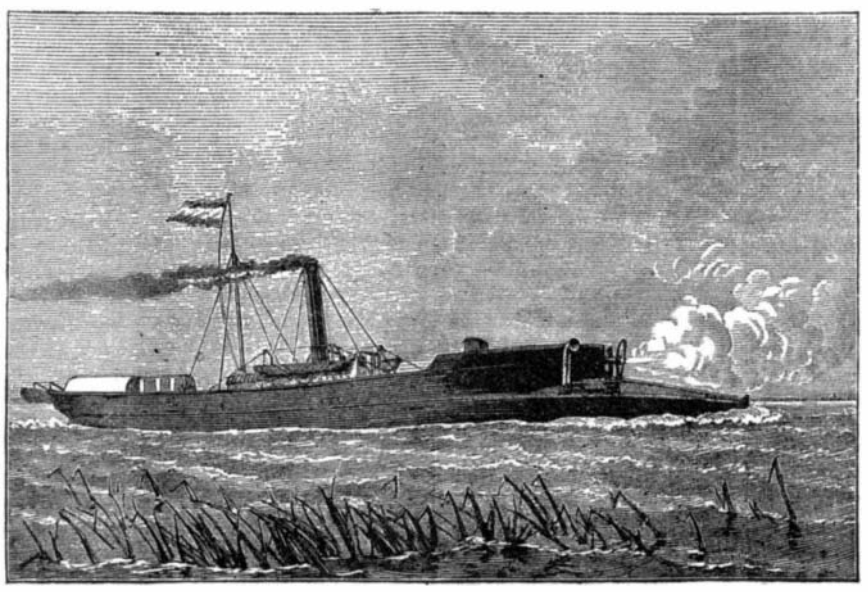
### A NEW GUNBOAT.

Msesrs. J. and G. Rennie, of Greenwich, England, have recently launched a gunboat, the Bermejo, built for the Argentine Republic. She is intended to carry a 26½ tun, 11 inch Armstrong 600-pounder gun, and is after the Arrow and Bonetta type, now being constructed for the British navy by the same firm. She is of the following dimensions: Length, 105 feet; beam, 30 feet; and depth, 10 feet 6 inches, having a draft of water of about 7 feet 6 inches when loaded, with an intended speed of about nine knots per hour. There are two pairs of inverted compound twin screw engines, each driving a separate screw under the quarter. They are expected to give out, when at full working, an indicated power of about 400 horses. She is also fitted with a steam steering apparatus, enabling the gunner to point the gun by means of the rudder, without the necessity for separate means of training. The rudder is unusually large. A small temporary forecastle is to be fitted forward to enable the vessel to proceed with more comfort and safety to her destination, the River Plata.

The gun platform is movable, as in the British gunboats, and lifts and lowers by means of screws worked by a small engine for that purpose; the same engine is used to work a pair of hydraulic pumps, which will supply power to load and ram the gun.



NEW GUNBOAT THE BERMEJO.

### Compass Variations on Iron Ships.

It is now believed that some of the sudden and hitherto unaccountable changes in the deviation of the compasses of iron ships—which are often unsuspected until alleged as the only conceivable cause of the vessels running ashore—are the effects of an unequal and varying distribution of heat over the iron hull. Sudden slight changes of compass deviation, not exceeding five degrees, have been noticed on board iron ships on our American coast, and these are now attributed to changes in the hull, occasioned by the vessel's passing from warm to cold water, and the reverse. The warm temperature of the Gulf Stream, taken in connection with the cold counter current, may account for many of the suspected compass errors on iron ships, and the devising of a remedy for this would be an excellent subject for study on the part of an enterprising inventor.

### DRIVING PORTABLE TOOLS.

We illustrate herewith a mode of working portable tools for drilling, boring, sawing, polishing, etc., designed and patented by Mr. John Paterson Smith, of Glasgow, Scotland. As the arrangement will, says *Engineering*, probably at once remind our readers of hair-brushing by machinery, as the plans really consist in adaptations of the mode of driving a rotary brush, used by the hair-cutting fraternity, to the varied requirements of the workshop.

