The Chinch Bug.

In a late number of the SCIENTIFIC AMERICAN was a short article saying that the chinch bug had made its appearance in Eastern grain fields, and in such numbers as to excite alarm. The cause for alarm is well founded if the pest named has showed itself, for Western farmers have had but few enemies so destructive and difficult to contend with as the chinch bug. When it works at all, it works so rapidly and in such myriads that but little effective opposition can be made. Wheat is the grain which suffers first, as a general rule; but when the conditions are favorable to the pest, it is liable to extend its ravages to all other grains, not excepting corn. More than once have I seen a fair sized piece of corn wholly ruined by the chinch bug. In such cases the stalks to the height of a foot and a half, or more, would look as if they had been flooded with muddy water which had left its filth behind on retiring. All the sap channels of the stalk would be cut through, leaving the grain and beans to wither away in absolute worthlessness. The bug only thrives in dry, hot weather; a wet season is one in which it can do no harm. Any means which can keep the ground about the grain roots cool and damp operates to check its ravages. Many have saved their wheat by sowing clover with it. Salt is thought by some to have a good effect from its tendency to attract moisture. Barley and rye generally get out of the way before the weather is hot enough to bring out the bug in full force; the outcrop is so dense and moist as usually to escape unharmed. A thin crop of spring wheat on a lumpy soil is the bug's delight on a hot July or August day. The bugs winter among the refuse of fence corners, and decaying logs and brush, and find good conditions in a field well covered with stalks and lumps of earth. The clearing up of such refuse and the rolling of the ground so as to leave a smooth surface have a preventive effect. The location of a nest of bugs can often be determined by the whitened heads of the grain in a particular part of the field. It is a good plan to try at once and destroy the nest, which can usually be done by stamping and pounding the ground down hard. Fire has but little effect on the bugs, that is, such fire as burning straw over them would make; they are more afraid of water. Some of our farmers have protected their fields quite effectively from outside invasion by sowing Hungarian grass around the outer edge of the field, for about a rod in width. C.

CONSTRUCTING, VENTILATING, AND COOLING CELLARS.

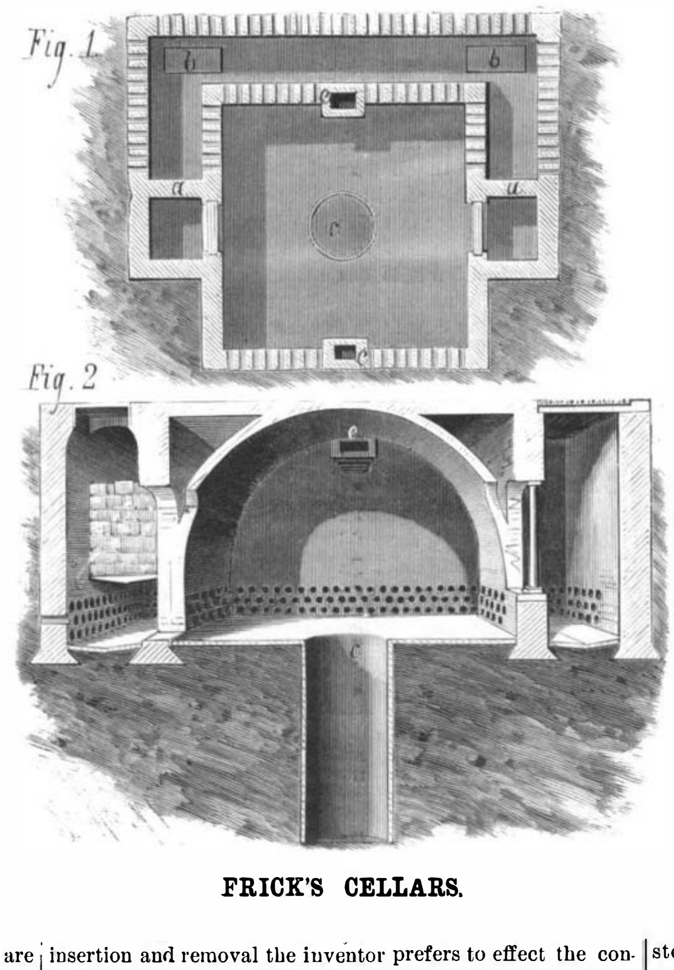
A current of cool air is caused to pass from the earth, stones, or gravel outside of the cellar walls through the cellar upward or outward into the open air. By means of tubes open at each end and extending through the walls, the air is obtained from the earth, where it naturally exists wherever the soil is porous, light, or sandy. The ends of the tubes toward the earth may bear either directly against the earth, so as to appear to be stopped up, or, as is preferable where the nature of the soil will admit, they may be inserted in holes bored in the earth a short distance, or, when that is not practicable, the earth may be removed from the immediate vicinity of the ends. By the last two methods there will be less danger of the tubes stopping up with earth and thereby lessening the draught of air thus obtained.

