Novel and Valuable Development in the Use sumed to be the same in both cases. The of Microscopio Lens.

Contrast Between the New and the Old Methods-Retter Magnification Secured-Examples of Proicetive Photography.

The microscope has become almost indispensable in many branches of modarn soronce and microscopic photography is of great value in making scientific records. Yet the mistakes made by microscopists and the false impressions produced by miproscopic photographs have been very numerous. There are two main reasons for

The first is that the lines and markings shown by the microscope are often extremely indistinct and uncertain. On more than one occasion the lack of exact definition under the glass has led the observer to exercise his imagination with results that were little short of absurd. The sec end reason is furnished by the "flatness" of the microscopic image. This detect is augmented in something akin to geometric ratio as the magnification is increased When a lens of a higher power is used the object appears to have neither depth nor thickness, only flat expanse, no matter what its true shape. The shortcomings of the high-power lens are bad enough in the microscope proper. In microscopic photographs they are worse, especially when I is sought to reproduce such photographs for purposes of newspaper or magazine illustration. Only the faintest and most uneatls factory notions of the objects pictured can be presented. There is no suggestion of solidity, of perspective, of rounded form. In such circumstances scientists wishing to publish Illustrations showing the results of microscopic investigation have sometimes resorted to line drawings from the plates But even these have been unsatisfactory ecause lines indicate altogether too much sharpness of outline.

"Projective Photography." Recently, however, a scientific photog

rapher in New York has succeeded in mak ing enlarged photographs of microscopic objects, in which many of the faults shown in microscopic photographs are avoided. A certain degree of sharpness has been lost but rounded and other irregular surfaces are . made to appear as they really are, and not flat, as the same surfaces would appear in small portion of the pearl would be shown | prise him. The time of exposure need not | tracted much attention in the seed and plant He calls his work "projective photography." known and taken advantage of, but he seems and the like. And, as it is impossible to though every minutest speck and flaw would patent his plan, it is likely that it will be ed extensively in the future in preparing illustrations for scientific publications of various sorts, works on entomology and the

Professional photographers and many amateurs will understand his method when it is explained that "projective photography" is a modification of the methods used in a reducing and enlarging camera. To those not conversant with photography it may be explained that the same principle is employed in the magic lantern. lantern slides are never more than two or three inches in size, yet the image thrown upon the screen covers many square feet. Its size depends upon the distance between the light and the slide and between the lantern lens and the screen. The rays of light passing through the lens spread as they extend outward, showing larger on the screen in exact relation to the space separating it from the lantern. Were the light strong enough, and the image on the of sufficient definiteness, there would virtually be no limit to the possible magnifying power of the lantern. Were the screen a gtgantic sensitive plate the result would be an enormous photographic negative. All photographic enlargements are made by the utilization of this principle.

Magnifies with Low Power Lens. From this explanation it will be plain to all possessing even slight knowledge of photography that pictures showing high magnification of minute objects can be readily taken with a lens of comparatively iow power. The chief difference between 'projective photography" and ordinary enlargement work is this: In the latter the enlarged negative or print is produced by passing the light rays through a glass posttive or negative exactly as they are passed through the slide in a magic lantern and "thrown up" on a sensitive plate or sensitized paper, while in "projective photography" the image of the object to be photographed is itself "thrown up."

of the pia mater-the covering of the brain -or other transparent tissue, the light may be passed through it to show its structure If the object be opaque, as an insect, the light is allowed to fall upon it exactly as in ordinary photography. The form of camera used virtually differs from the ordinary camera , only in being deeper, so that the plate may be farther removed from the lens. A fair idea of the different results obtained by microscopic and "projective" photography may be obtained from the contrasted representations of lung tiesue accompanying this article. The larger picture is taken from a "projective photograph." the smaller from a microscopic pho-