Fig. 1 of our engraving is a perspective view, showing one method of operating with a portable tool. In this figure, *e* i s an overhead shaft, driven from the prime mover by the belt, *f*, and pulley, *g*. The shaft, *e*, is carried on bearings, *h h*, and has planed on it a groove or key way, *i*, running its whole length. The pulley, *j*, is bored out for the shaft, and fitted with a key or feather to suit the key bed just mentioned, and it is, moreover, so mounted as to be easily moved or shifted along the shaft to any portion between the bearings, *h h*; this pulley, *j*, has formed in its periphery a V groove to receive the elastic or other endless band, *k*, which conveys the motion to the grooved pulley, *c*, of the portable tool. Z represents the work to be operated upon, held in the vise, *m*, attached to the workman's bench, *n*. The hands, *o*, of the operator grasp the handles on the movable tool, and guide and direct it when in operation, as shown.

Fig. 2 is a longitudinal vertical section of a tool suitable for drilling, boring, widening, or other purposes, similar to the modification delineated in Fig. 1. In Fig. 2, *a* is the center spindle, having one end formed as a socket to receive the drill or other tool, *b*, and on this spindle, *a*, is fixed the V grooved pulley, *c*, for receiving the driving band or power transmitter. Two tubular or loose handles, *d d*, are also mounted on the spindle, so that the latter rotates within them.

Fig. 3 is a side elevation, and Fig. 4 a sectional elevation of means for fixing drilling, boring, or other cutters in holders, when tools are arranged to be operated as portable hand tools. In these figures, *a* is the cutter holder, having one end formed to enter the socket of the portable tool spindle, while the other end is taper or cone-shaped, with a slit, *b*, to receive the small steel cutter, *d*, and the bridge of the taper thimble, *c*. The taper thimble, *c*, is bored out to fit the cone, and has a bridge at the wide end to pass up the slit. The steel cutter bears on this bridge; and the harder the cutter is pressed on the work, the more firmly the taper thimble compresses the slit cone and causes the slit cone to grip the cutter.

Fig. 5 is a sectional elevation of a bevel gear tool suitable for operating in a horizontal, vertical, or angular direction. In this view, *a* is the central spindle, having one end formed as a socket to receive the tool, *b*. The V-grooved pulley, *c*, runs loose on a stud handle, *d*, fixed in the frame, *e*, which latter is also bored out to receive the central spindle, *a*, and back center screw, *h*. The grooved pulley, *c*, has fixed on it a bevel tooth pinion, *f*, which gears into and actuates the wheel, *g*, on the center spindle, *a*. The adjusting screw, *h*, is fixed into framing, *e*, by cotter, *i*, and the box screw back center nut, *j*, is arranged in the usual way.

