Correspondence.

Aerial Navigation.

To the Editor of the Scientific American:

I noticed in your issue of Sept. 4, page 154, a paper read before the American Association for the Advancement of Science, at Buffalo, N. Y., August, 1886, by Mr. Lancaster, of Chicago, upon the flight of birds. Mr. Lancaster had a number of diagrams to illustrate his paper, after which it was understood that he was to exhibit his model and let it soar; but as said model was not forthcoming, disappointment grew to indignation, and members offered one thousand dollars for a model that would work. Now, if these gentlemen mean what they say, and will place one thousand dollars in the custody of the SCIENTIFIC AMERICAN, I will produce a model which will rise without the aid of balloon power, and will continue its aerial motion or flight as long as the spring or mechanical power will last. I propose to use the one thousand dollars for the construction of a new motor which will dispense with all the difficulties of an aerial ship, and I will give that gentleman a sail to California and back again free.

J. R. CAMERON.

No. 90 Fourth Avenue, Pittsburg, Pa.

Oil of Cedar.

A subscriber says: "You will greatly oblige me by giving information as to the best and cheapest mode of manufacturing oil of cedar; also as to the parts used."

The original "cedar" is the well known Biblical cedar of Lebanon (*Cedrus libani* Barr.), which is a native of Syria. The wood of this tree has been renowned as a perfume from the most remote times. On distillation it yields an essential oil "which is very fragrant" (Piesse), and which is (or has been) used extensively for scenting "cold cream soap." Piesse states that this oil, the so-called otto of cedar wood, has become very scarce. Yet we find it quoted in wholesale price lists of the foremost manufacturers and dealers in essential oils at about $1.25 per pound in wholesale packages. That this oil is no longer derived from Lebanon cedar wood is made evident by various circumstances, among others by testimony of a very competent authority, namely, G. W. S. Piesse, in his "Art of Perfumery," where he says:

"Since the publication of the first edition of this work, otto of cedar wood, *which was very scarce*, has been sent extensively into the market. Messrs. Piesse & Lubin have procured an average of 28 ounces from 112 pounds of shavings, being the refuse of the *pencil makers*. The pencil cedar is the Virginian or American cedar, *Juniperus virginiana*, L. The true cedar, *Cedrus libani*, and from which the handkerchief perfume is '*named*,' yields a very indifferent otto and odor to the American plant. The 'Cedars of Lebanon' are so familiar, however, that perfumers could not afford to change the title of the scent they make for [from ?] the red wood of the West, though the latter is superior to the former in fragrance."

There is a contradiction regarding the fragrance of oil of Lebanon cedar between this passage and that quoted before from Piesse's work. The fact is, the two oils resemble each other very much, and any difference or preference of one over the other is probably due to care in distillation, as well as to proper selection of the most suitable portions of the wood. Hirzel (in *Toilet-ten-Chemie*) says:

"Ethereal oil of cedar was formerly very scarce; now it may be obtained in large quantities. The wood of the American or Virginian cedar, also called 'lead pencil cedar,' which is used largely by lead pencil makers, is very rich in essential oil, 1,000 kilos. (1 ton) yielding on distillation 1,700 gm. (about 3¾ lb.) of essential oil. The oil of the Virginian cedar does not differ much in odor from that of the Lebanon cedar; but all perfumes which bear the name 'Cedar of Lebanon' contain the oil of the American cedar, since the perfumers do not wish to alter the former name. The ethereal oil is prepared from the shavings and refuse of the lead pencil works by distillation."

Considerable quantities of it are also obtained, as we learn from other sources, during the drying of the wood, and are collected by condensing the vapors escaping from the drying rooms.

On the price lists of wholesale dealers we also find "Oil of Florida Cedar," at about 90 cents per lb. wholesale, and "Oil of American Cedar," at about 60 cents per lb. The latter is said to be scarce, and often adulterated or substituted by common oil of turpentine. In just what way these two grades differ, whether they are obtained in a different manner, or whether one is a residue of the other, we are at present unable to say. At all events, our correspondent will have no difficulty in obtaining cedar wood, either from lead pencil works or from cigar box manufacturers. The distillation, of course, is carried on as usual by distilling the wood with water, or passing steam through it.

It has also been reported that the essential oil obtained from the white cedar (*Cupressus thyoides* L.) has been sold as oil of cedar.—*Amer. Druggist.*

The Roosen System of Preserving Food.