If the object be transparent, as a section



Both are made from the same section of tissue. Not only is the "projective photograph" larger, but the detail and depth revealed are far more satisfactory, It should be added, though, that a microscople photograph of as great magnification as the other is quite possible. But such a photograph would be almost worthless. It would be even flatter and show less definition than appears in the picture. On the other hand, the magnification in the "prajective photograph" might be increased ma-

terially without serious effect.
Objects of much greater size may be magnified photographically by "projective" than by microscopic photography. A "projective" photograh magnifying 300 times has been taken of the toes of a mouse, in which every detail, even to the structure of each hair, is clearly shown. The field of the lens with which the mouse's toes were taken is almost a square inch, at the close range required, and the toes might have been en larged 600 times as readily as 300. But a microscopic lens magnifying only twentyfive diameters covers a field only one-fifth of a square inch in extent, while a lens that will magnify 1,000 times coves only

about 1,200th of a square inch. High and Low Power Lenses. The accompanying diagrams will make the difference between the high-power and the low-power lens clear. Figure 1 indi-

PROGRESS OF PHOTOGRAPHY cates the passage of the rays from an object photographed by a low-power lens to the plane, and hence so buried as not to be recognizable. Anyone looking at a picture of a pearl taken by magnification would supplied by a low-power is used. The size of the object and of the image is asimage produced by the low-power glass will show less detailed definition, but much greater penetration or depth of focus, while

NEGATIVES ENLARGED BY NEW PROCESS | the image thrown by the lens of high power will present more details, more definition, but less depth of focus. The magnifying lens gets the details at the expense of depth or perspective, while the other lens, fitted in a deeper camera, allowing greater distance between lens and plate, will produce equal magnification, while the image will possess the "plastic" quality, so-called, in much greater degree and therefore will re- | no be studied microscopically, if a proper semble the object far more closely.

round body, a pearl, for instance, is to be and slightly stronger lens than is commonly publication in the annual report of the Dephotographed. Figure 3 shows how the light used, the comparatively unskilled aimiteur partment of Agriculture of the results of his plate through a low power lens. Only a sects and other small objects that will sur- acclimatization in this country have at-

of a pearl taken by magnification would suppose he was looking at the picture of a ring, and the true appearance of the object would be entirely lost.

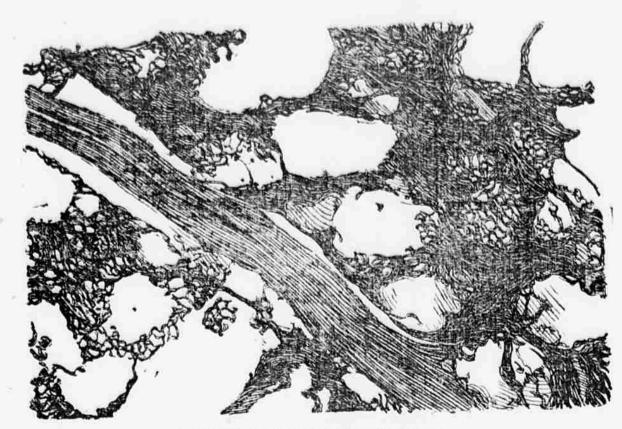
The microscopical photograph is of use only in studying surfaces, the porce of the skin, for instance, or any object that has no IMPORTS DECREASE AND EXPORTS INCREASE thickness. This will be plain from the statement that a lens magnifying 1,000 times has a "depth of toqua" of only 1-2,500ths of an Prolonged Trints of Seeds Imported inch. It will therefore show an almost unappreciable amount of perspective. This is why reasons, when viewed under a micro scope, took like silbounties. Insects should perception of their true appearance is de-To explain a little further: Suppose a sired. By procuring a camera of extra depth | tion in Asia and northern Africa and the would pass from the object to the may produce magnified photographs of in- expedition in collecting desirable plants for

Foreign Countries Have Little to Offer America in That Line.

Prove Them Interior to the Native Article-Views of East-

ern Experts.

The return of Prof. Swingle from his mis-



PROJECTIVE PHOTOGRAPH OF LUNG TISSUE.