The filling of the tubes with porous soil will not destroy the draught of air, but may to some degree impede it. When the cellar walls are surrounded by a heavy clay soil, a well may be made outside of and adjoining the walls; this well should extend parallel with the wall, and may, if necessary, go entirely around the walls. The object of the shaft in clay soil is to afford a receptacle for sand, gravel, stones, or porous earth, from which the cool air is to come by means of the tubes through the cellar walls. Instead of tubes, openings of any sort may be made in the walls, but terra cotta tubes are preferable. The tubes may, if advisable, be inserted in the bottom of the cellar through the impacted earth of the floor down into the looser and more porous earth below.

This plan is also applicable to beer and other cellars where ice is used in hollow walls around the cellar to keep it cool. In such cellars the air is first taken from the earth in the manner described, and passed by tubes or openings into a vault or cell made cold by ice; then it is passed by another set of tubes into the interior of the main cellar, so that the air obtained from the earth is made cooler by being drawn through the ice cell. The ice rests upon a grating just above the currents of cool air. In beer cellars, where it is necessary to have an extraordinary amount of air and a rapid draught—greater than can be obtained from the earth, because it is not porous enough—a shaft is dug outside the ice cell and filled with coarse material. Tubes extend into the outside earth. Openings from the interior of the cellar to the external atmosphere are essential to produce a draught of air from the earth.

In the accompanying engraving Fig. 1 is a ground plan of a cellar, and Fig. 2 a view showing the interior. Along the bottom of the walls are shown the rows of tubes through which the air passes from the exterior; *b b* are trap doors; at *e* are openings leading to the outer air, and at *c* is an air well built in the center of the cellar floor. Just in front of the walls, *a*, are areas, and behind one wall is a mass of ice, shown in the left of Fig. 2.

This invention has been patented by Mr. Joseph K. Frick, of Evansville, Ind. For particulars address John Raum, Washington, D. C. (see Business and Personal column).

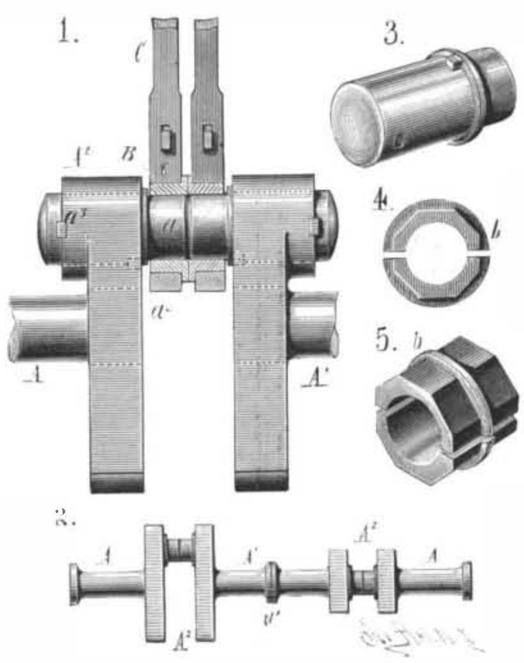


FRICK'S CELLARS.

CRANK PIN FOR STEAM ENGINES.

Too frequently we hear of ocean steamers being disabled by reason of a broken crank pin, crank, or crank shaft, and during the time occupied in repairing the damage the safety of the vessel is endangered. The object of the invention illustrated by the accompanying engravings is to provide simple and effective means for obviating the liability to breakage of crank pins in the crank shafts of steam and other engines, and for facilitating and economizing repairs, especially in the case of marine engines, either at sea or in port.