A new system of preserving fresh food has been under trial for the past year or so, and, having satisfactorily survived numerous severe practical tests, is now being publicly introduced in this country. This process is the invention of Mr. August R. Roosen, of Hamburg, and its novelty consists in the fact that it is carried out without reference to temperature, while its importance is due to its economical character and its proved success. It partakes of the chemical and the mechanical nature, and consists in placing the food to be preserved in an innocuous antiseptic solution, and submitting it to continued pressure until required for use. So far the main experience has been obtained from the preservation of fresh fish, and with fish, therefore, we will deal, our own observations, too, having been made with this class of food. In practice, large steel barrels are provided, having lids which can be hermetically closed. The fish as captured are placed in a barrel, which is nearly filled with a solution consisting of 97 per cent of fresh water and 3 per cent of boracic acid, tartaric acid, and salt in certain proportions. The lid is then fixed on, and by means of a small hydraulic hand pump, water is pumped in until the cask is full and the air expelled. This condition is ascertained by a fine stream of water spurting through a hole in a screw nut, which is then screwed down and the orifice thus closed. The hydraulic pump is then worked until the pressure reaches about 80 lb. per square inch, when the pump is detached, a small valve in the cask lid being closed by back pressure from within. The process is now complete, and by it fish is preserved for lengthened periods.

It will thus be seen that the process is simple, and can be easily carried out by any ordinary laborer or fisherman. In the case of fish, smacks or steamers would be provided with the steel barrels, in which the fish would be placed, either gutted or ungutted, and treated as we have just described, the operation of filling the barrel, exhausting the air, and putting on the pressure occupying only a few minutes. On being discharged from the vessels, the casks can be forwarded to the inland centers of consumption, or they may be emptied and their contents forwarded by rail, as the fish will keep in a perfectly fresh condition for a number of days after being taken from the casks. As within a few weeks, more or less, the efficiency of the process is not affected by the length of time the casks remain unopened, the center of population to which there is access by water will reap all the benefit of the economy of water carriage over carriage by rail. The advantage of this in dealing with the cheaper kinds of fish will be readily appreciated by a comparison of the cost of the two modes of conveyance of the steel casks in question, full of fish, from Leith to London, which is from 2s. to 2s. 6d. by water, and 17s. 6d. by rail. These casks will hold about 300 lb. of fish, and it is intended to let them out at a charge, which will, it is stated, with the cost of the solution, and assuming that they are only filled twenty times in the course of the year, cause the total expense not to exceed one-fifth of a penny per pound of fish.

The Roosen process appears destined to become very important in connection with the food supply of this and other thickly populated countries. It will effectually prevent the enormous waste which, in the fish trade particularly, has been hitherto unavoidable, but it is stated to be equally applicable to meat and any other kind of food. Large quantities of perfectly fresh fish can be forwarded from the fishing stations to the large cities and towns, and placed on the market for immediate sale or kept until there is a demand for them. Numerous practical tests have been made to demonstrate the commercial value of the process. Fish have been sent from Norway to London and Paris, and from Shetland to different parts of Scotland, and recently the process has been shown in Edinburgh, Leith, Hamburg, and Berlin, and has been pronounced by the highest authorities in the fish trade to be a complete commercial success. On July 1 a steel cask in which a quantity of beef had been placed under pressure on February 5, or about five months previously, was opened at Copenhagen, and on part being boiled and part roasted, both were eaten, and were stated to be of perfectly good flavor. Lobsters have also been kept for fourteen days and then eaten, and found to be quite fresh.