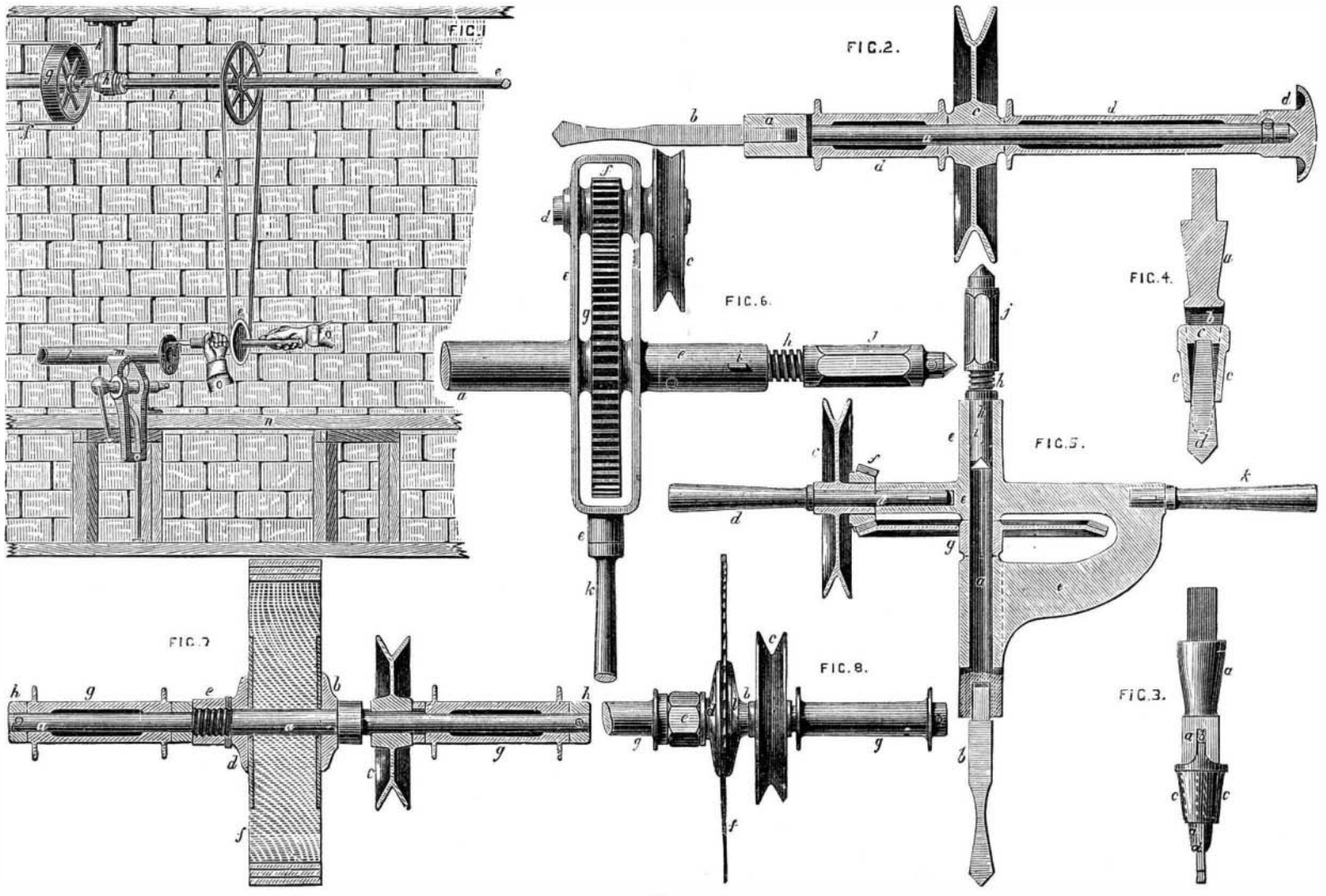
Fig. 6 is a plan of a single spur-geared boring, drilling, widening, or other tool, specially useful where the work to be done is of a heavier class than is suitable for the modification represented in Fig. 2. In this case, *a* is a central spindle having one end formed as a socket to receive the cutter, *b*. The V-grooved pulley, *c*, is fixed on a counter spindle, *d*, running in bearings in the frame, *e*, which is also bored out to receive the center spindle, *a*, and back center screw, *h*. The counter spindle, *d*, has keyed on it a tooth pinion, *f*, which gears into a wheel, *g*, fixed on the center spindle, *a*. The adjusting screw, *k*, is fixed into the frame, *e*, by the cotter, *i*, and the box screw back center nut, *j*, is of an ordinary kind; *k* is a handle fixed in the revolving frame, *e*, by means of which the driving pulley, *c*, and spur pinion, *f*, are carried round the periphery of the spur wheel, *g*, thus giving means for tightening up the driving band.

Fig. 7 is a section of a grinding or polishing tool, arranged to be worked in the same way as the drills already described. In this figure, *a* is the center spindle, on which are fixed the disk or collar, *b*, and V-grooved pulley, *c*. The disk, *d*, is free to slide longitudinally on the spindle, *a*, and to adjust closer to disk, *b*, by screwing up the nut, *e*. The cylindrical grinder or polisher, *f*, is held between the two collars, *b* and *d*. On the spindle, *a*, two loose guiding handles, *g g*, are mounted, so that the spindle rotates within them; the collars, *h h*, keep the handles in position on the spindle.

Fig. 8 is a front elevation of a sawing or cutting tool, also driven in the same way. Here *a* is the center spindle, on which the tubular bush, *b*, with enlarged collar, *b'*, for fixing saw, freely revolves. The V-grooved pulley, *c*, is keyed on the tubular bush, *b*. The collar or disk, *d*, is free to slide on the tubular bush, *b*, and the saw or cutter, *f*, is held between the collars, *b'* and *d*, by screwing up the nut, *e*. The guiding handles, *g g*, may either be fixed to or free to rotate on the spindle, *a*.

We need merely add that there is a variety of light work for which tools so driven might be advantageously employed.

A POUND of copperas dissolved in a pailful of soft soap, and, when thinned with water, applied to onions, is good to keep off the maggot and to promote the growth of the onions.