The crank pin (Fig. 3 is a perspective view of one section of a divided crank pin) is either forged in or subsequently divided transversely in two separate sections, each of which



EDDOWES' CRANK PIN.

has a cylindrical bearing surface at one of its ends for a distance equal to about one-half the length of the bearing surface of an ordinary crank pin, and a body of proper diameter to fit within the eye of the crank arm, A^2. In order to stiffen the sections, a collar, a^2, which may either abut against the face of the crank or enter a recess, is formed upon each section of the pin between its bearing surface and body. The outer end of the bearing surface is curved at its periphery, so that when the two sections are brought into line a small circumferential groove will be formed, which serves to give proper clearance to the brasses and also retain the lubricating substance.

The crank pins may be secured to the arms by being shrunk in in the ordinary way, but for greater facility of insertion and removal the inventor prefers to effect the connection as follows: The eyes of the cranks are bored out with a very slight taper, and the body of the pin is correspondingly turned so as to insure a good, snug, and moderately hard driving fit entirely through. A feather (shown in Fig. 3), formed upon the body of the pin at the face of the crank arm next the bearing surface, fits into a recess in the arm, serving to resist turning or twisting strain upon the pin. To further secure the pin, a key, a^3, is passed through a transverse slot in the body of the pin, the key fitting at its ends in keyways in the face of the crank eye. The key is carefully and snugly fitted, and should have a very slight draught to keep it safely in place. It may also have an adjustable keeper, secured by a top bolt and jam nut in the usual manner.

The crank pin box, of which Fig. 4 is an end view and Fig. 5 a perspective, is divided longitudinally into halves, each one of which may be in a single piece or be divided transversely into two sections, each fitting the bearing surface of one section of the pin, as in Fig. 1. In either case, to afford additional strength to the brass, a collar is formed upon each of its halves, extending around the periphery of the brass exterior to the plane of contact of the abutting ends of the crank pin sections. The collar may be accommodated either by forking the end of the connecting rod or by dividing the rod longitudinally into two parts, as in Fig. 1, each portion being fitted with a separate stub end to embrace the brasses of the adjacent crank pin section, and being coupled at its opposite ends to the cross head. In such case a slight degree of circumferential movement will be permitted between the two crank pin sections, thereby tending to relieve the box from strains induced by variations in the alignment of the crank shaft sections to which the arms are respectively attached. Fig. 2 is a side view, in elevation, of a crank shaft embodying this device, and Fig. 1 is a similar view, showing a pair of crank arms with the crank pin box in position and illustrating the method of securing the crank pin sections by keys and feathers.

In addition to the advantages already enumerated, this method admits of any desired section of the crank shaft being easily and quickly raised whenever desired, to afford access to the bottom brasses of the main journals, and enables a section of a shaft to be readily removed, if broken, and replaced by a spare section without disturbing the remaining portions of the shaft.

Further information regarding this invention may be obtained from the patentee, Mr. A. K. Eddowes, whose address is care Agent Pacific Mail S. S. Company, San Francisco, Cal., or from Mr. J. Snowden Bell, Pittsburg, Penn.

American Gems and Precious Stones.

Mr. George F. Kunz has contributed to "The Mineral Resources of the United States," published by the Government, an article on American gems and precious stones, of which separate copies have been printed. Mr. Kunz has for some years been connected with Messrs. Tiffany & Co., the well known jewelers of New York city, and has had an excellent opportunity for collecting facts concerning American gems.

He states that systematic mining for gems and precious stones is being carried on at only two places in the United States, viz., Paris, Maine, and Stony Point, North Carolina. In other cases where gems are found they are either met with accidentally, or occur in connection with other materials that are being mined or in small veins which are only occasionally met with. They are often gathered with little system on the surface, as is the case with the sapphire, garnet, and olivine found in Montana and New Mexico; or from the beds of streams and decomposing rock, as the moss agate from Colorado; or on beaches, as the agate, chlorastrolite, and thomsonite from Lake Superior.

Some eighty-eight different minerals occur in the United States which have been used as gems. Twelve of these occur in the United States only.