The latest demonstration of the efficiency of the process was given on July 29, at the Criterion Restaurant, by Messrs. Dufresne & Luders, of 63 Cornhill, London, who are the agents of Mr. Roosen. There were present upon the occasion a large number of gentlemen interested in the question of the conservation of our food supplies, both at home and in the colonies, and the company included Sir W. Guyer Hunter, Sir Joseph Fayrer, Sir J. W. Reid, Sir James D. Mackenzie, Col. Sir Francis Bolton, Col. Edmund Palmer, Captain Douglas Galton, Dr. Day, Dr. A. Vintras, Mr. J. Dixon Gibbs, Mr. F. Gaulard, and Mr. Luders. The demonstration was conducted by Mr. Zwierzchowski, to whom is due the credit of perfecting the mechanical details of the invention. Having explained the method of preservation by the aid of one of the steel barrels and the handy little force pump, he opened a barrel in which a number of fine salmon were packed at Montrose on July 12, and which had therefore been in the solution under pressure for seventeen days. On one of the fish being cut in two, the blood followed the knife, and the flesh was found to be perfectly firm and of a fine fresh color. In fact, the preservation was perfect. The further test of this fish was the eating, which test was applied at a luncheon which followed the demonstration. There the visitors partook of the fish, both grilled and boiled, and among the connoisseurs present not one dissented from the decision that the flavor was in both cases full, and the flesh of the fish perfectly natural, a unanimous verdict of thorough success being given. That the very fish taken from the barrel was being partaken of was vouched for by one of the visitors, who had followed the fish from the barrel to the grill and back to the luncheon.

It is claimed for the Roosen process that it absolutely arrests putrefaction, and kills or destroys the germs of any putrefactive or other bacteria which may have been present in the blood, body, or viscera of the fish or meat submitted to its action. It is said to preserve for an indefinite period the muscular tissues of fish and animals in the first stage of the changes which follow death, and which, under ordinary circumstances, in summer does not last more than twenty-four hours. These important results are achieved by the pressure on the antiseptic solution in which the fish or meat are immersed, which pressure causes a direct inhibitory action upon the vital processes forming part of the development of putrefactive and fermentative bacteria. The antiseptic solution used, of which, as we have stated, boracic acid is the base, does not impart any taste whatever to the food treated, and is absolutely innocuous to human life and health, although destructive to the lower organisms which cause decomposition. We congratulate Mr. Roosen on the success of his simple, inexpensive, and ingenious process, which appears destined to cheapen our fish supplies by preventing the destruction of food, of which our fish markets are so frequently the scene.—*Iron.*

Gold is King.

The town of Grass Valley has an enduring foundation. It is as the house "founded on a rock," and the rock of our foundation is good gold-bearing quartz. In all our vales and on every hillside are the sure evidences of the wealth deposited beneath our feet. Deep down in Mother Earth the hardy miner has forced his way almost 2,000 feet below daylight; he has followed the golden veins through solid rock, and picked and blasted many miles of galleries; he is still going downward, and finds still richer reward for his increased labor. Locked fast in their rocky safes, these rich deposits in our eternal hills are not to be wrested away and scattered in a day; they are safe from drought and flood, and frost and blight and insect pests; no custodian of our deposits can take the treasure box to Canada between two days. But, unchangeable and indestructible, the precious metal beneath our feet waits to be brought forth by the intelligence and industry of man. The gold field in the midst of which Grass Valley sits is of some miles in surface area, is thickly veined with gold-bearing ledges, and the depth is unknown, but it is known that with depth the richness of the mines increases. There is no reasonable doubt that for generations, and very likely for centuries, gold will be mined in Grass Valley. When the last fish shall have been caught from the sea, the last gold may be mined from the earth.

And above this treasure box of ours smiles a genial sky, and the earth yields many of its fairest fruits and flowers in abundance.

But the grand fact which gives assurance of enduring prosperity and prominence to the place that can produce gold is to be found in human nature. Everybody loves gold, always has, and always will love it—unless the Creator should become tired of the sort of beings that now inhabit the earth, and should people it anew with an entirely different kind of man. Gold is the only thing that all mankind delight in honoring and unite in loving—even its bright sister, silver, is slightingly spoken of by some. The gold miner need never fear that the ware he gives to the world will ever cease to be in demand. Gold will always be in fashion. The miner, too, can proudly reflect upon the enduring nature of his contribution to the world's wealth. The "golden grain" of the farmer is eaten, and its mission ends. The golden metal of the miner is coined, and goes ever on and on, giving pleasure, if not blessing, to him who spends it and to him who receives it. In gold coin, labor is concentrated and wealth represented in a form such that the laborer and the capitalist can conveniently preserve or exchange their gains. The gold miner is often a hero, though his deeds of heroism are not so loudly sounded as the hero who wins a battle; and yet the hero miner found and dug the gold which the hero warrior's king or country had to have in order to place its armies and its hero on the battlefield. Truly, gold is king, and the miner holds up his throne.—*Grass Valley Tidings.*

The Elements of a Man.