SMITH'S MODE OF DRIVING PORTABLE DRILLING TOOLS, ETC.

### American Grape Vines in France.

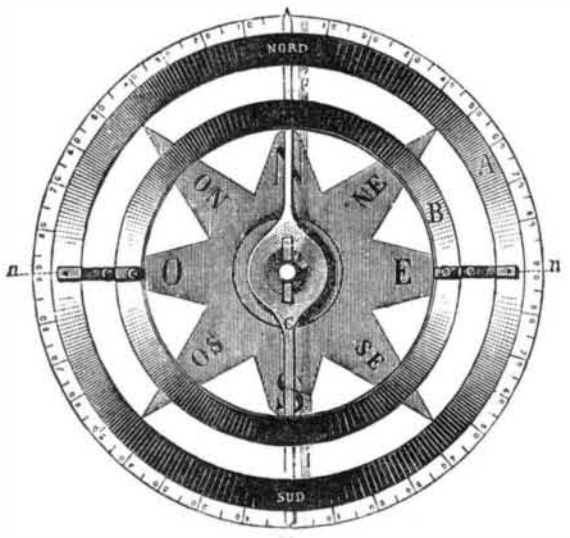
Mr. C. V. Riley, State Entomologist of Missouri, has lately returned from France, where he has been on a tour of inspection among the grape-growing regions. He was every where received and treated like a prince, dinners were given in his honor, and every possible attention shown to him in public and in private.

The particular reason for these civilities is the fact that Mr. Riley was the first to call the attention of the French to the fact that a simple remedy for all their troubles in connection with the grape vine disease was the substitution of certain species of American vines, by him named. These, he affirmed, would yield good wine in France and be free from the pest.

Some of the wine growers tried the experiment, which was continued the next year and that following; and the success has become so well established that extensive orders have now been sent to this country for vines. In fact it is believed the demand from France will be so great that our nurserymen will be unable to fill the orders for exportation this season. Mr. Riley saw plantations of American vines flourishing in France, where the native vines had been utterly destroyed.

### A NEW CIRCULAR COMPASS.

M. Emile Duchemin substitutes for the ordinary compass needle two concentric circles, A B, in the annexed engraving, connected by a crosspiece, C, of aluminum or other metal. The maximum of magnetization starts from the N. and S. poles, and decreases to the neutral points, *n n*, as is indicated by the dark shading on the circles in the illustration.




This compass is said to be much more sensitive than the needle, to be less affected by rolling of the ship, and to be much less sluggish than the liquid compass. These facts were adduced by recent French naval tests of the instrument in comparison with compasses of the usual construction.

### Centennial Notes.

About $3,500,000 have been subscribed toward the building fund, leaving a deficit yet to be made up, according to the reduced estimates, of $2,000,000. This is exclusive of the cost of Memorial Hall ($1,500,000), which is guaranteed by Philadelphia and the State of Pennsylvania, over and above their subscription. The latter amounts to $2,575,000 out of the $3,500,000, leaving $925,000 as representing the total received from the balance of the Union thus far.

France wants special laws enacted by Congress in order to protect her exhibitors from piracy of their inventions by the "grasping Yankees." The French say that they passed such enactments for the benefit of contributors to the 1867 show and that now we should go and do likewise. If we remember rightly, the French laws did not prevent sundry grasps of American inventions at the 1867 Exposition, and exhibition of the same in French shop windows, for sale, while the owners waited and sought for redress which they never got. We have no illiberal policy which prevents foreigners taking advantage of our patent laws, and thus securing full protection for their ideas with as much facility as our own citizens; and such laws we think will be found to answer every purpose of preventing piracy, without any additional legislative tinkering.

The Director General of the Centennial has issued the following rules for the information and guidance of exhibitors.

The space granted to an exhibitor within the building is available floor space, exclusive of the intermediate passages between the exhibits.

There will be no charge for space, but all platforms, counters, ornamental partitions, show cases, and appurtenances must be erected at the expense of the exhibitor; but they must not exceed the following hights without special permission from the Chief of Bureau:

Show cases and partitions: Fifteen feet above the floor.

Counters: Two feet ten inches above the floor, on the side next the passage way.

Platforms: One foot above the floor.

Exhibitors have the privilege of placing railings of approved design around the space allotted to them, of the uniform hight of two feet six inches above the floor level. The floor space granted includes the area embraced by the railing.

