truth that all this loss has followed upon the unfounded remark made far back in the past, that a farmer did not have common sense enough to grade his cotton. This remark grew into a popular belief, till now its force is accepted by the majority as an existing law of mental misendowment not to be changed. The producer has paid high for the luxurious enjoyment of an ancient custom, and it is to be regretted that Mr. Miller, who has given to the public an otherwise excellent work, has omitted the investigation of this great error. There are but two parties to the transaction embracing a transfer of property right in cotton. One of these is the producer, whose knowledge of cotton should be superior to that of any other man, and the second party is the buyer, many of whom would not know a stalk of cotton as distinguished from an Okra bush, if such knowledge should be based on familiar acquaintance with the two productions. Yet the **Wand of Custom** has been waved over the buyer, and he enters the field, knowing all about the grades of cotton. He is versed in all the signs, winks, grips and pass-words of the **Profession**, and though, perhaps, only a beginner, it is his secret. The farmer, however, sits veiled in the mysticisms. He wonders in this progressive age, while he considers the many fallacies, false beliefs, and harmful, ignorant practices of his forefathers, why the higher native intelligence possessed by them did not reveal these mistakes. As he does this he swallows his 'dope' with a smile of complacency, and accepts as truth a statement which would have been discarded as unreasonable by any of the most ardent believers in New England witchcraft.

It would we well if the organized bodies of farmers in the cotton section would combine with their plannings to hold

for higher prices, and to seek the best points of market some slight knowledge of **What It Is They Have to Sell**. County **Institutes** should be established throughout the territory to be presided over by intelligent growers, in which **Cotton Grading** should be made a study through a system of "**Standard Types**," and "**Mechanical Measurements**." Why not mix a little of this study with the items on the farmers' meeting programs? It would bring remunerative returns without question. A point has been raised that such knowledge would be of no benefit to the farmer, that the grading buyer would purchase on his own grading only. This is equal to the cry of "Surrender" before there has been a declaration of war. This law might stand where only one of many was affected. But let it be known to all that every cotton producer has a fairly good knowledge of cotton classing and the arbitrary law of the buyer would stand self-abolished. It is strange that in the conservation of mental energies the farmer should begin the practice of economy of thought just at this point, by treating this item of knowledge as a matter only intellectually cumbersome. It is not only strange but shameful; and if the system is to be continued, the several cotton states, having the right to protect the common interests of the whole people within their borders, should enact cotton classing laws, operative in the same way as those applying to weights and measures. I have stated in other writings (explaining that I intended no reflection on my people of the South) that if cotton were produced in Connecticut or Massachusetts it would not be easy to find a male member of the population of those states above the age of fourteen years who would not understand thoroughly the system of cotton classing. Its study would be made a part of the common school curriculum, and though every old expert cotton classer, every interested cotton buyer and every manufacturer on the globe, should go as a lobby before their legislative bodies, arguing that cotton classing could not be taught through **Standard Types**

and **Mechanical Measurements**, they would not be heard above the reasoning of common sense, and the laws would be enacted. I am making this criticism (and excellent advertisement) of Mr. Miller's book, a part of this publication, not because there is ample room between its covers to give it a place, but because it is proper matter to be included. The work is written to be used primarily as a text book in our common schools, but an effort will be made to give it a large and general circulation otherwise.

With Heavy Accent on the "I."

Unfortunately for one seeking information on the subject of cotton classing as a study, he naturally approaches a known cotton classer. When he asks whether or not cotton classing can be taught successfully in any of the schools now conducted for that purpose, he is laughed to ridicule, and told that the idea is absurd; that cotton classing is not to be learned at all, that it is just known, "felt in the bones," after many years practical work handling it. Of course, the applicant for information leaves discouraged. If he had plied him with a few pertinent questions touching his career as a classer, the answers given would not have sustained the declarations that had killed his ambitions to become one of the guild. Why men of high reputation for truth and general honesty will make these (untrue) stereotyped answers is a mystery almost as great as the fact that they are belived by all the outside world. Each and every one will leave the impression that he, himself, is master of the art, however short the time it has taken him to attain such proficiency. The answers invariably name a period just a little short of the time each has been in active work.

Let us quiz a few of them, and note their respective declarations.

Mr. A., as an expert cotton classer will you tell me what

length of time is required to gain a knowledge of your profession?

Ans. "I have been engaged in the work about twenty years, and I should say that it is only within the last year or two that I could claim to be what you might call, pretty well up."

Q. How did you gain your first knowledge of the work?

Ans. "Oh, I just picked it up watching good graders, now and then, and noticing the names they gave to the different samples?"

Q. Did you begin buying on the knowledge you had thus acquired?

Ans. "Oh, yes; but I had good friends whom I could sometimes consult."

Q. Did you make any mistakes in your early work; that is, during your first and second seasons as a classing buyer?

Ans. No, not one, but I was very particular.

Let like questions be propounded to B, C, D, and E, who have worked at this business respectively fifteen, twelve, ten and five years and the answers from each will be in substance that of A, except for the last question, when each answers the same, "No, not one, but I was very particular."

Let us next present D, who is like the others a "pick it up" graduate, but who is just entering his third season as buyer. He will tell you that two years of experience are requisite, but to the last question he will join the others in the speech, "No, not one, but I was very particular."

In concluding this notice I will say again that Mr. Miller makes a mistake in promulgating through his publication this "strain of false sonnet."

For several generations there has been no one in position to contradict the declarations behind this grand scheme of interested cotton manipulators, but now it is different. Thousands are going out from the various cotton schools of the country, who know cotton and who gained that knowledge from a study of "**Standard Types**" and "**Mechanical Measurements.**"

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