It depends, of course, on how one looks at a man. That was the reflection of a Washington *Star* reporter, as he stood before a case forming a part of the exhibits in the section of foods at the National Museum. The contents of the case showed one what a 154 pound man appears like from the chemist's point of view. In other words, a supposititious man 5 ft. 8 in. high, weighing 154 pounds, had been passed through the chemist's laboratory, and divided and subdivided into his ultimate elements. There stood all these elements and chemical compounds in glass jars, properly labeled. All of the man was there, except the subtile breath of life, which in some way escapes before the chemist can get it corked up in a jar and labeled. Hence, as this important element is lacking, it would be difficult to make a man that would amount to anything out of the contents of these jars. The case of exhibits forms a part of a series being prepared under the direction of Mr. Romyn Hitchcock, curator of the section, and which, when complete, will illustrate not only the chemical composition of the human body, but the daily income and expenditure of the body, based upon the results of analyses made by Prof. W. O. Atwater.

The story or meaning of the exhibits is told so plainly by the different sizes of the jars and the graphic and explicit statements of the labels, that it can be easily understood even by one who knows little or nothing of chemistry. The first series of exhibits represent the thirteen elements which a large label informs you enter into the chemical compounds of which our bodies are made. Five of these are gases and eight solid substances. The oxygen is shown in a jar with a label which states that the weight of oxygen in a man weighing 154 pounds is 97 pounds. This jar, which would hold about a gallon, represents only one ten-thousandth part of the oxygen of a man of that weight. If the 97 pou ds of oxygen were set free from the body, it would fill a space of 1,090 cubic feet. The oxygen is the great supporter of combustion in the system.

The next jar represents the 15 pounds of hydrogen going to make up the 154 pound man. This amount of hydrogen set free would fill 2,750 cubic feet, and the jar represents only one ten-thousandth of the whole amount. Another jar or bottle, having a capacity of a little over a quart, represents the 3 pounds and 13 ounces of nitrogen found in the imaginary man. This nitrogen, if free, would fill 48·3 cubic feet. Another small bottle contains, combined with calcium, the 3·5 ounces of fluorine, and another jar contains one-tenth of the 4 ounces of chlorine to be found in the man. Chlorine is one of the constituents of bleaching powder. After the jar of chlorine was put in the case the stopper was blown out, and the gas bleached all the tinted labels in the case.

Thus the elements of the human body are shown to comprise five gases, existing in such quantities, as if they were set free, would fill a space of about four thousand cubic feet, which, if paid for at the rate of $1.75 a thousand at the usual discount for promptness, would amount to $6. If the gases of a 154 pound man began to expand, and expanded to their utmost, the man would fill a large room or hall. The Hall of Representatives, commodious as it is, could hold only a few men in the gaseous state.

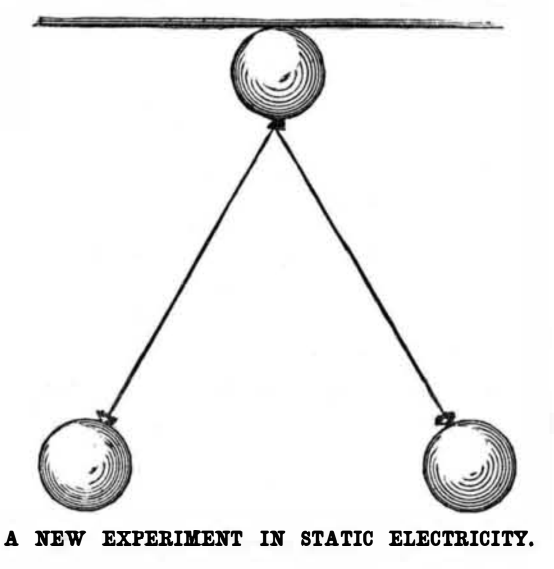
The next series of jars or exhibits represent the solids of the body. First, there is the carbon, represented by a solid cube of charcoal weighing 31 pounds. If a man had to take his carbon out and carry it around with him in a basket all day, he would be pretty tired at night. Yet every man, millionaire or tramp, is weighted down with a load of carbon which, if coined into diamonds, would enable him to rival the splendors of Monte Cristo. Then the 154 pound man yielded 1 pound and 12 ounces of phosphorus, and 3·5 ounces of sulphur. After the gases, the carbon, the phosphorus, and sulphur have been extracted from the man, there is nothing left of him but metals. It is doubtful whether metal exists in the human body in such paying quantities as to offer inducements to mining companies, still one would be surprised to look into this case and see how much a man is weighted down with various metallic substances.