Diamonds are not mined in this country, although they have occasionally been found at a number of localities. A large diamond was found at Manchester, opposite Richmond, Va., by a laborer employed in grading one of the streets. It was an octahedron, and weighed, after it was cut, over ten carats. It was worth $5,000 before cutting. The principal localities for sapphires and rubies are in New Mexico, Arizona, and Southern Colorado, where they occur in the sand, often on ant hills. Garnets occur in the same region, about $5,000 worth of cut stones being annually produced. It is estimated that the value of the tourmalines taken from Mt. Mica, Maine, is between $50,000 and $65,000. Tourmaline and hiddenite are being regularly mined at Stony Point, N. C., some $7,500 worth having already been sold. Rock crystal is gathered and cut in large quantities, the sales at different localities probably amounting to $40,000 annually. Much of it is cut for jewelry, as "Lake George" or "Cape May" "diamonds." The clear crystal for optical purposes is almost entirely Brazilian, as the good material found here rarely reaches the proper channels. Although agates are abundant here, nearly all the polished specimens sold in America have been polished in Germany, having originally come from Brazil and Uruguay. Moss agates, however, are collected here in large quantities, although the cutting is done abroad. The sunstone and moonstone, from Pennsylvania and Virginia, is of good quality, although as yet used but little. The American turquoise is of much interest, but is not much used by jewelers. It is frequently blue when found, but soon turns green on exposure. Jet occurs in Colorado and Texas, and will probably soon be utilized in the arts. The bowenite of Rhode Island and the williamsite of Pennsylvania are used as a substitute for jade.

Why Patents are Necessary.

Henry M. Smith, in his address on "Farmers and Patents," says: "The number of patents granted annually is 15,000 to 16,000, and nearly half as many more were rejected last year. Since the adoption of the plan of examination, the number of rejections has been about one-third of the whole number of applications. This weeding out gives a value to the American patent which no patent issued on any other system can possess. It is this assured value of novelty that gives the American patent system its strength, and its value to the inventor, and hence to the public. The whole public is interested in the growth of material resources, and must be directly interested that the inventor shall be stimulated by a hope of reward, and that his expectancy be so well assured that it can be parted with and assigned to some one who can furnish the means to carry the invention to success.

"Tenfold more inventive skill is now called for than could have possibly found employment in a simpler age. Discovery is being pushed in directions only now for the first time possible. It is found in the history of inventions that inventions come in separate eras. The era of agricultural machinery is not old. It begins first with any solid meaning in 1850, yet what has it wrought! To-day the farmer can more easily feed 100 men than his grandfather could, with the old farm appliances, feed his household. It is shown by the recent census that we have 3,500,000 agricultural laborers in a total of about 17,500,000 workers of all classes, yet we export $288,000,000 worth of breadstuffs, or more than three times the amount of export per agricultural laborers ten years before. Agricultural machinery has been supplemented in advantages to the farmers at a multitude of points in the patent list.

"We need new inventions to meet a multitude of demands for the commonest processes and utilities. It is not the time to say now we have enough. When the steam engine itself, after one hundred years, is still so far short of

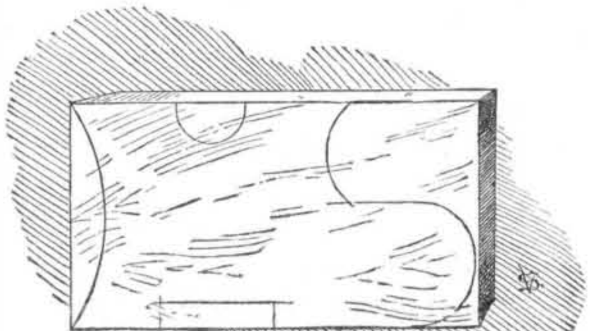


Fig 2

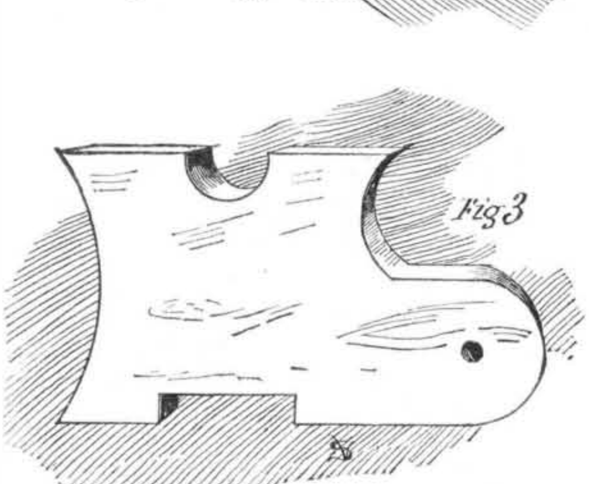


Fig 3

perfection that it utilizes only a small amount of the power residing in its fuel, we need new motors, and we shall get them; new metals and new methods of manufacture in the oldest metals."—*Midland Industrial Gazette.*

Sleeping Together.