THE OLD-TIMERS.

shotographs taken with a microscopic lens, in the figure-about 46 degrees-but it necessarily be great. On a good bright day trade. How important this trade is in the would appear as a curved surface, though | thirty seconds is generally sufficient for ex- United States, says the New York Tribune, The principles he utilizes have long been with comparatively few details. Figure 4 cellent results, but, of course, individual few who are not connected with it are likely shows the path of the light rays through a experiment is the best teacher. Teachers to be aware. It is not generally known, for

to be the first to use them for making large high power lens. In the figure about 100 may find in projective photography a long instance, that one New York firm sends is not easy to decide who really was its to be the first to use them for making large along power lens. In the ngure about 100 may mad in projective photography a long pictures of diminutive things, such as small degrees are taken in, but only a very small desired aid in the teaching of natural hissections of animal tissue, minute insects part of the pearl would be photographed, tory, physiology and chemistry. OBJECT FIG. 2. OBJECT The 196th anniversary of the birth of Dr. FIG.3.

LENS

OBJECT

EXPLANATORY DIAGRAM.

IMAGE

FIG. 4.

pean countries, where they are in great demand for planting in swampy places, but even to Australia, where the trees are in-Rufus Larcom and wife of Beverly, Mass., celebrated their golden wedding on Wednesday. December 27. Mr. Larcom comes of a long-lived family. Two of his brothers and one sister celebrated their golden wedlings are firm annually exports considerable quantities of tree seeds to the order of the gland one sister celebrated their golden wedlings. Japanese government.

The importation of foreign plants into Printedephila recently by the dedication of the Constantin Horing building. He was one of the founders of Hahnemann college. Planted phila was stid to have entirely given up work owing to his great age—\$5. The composer has lately been working hard at a new obsers entitled "King Lear." An excellent liberate was long ago furnished him by Arigo Boito.

Louise Michael, who has just entered her fame year, has returned to Parls. She is hale and hearty and full of energy. One days the delivered two lectures at the Boddiniers on "Concord Batween Nations" and "Fire Traffic in White Slaves." Her voice was as resonant as ever.

Printedephila recently by the dedication of the Constantin Horing building. He was one of the founders of Hahnemann college. Printed and which will not have really been working hard at a college of the same place, Miles Point, Vt., said to do him any good. Mr. D. A Fisher of the same place, Miles Point, Vt., said to do him any good. Mr. D. A Fisher of the same place, Miles Point, Vt., said to do him any good. Mr. D. A Fisher of the same place, Miles Point, Vt., said to do him any good. Mr. D. A Fisher of the same place, Miles Point, Vt., said to do him any good. Mr. D. A Fisher of the same place, Miles Point, Vt., said to do him any good. Mr. D. A Fisher of the same place, Miles Point, Vt., said to do him any good. Mr. D. A Fisher of the same place, Miles Point, Vt., said to have one time of the work as treated by several physicians, who failed by corrected by several physicians, who failed to do him any good. Mr. D. A Fisher of the same place, Miles Point, Vt., said to do him. "You get a bottle of chamberlain's principle. Balms, Creams, Lotions, etc., The Misses Bell have pacceded up fill the Misses Bell, the now famous Complexion Specialists, of 78 Fifth avenue, New York may be benefited they will thive beer ough and cold and power have a several physicians, who failed by own to do him any good. Mr. D. A Fisher of the will the waster that the waster that the work is treated by several physicians, was as resonant as ever.

Prof. Park of Andover, who was 81 years old on December 29, is in fairly good health and takes the livellest interest in all af-Academy of Sciences, and remained here to Heaven's Gate, in far off China, found a very welll known Delaware family."

Thomas Kite, the old parish clerk of Shakespeare's church at Stratford-on-Avon, who died recently, was 21 years of age and succeeded his father and grandfather half a century ago. Among those whom he conducted to Shakespeare's tomb were Sir Walter Scott, Washington Irving, Dickens, Emerson, Booth, Kean and Nathandel Emerson. Booth, Kean and Nathandel Emerson. be clearly apparent, and the picture would apparently be of a perfectly flat surface. If this lens were focussed on the "axial point" of the pearl's surface a small circle would show sharply; if focused on a point further away, a ring would be defined, since all the nearer and farther parts of the pearl's surface a small circle would show sharply; if focused on a point further away, a ring would be defined, since all the nearer and farther parts of the pearl's pearling of the university of the universi coupling of our name with this new plant

selection, perhaps hybridization, is necessary before a seed suitable for American cultivation is obtained, and then the result is put upon the market under a different name from what it had when it first ar-'Many of the new varieties, however, are themselves the result of cultivation. Here, for instance, is a lettuce which one of our agents found growing in a French garden; he told us that the variety had no name of its own over there, and so we have given it

sibly introduce a new species with any suc-

be done is to import newly developed varie-

ties of species already known. Whenever

a supposed new thing is brought here from

abroad it turns out that either the species

is unsuited to our conditions or else it has

been already cultivated here for some time

past under another and more familiar name.