First, there is iron, of which the average man described carries one-tenth of an ounce in his system. This quantity is shown in the exhibit in the form of iron wire. The metal with which the body is most abundantly provided is calcium, the basis of lime, of which the man, supposed to have been resolved into his chemical constituents, yielded 3 pounds and 13 ounces. This is a yellowish metal, and the amount obtained is shown in a cube about 3 inches high. A little block of magnesium, a silver-hued metal, weighing 1·8 ounces, and then 2·8 ounces of potassium were taken from the man, and all that remained was a little quantity of sodium, weighing 2·6 ounces. The weights of the chemical elements in the body of a man weighing 154 pounds are summarized on one of the labels as follows: Oxygen, 97·20 pounds; carbon, 31·10; hydrogen, 15·20; nitrogen, 3·80; calcium, 3·80; phosphorus, 1·75; chlorine, 0·25; fluorine, 0·22; sulphur, 0·22; potassium, 0·18; sodium, 0·16; magnesium, 0·11; iron, 0·01. Total, 154 pounds.

This, however, is only one way that the chemist has of looking at a man. These elements are chemically combined with each other, forming numerous compounds, and another series in the same case represent the result obtained by resolving another 154 pound man into his principal chemical compounds. First, there are two large jars of water, containing together 96 pounds or 46 quarts. Then another large jar represents the proteine compounds, of which the man yielded 24 pounds. The next in order of quantity are the fats, weighing 23 pounds; the mineral salts, weighing 10 pounds 13 ounces; and the carbohydrates, starch and sugar, weighing 3 ounces. Among the proteine compounds appears hemoglobin, the red coloring matter of the blood, and which serves to carry and distribute the oxygen from the lungs to the different parts of the body. Two little vials contain protagon and lecithin, substances found in the brain, spinal cord, and nerves. Then there is a pound of carbonate of lime, 8¼ pounds of phosphate of lime, 7 ounces of fluoride of calcium, 6 ounces of phosphate of magnesia, 6 ounces of chloride of sodium, 5 ounces of chloride of potassium, that exhausted the man with which the chemist started.

A NEW EXPERIMENT IN STATIC ELECTRICITY.

In devising some electrical experiments suitable for exhibition to a small audience, I sought for a simple and novel way of showing the fundamental phenomena of electrical attraction and repulsion; and reflecting on the strong electrical properties of rubber, it occurred to me to test the possibilities of the common toy rubber balloons, as they seemed to offer the advantages of large exciting surface and small weight, both of which are important desiderata in experiments of



A NEW EXPERIMENT IN STATIC ELECTRICITY.

this kind. A trial proved them particularly adapted to striking and interesting demonstration. My first experiments were made with the ordinary grade of toy balloons, which have a red-stained wooden mouthpiece containing a "squawker," well known to small boys and adults who have been harassed by their intermittent squawking. These common balloons may be procured at almost any toy store for a few cents each.

They are inflated with the breath and tied at the end with silk or thread, when they may be pushed off the tube. If one of these inflated balloons be thoroughly stroked with a cat skin, it becomes strongly electrical, and will fly to the body or adhere to the hand if held over it, or it may be rapped up to the ceiling with a small stick.

Its adherence to the ceiling is remarkably persistent. I have repeatedly had balloons remain in such positions for more than four consecutive hours. Numerous instructive experiments may be made with them singly or in combination, and the few here described will suggest others. Their strong attractive force implies, of course, strong repellent force. If two are suspended by threads of the same length, and excited with the cat skin, they will be pushed apart two or more feet, the distance depending to a great extent on the length of the suspending threads. If the hand be now brought between them, they will be attracted to it, and if it be suddenly withdrawn before the balloons have touched it, they will bound away from each other almost as if they had struck a wall.