Somebody has said that more quarrels occur between brothers, between sisters, between hired girls, between clerks in stores, between apprentices in mechanics' shops, between hired men, between husbands and wives, owing to electrical changes which their nervous systems undergo by lodging together night after night under the same bedclothes, than by any other disturbing cause. There is nothing that will so derange the nervous system of a person who is eliminative in nervous force than to lie all night in bed with another person who is absorbent in nervous force. The absorber will go to sleep and rest all night; while the eliminator will be tumbling and tossing, restless and nervous, and wake up in the morning fretful, peevish, faultfinding, and discouraged. No two persons, no matter who they are, should habitually sleep together. One will thrive and the other will lose.

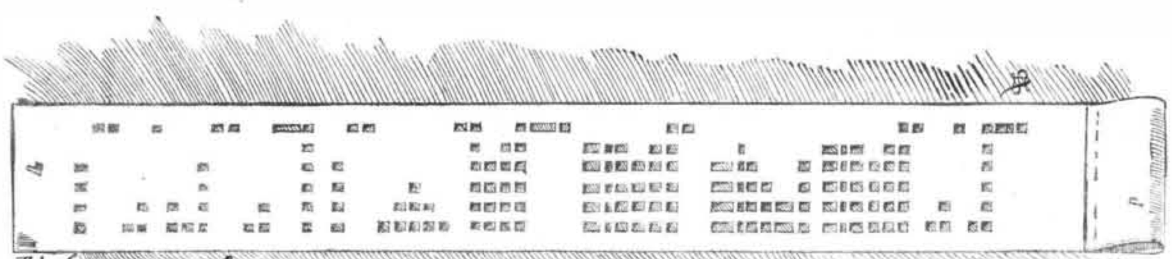


Fig 6

"YANKEE DOODLE" ARRANGED FOR THE AUTOMATIC FLUTE.

THE AUTOMATIC FLUTE, AND HOW TO MAKE IT.

BY VICTOR SMEDLEY.

Most all boys have a natural love for music; with some it amounts to a passion, and such are happy and contented to

Fig 1

devote a large portion of their time in studying and practicing, to perfect themselves on some favorite instrument. Such are the favored few born with a musical talent, but a large majority, while they can enjoy and appreciate the music produced by others, lack the patience or application necessary to acquire the art. To all such this method will be doubly welcome, as it requires neither study, practice, nor teacher, and the only necessary expense will be ten cents for the tin whistle, which can be obtained at any toy shop. Paddy, when asked if he could play the flute, answered: "Sure, how do I know, whin I niver thried it?" To be sure this was a characteristic reply, but by following the instructions given below, any boy can play this flute on first trial.

For the ends two pieces of board about ⅜ of an inch thick, 2¼ inches wide, and 3½ inches long will be required. Mark on both of these with a lead pencil (as a guide in cutting them out) the shape shown in Fig. 2, with the exception of the circular incision in which the flute rests, which should be about one-third as deep in the one to be used at the tapering end as in the other; this is done that the upper part of the flute will be parallel with the roller. See Fig. 3. The lower incisions in the end pieces (1 inch wide and ⅜ of an inch deep) are for the ends of the connecting strips, A, to fit into. At about ⅝ of an inch from the ends of the projecting arms of both pieces bore holes for the axle of the roller to pass through, having them large enough to allow it to revolve in them freely. The connecting strip, A (see Fig. 4), 8½ inches long, should fit neatly the incisions that have already been made for it at the bottom of the end pieces; a single nail or screw at each end will hold it securely in place.

For the roller a piece of old broom handle, B (see Fig. 4), 7⅜ inches long, can be made to answer; the only objection to its use in the condition it is sawn from the broom is its not being of the same diameter all its length; this should be remedied by whittling down the thicker part (taking care to preserve its original rotundity) until it is of the same thickness at both ends. In the center of each end bore a hole about one inch deep of slightly less diameter than the wire to be used for the crank.

A crank is made of a piece of stout wire about 4½ inches long, bent to the shape as shown at C, in Fig. 4; the end that is to go into the roller should be hammered flat, as this will prevent its turning around in the roller.

To put the crank in place: First, put the roller in its proper position between the two projecting arms of the end pieces, then with a hammer drive the wire securely into the holes that have already been started for it.