Each column within the building will be lettered and numbered, the letters designating the lines of columns, lengthwise, from east to west, and the numbers the lines, crosswise from north to south. Each exhibitor will have his location defined with reference to the nearest column, and the official directory of the building will give the position according to this system.

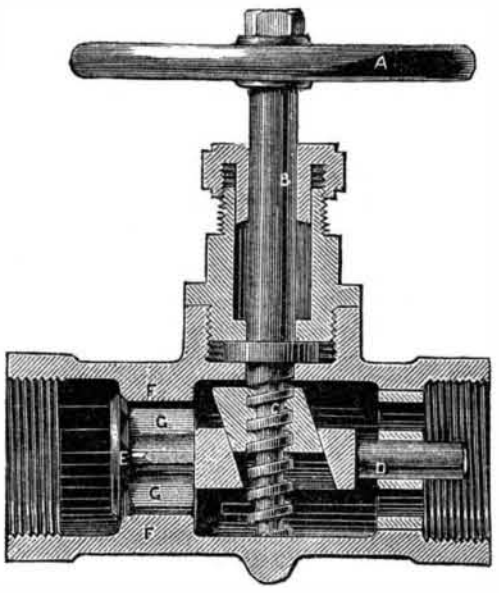
Exhibitors having space granted in close proximity to the columns or outer wall of the building will be furnished from the Bureau of installation with drawings showing the form of the columns, the water spouts, and the available wall space. Cards stating the exhibitor's name, class of objects, catalogue number, place of manufacture, and price will be affixed to goods under such regulations as the commission may prescribe.

All products arriving at the doors of the building by rail, wagon, or otherwise, will be received by the Bureau of Transportation and delivered on the space granted.

All exhibits must be arranged, completely and finally in position, not later than May 1, 1875.

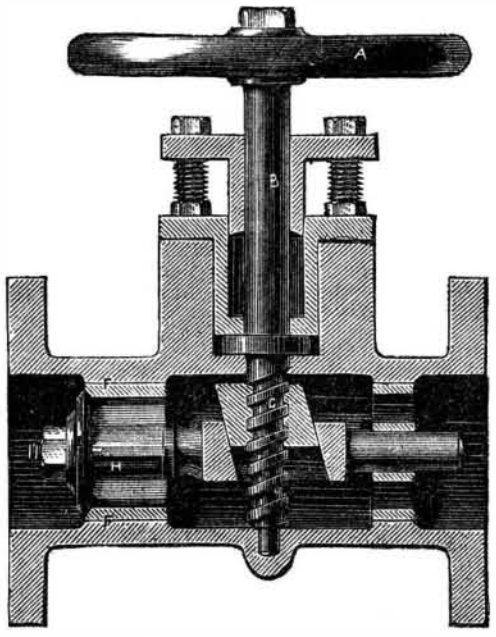
### WHITTON'S STOP VALVE.

We publish herewith sectional views of two forms of a




stop valve recently invented by Mr. Whitton, and introduced by Messrs. Low and Duff, of Dundee, Scotland. Its chief characteristic is its powerful closing and opening movement, obtained by a combination of the screw and the wedge. This gives it a ready control over the supply of steam or water under great pressure, and especially adapts it for use as a throttle for a locomotive or as a water hydrant valve.

In Fig. 1, the spindle, B, has a square thread, C, cut upon it, upon which slides a wedge block, moving in an inclined slot in the valve spindle, O, by which arrangement it will be readily understood that the disk, E, is powerfully controlled by the wedge, which is again acted upon equally and uniformly by the action of the screw. It will be seen that the stuffing box and gland, through which the spindle, B, passes, are both screwed into the socket of the valve. In Fig. 2, however, the stuffing box arrangement is improved, the box being driven in tight and screwed down, and the gland being




adjusted by studs. The seat of the valve, being put in separately, can be easily repaired. The bottom of the screwed spindle is also recessed into the bottom of the valve, giving lateral support to the spindle.

### A New Textile Industry.

The government of India has been encouraging of late the culture of China grass (tschu-ma) or inner bark of the *Böhmeria nivea*, which yields a very beautiful fiber, some three times as strong as hemp, and as soft as flax, while possessing a luster equal to that of silk. Although the properties of this fiber have long been known there has been an absence of proper machinery for its preparation, and until quite lately it has been supposed that only the green stem could be operated upon. Since it has been discovered that the dry stems may be treated by ordinary flax and hemp machinery, producing a fiber but little inferior to that obtained from the green plant, their utilization bids fair to constitute an important addition to existing textile industries.