A very pretty experiment is illustrated by the engraving. Two of the balloons are hung with equal threads to a third, the threads being of such length that when the third balloon is against the ceiling the others may be conveniently reached. The third balloon is now excited, and put against the ceiling by means of a long stick. If properly done, the attraction is amply sufficient to support the two other balloons. These latter are now excited, care being taken not to pull the supporting one away from the ceiling; and as their mutual repulsion forces them apart and they float airily around each other, the whole group affords a demonstration of both the attractive and repellent forces of electricity so striking that it can hardly be appreciated until it is seen. If a strip of hard rubber be electrified with the cat skin a d put between the suspended balloons, they fly still further apart, and one of them may be chased around, or made to rise vertically by a little dexterity with the rubber strip. By arranging say half a dozen balloons in the form of a hexagon horizontally on threads strung across a room or on a suitable light frame, it is quite possible that another balloon could be suspended in mid-air by the combined repulsion of the group when in a good state of electrical excitement. This would be a very effective experiment, although it has not yet been tried.

There is a choice among the balloons of different grades for these experiments. The cheaper kind I have found almost unexceptionally satisfactory, but it seems impossible to electrify the better ones, which are heavier and more highly colored. Probably the coloring matter gives them more or less conductivity, so that the charge excited on them easily flows off. It may be, however, that by thoroughly extracting the coloring matter with alcohol or otherwise, they may be made available for electrical purposes, in which case their larger size might make them specially desirable in some experiments. It should be added that, like most experiments with statical electricity, these succeed only in cold weather. H. A. DOTY.

Bloomfield, N. J.

Chrysamin.*

This coloring matter, which I have already had occasion to refer to when it was first brought into the market, possesses, besides the remarkable property of dyeing cotton a bright yellow without the intervention of a mordant, one or two peculiarities which may be of some interest to dyers and painters. A short time after I had received the first sample of the dye, I was informed by a member of the firm that manufactured it that cotton dyed with chrysamin in the ordinary way possessed an affinity for anilin green, and that by topping it with the latter a series of compound colors could be produced. I have lately conducted a few experiments with a view of verifying this statement, and find that it not only applies to anilin green, but also to several other basic coal tar colors. Cotton dyed with chrysamin and then in a solution of malachite green assumes a full shade of green, which is characterized by its great brilliancy. A similar shade is obtained by using methylene blue in place of malachite green. When topped with safranine, a scarlet is obtained which is quite equal in brilliancy to Turkey red (yellow shade) or crocein scarlet. Magenta yields an equally brilliant shade of crimson.

It is interesting to note the effect of temperature in dyeing these mixtures. If the solution of the basic coloring matter is used cold, the above brilliant effects are produced; while if the solution is heated, the color gradually loses its brilliancy, and a dull, worthless shade is the result. This property applies alike to all the basic dyes cited above.

These results led me to infer that the combination which takes place on the fiber is not of a mechanical, but of a chemical, nature. Solutions of malachite green, methylene blue, safranine, and magenta all yield characteristic precipitates when mixed with a solution of chrysamin; and by adding the latter cautiously, the liquid can be completely decolorized. Reactions of this kind usually point to a chemical combination. Experiments are at present being carried out with a view of ascertaining the composition of these precipitates, and, if possible, to explain the effect of heat on the colors obtained in the cold, on which, as well as on the fastness of the compound colors, I hope to be able to report shortly.

By passing cotton dyed with chrysamin through baths of metallic salts, various shades can be obtained. Bichromate, copper sulphate, and ferrous sulphate all sadden the original yellow, ferrous sulphate yielding a light brown somewhat similar to a catechu brown. Lime water yields an orange.—*E. Knecht.*

The Pecan Tree.

The pecan tree is found in a wild state in the woods of the various sections of the South and West. It grows to a very large size, and bears yearly many bushels of fine flavored nuts. Though little or no attention has been paid to these valuable trees, cultivation greatly improves them, the nut growing much larger and improving in flavor. The pecan tree lives to a great age, and continues long in bearing. There is no good reason why it should not be grown extensively in all parts of the United States. It is well adapted to almost any kind of soil, doing well even on rocky hills and waste land. There is no nut or fruit tree more valuable and requiring so little attention. Every farmer, in my opinion, should have his nut orchard, and cultivate especially the pecan for home use or sale. The nuts always find ready sale at fancy prices. In planting the trees, the only object is to obtain good fresh nuts, and of a good early variety, of large size, from which to grow the trees. If it is preferred to set out the plants, get healthy trees of a good variety one to two years old.

* Communicated from Edmund Knecht, Ph.D., to the *Journal* of the Society of Dyers and Colorists.