Do not attempt to push it in with the hand, as it will spoil the effect of the flattened end of the wire.

Another piece of wire like that from which the crank was made, about 1½ inches long, will hold the other end of the roller in place.

Fig. 5 will show how the frame work will appear when finished.

The flute is held in position by a rubber band, D, or a piece of string passed around the thick end of the flute, then under the frame lengthwise and around the thinner end; this will hold it securely in place and also allow its being moved back or forward, if the holes do not exactly tally with those cut in the paper.

Common Manila wrapping paper, known in paper warehouses as Reigles, weighing 200 pounds to the ream, is of about the proper thickness on which to cut the tunes. It should be of one piece rather than several short ones joined together, as joints in the paper are apt to catch on the flute in passing over and prevent the regular winding of the roller.

The paper on which the notes are to be cut should be 7½ inches wide, the length depending on the number of notes there are in the air.

For "Yankee Doodle," which tune is shown in Fig. 6, a strip of paper five feet long will be needed.

In the center of this sheet six lines one inch (or the distance that the holes on your flute are) apart should be ruled the full length of the paper. Leave about four inches of blank paper before you begin cutting out the holes, to paste on the roller and reach from it to the flute.

At the last end of the tune there should be enough spare paper to fold and form a loop in which to put the weight that keeps the paper close to the whistle, in order not to allow the air to escape through any but the proper holes. Fig. 6 is a model of "Yankee Doodle," and shows the number and length of the holes that are to be cut. By following this as a copy (allowing the first four holes to be ½ inch long, the rest in the same proportion, by using a sharp pointed knife, the tune can be cut out with very little trouble.

The diagram (Fig. 7) will be of great assistance. It shows which holes are to be opened in order to produce any of the notes that the flute is capable of playing.

When a quarter note is to be cut out the hole should have a length of half an inch; for a half note a hole one inch long will be required; for a whole note two inches will be the required length of the hole. In width the holes are all the same, about one-half inch.

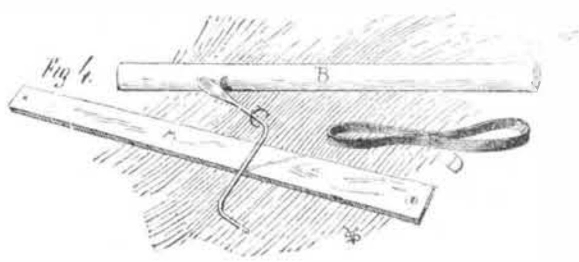


Fig 4

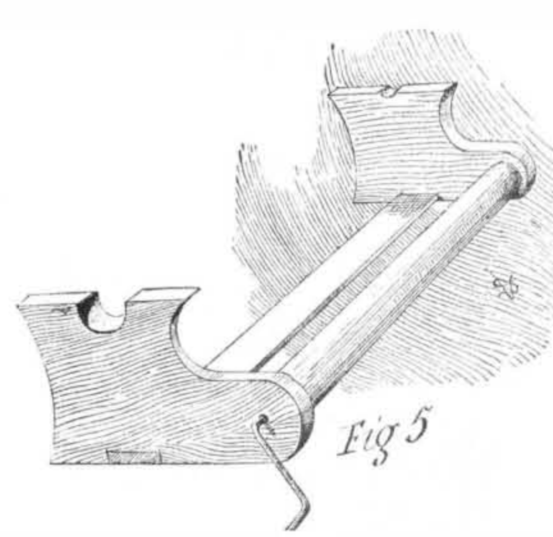


Fig 5

As there is in almost every family some one who understands music, by their aid you can cut out any melody, from a plain hymn tune to an operatic air, or make arrangements for a small orchestra of three or four instruments, thus producing a very pleasing effect.

Care should be taken to blow evenly, and not too strong, or tones will be played that are not intended. Fig. 8 shows the complete instrument. The flute made of tin may be bought for a few cents.

The Eyes Connected.

It has been shown by Knies and Horner, by injections of Prussian blue in dead bodies, that there is a direct communication between the two retinæ by the way of the optic nerves and chiasma. Pfluger has corroborated these assertions by making injections in dogs with a few drops of a saturated solution of fluoresceine. This fluid is forced into the optic nerve, so that it passes not only into the subarachnoid but also into the subdural space. Two minutes after the injection both eyes showed a fluorescence of the retina, which persisted for five weeks. A small quantity injected into the orbital cellular tissue gave no result.