Although the vegetable is indigenous to China, India, Japan, and has been successfully cultivated in Martinique, Jamaica, Trinidad, Algeria, Queensland, and Mauritius, and to a limited extent on some portions of our continent, we are not aware of any extended efforts being made towards its acclimatization in the United States. It is said that the plant adapts itself to climatic conditions with considerable facility, and hence it may be inferred that systematic culture in southern states would be attended with favorable results.

### THE CATALEPTIC ROOSTER.

There is a curious experiment which any one who is the possessor of a rooster can try for himself with success, and which has never been positively explained. It is an ancient one, in fact it is two hundred years and over old, since it was commented upon by Kircher in 1646. Still it is none the less curious, and almost as much a subject of speculation now as it was when first observed. It is performed thus: Select a dark colored table with a smooth top; place it so that a narrow streak of sunlight will fall across the surface. The sun light is not absolutely material to success, but we have found the desired result to be more quickly obtained when it is present. Then set the rooster on the table, and hold his head down so that his beak comes in contact with the wood. Now, with a piece of chalk and in the sunlight, draw a line straight from the bird's beak, as represented in our engraving. Move the chalk very slowly, and by the time the line is a couple of feet in length the rooster will fall into a cataleptic or trance-like condition; and although the hands are removed from his body, he will remain perfectly rigid for a minute or two. It is said that a black line on a white surface will produce the same effect. Hens may be similarly treated, but it takes much longer to get them into the trance state, it being necessary to hold the head down several minutes before they come under the influence.

This phenomenon is termed hypnotism, or the result of a curious sleep-producing property incident to the fixation of the attention upon some bright object. It is by some considered a partial paralyzation of the brain. The same can be done upon human beings. The person should fix his eyes steadfastly on any glittering object, say a disk of silver paper, fastened on a black surface and brought within ten inches of his face, for about twenty or thirty minutes. A state of torpor supervenes, during which, if the limbs be gently raised, they will rigidly remain as placed. Surgical operations have been performed under these conditions without causing suffering to the patient.

### A Method of Increasing the Solubility of Salicylic Acid.

The solubility of salicylic acid is enormously increased by the addition of borax to the water, so that as much as ten parts of the acid can be dissolved in 100 parts of water, if eight parts of borax be present. This discovery we owe to Dr. H. Bose, assistant in the Surgical Clinic at Berlin, who has contributed a paper of much interest to the *Berliner Klinische Wochenschrift* (No. 28, July 12), to which we are indebted for the following details. The solution should be made by first dissolving the borax with the aid of heat, and then gradually adding the salicylic acid to the boiling fluid. Since commercial samples of both these drugs are not chemically pure, a small amount separates, and requires to be filtered off on cooling. The filtrate is a clear yellowish or light brown fluid, according to its concentration. The proof that the addition of borax does not convert more than a part of the salicylic acid into salicylate of soda—a salt devoid of antiseptic properties—is easily shown; for if we dissolve 6·9 parts of the acid in 100 parts of boiling water, and then add 2·89 parts of bicorbonate of soda, the carbonic acid in the latter is set free, while the soda combines with the salicylic acid, and on cooling there is such an abundant deposition of the excessive acid that the whole liquid becomes nearly solid, owing to the formation of crystals. Now, if the whole be reheated until the acid is completely dissolved, and then 3·58 parts of boracic acid added, no deposit of any kind occurs on cooling. The most suitable strength in which the above solution can be used for direct application to wounds is, according to Dr. Bose's experience, one which contains from 2½ to 5 per cent of salicylic acid, and 2 to 4 per cent of borax. Solutions containing more than 5 per cent of acid are too irritating, and give rise to a very abundant capillary hemorrhage if applied to the surface of a fresh wound. Dr. Bose speaks highly of the result obtained with the boro-salicylic dressing in a number of cases of removal of small tumors. The operations were all performed without the spray, and only the sponges and forceps used were cleansed antiseptically with the above solution. The wound was thoroughly washed with the same liquid, and then a thick layer of salicylic wadding, also soaked with it, was laid on its apposed edges, so as to reach several finger's breadths beyond them