One important thing to be remembered in

that connection is that a seedman hardly

ever puts a new seed on the market just as he imports it. Not to mention that that

would, as a rule, leave him a small margin

for profit, it is necessary for his trade repu

tation first to make quite sure that the new thing will do well in American soil.

Methods of Cultivation.

and carefully cultivated and watched, and

the first seeds to be sold are the produce of

Now, it often happens that a good deal of

plants grown in the seedsman's own ground

"The first seeds to arrive are planted out

our own name. Here is a vegetable which was produced by cultivation in the gardens of a customer of ours in Australia. The Japanese pear, I believe, we introduced into this country, as well as the Castanea sinensis, commonly called the Japanese chestnut though that is also cultivated in Europe But many of the varieties brought here from countries where horticulture is not in an advanced state have since been so improved and differentiated that it is hard to recognize new specimens when they are brought here as the poor relations of the superior plants that have long been well known in this country. That may very well have been the case with the melons which a government agent brought from Armenia some time ago, after he had been scouring all that part of Asia for new fruits to acclimatize; the new melon proved inferior to our own but very likely some of our own varieties had been developed from the same original

The members of the trade are not at all ready to mention definitely any particular foreign fruit which has been introduced to American soil by one of themselves. This fact is amply accounted for not only by the reasons indicated in the conversation just quoted, but also by the assertion that ac climatization of foreign plants has been going on so long in this country that where there are many possible claimants for the honor of introducing this or that variety it been introduced independently by several different growers, it is hardly worth while trying to decide the question at all. But the ago, which American stock refused to eat.

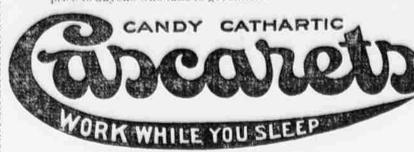
pleasant anecdote of Colonel Bowman of The trade does not aspire to the reputation | Kentucky, who was formerly consul at that of purely patriotic motives in this work of post. He was very domestic and in the General Longstreet, almost the only surviver in the first rank of southern generals of 1861-65, celebrated his 79th birthday recently in Washington, Colonel Ochlitree gave a dinner in his honor, which was attended by prominent men from all sections south and north.

The manager of a famous and long established firm put the case frankly like this: "The inducement to spend time and morth. The colonel had a model Chinese this: "The inducement to spend time and morth. The colonel had a model Chinese this: "The inducement to spend time and morth. The colonel had a model Chinese this: "The inducement to spend time and morth. The colonel had a model Chinese this: "The inducement to spend time and more the colone to regard his master as banity and had come to regard his master as

But the advertising we get from the talk with you and say to you some things?" "Certainly."

### ■於事於事於事於學於學於學於學於學於學於學於學於學於學於學於學於學於學 No lying about

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morial to discover some efficacious remedy for wrinkles and other imperfections of the complexion, but none had yet succeeded un-

the curicle, absorbing and carrying off all impurities which the blood by its natural impurities on the care of the hair; how to have fuxurinet growth; harmiess methods of making the hair preserve its ing tonic is to the blood and nerves, a kind of making the hair preserve its natural beauty and color, even to advanced the service of the skin. It is to the skin what a vitalization of making the hair preserve its natural beauty and color, even to advanced the service of the hair; how to have fuxurinet growth; harmiess methods of making the hair preserve its natural beauty and color, even to advanced the service of the skin. It is to the skin what a vitalization of the service of the skin methods of making the hair preserve its natural beauty and color, even to advanced the service of the skin. It is to the skin what a vitalization of the skin methods of making the hair preserve its natural beauty and color, even to advanced the service of the skin what a vitalization of the skin w fect is felt almost immediately and it speedlly banishes forever from the skin freckles, simples, blackheads, moth patches, wrinkles, iver spots, roughness, oiliness, eruptions and discolerations of any kind,

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