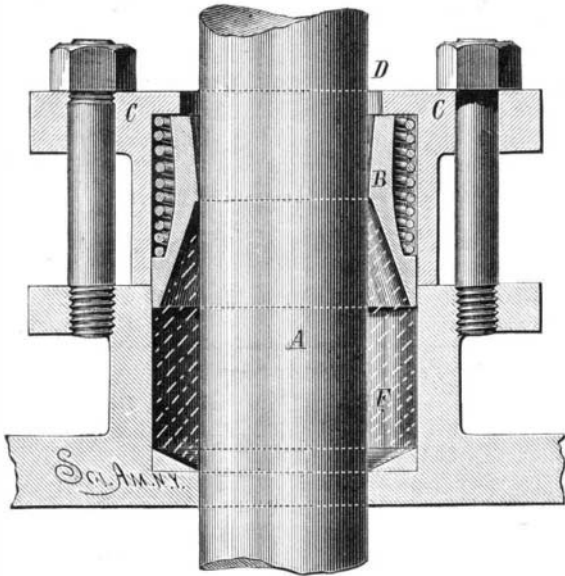


IMPROVED PISTON ROD STUFFING BOX.

We illustrate herewith an improved stuffing box for the piston rods of steam cylinders, which is so constructed at the cylinder heads as to be self adjustable without requiring the continual screwing up of the box to prevent leaking of the same. The inventor claims that the packing may be used as long as a single circular strand remains around the piston rod, keeping the stuffing box always perfectly steam tight.

A is a cylindrical cup which is fitted accurately to the piston rod so as to hug the same, and is made tapering toward the packing placed in the stuffing box of the cylinder head. The cup is applied by the gland, B, in which is a shoulder, C, which retains the cup in such position that its tapering end projects into and slides in the stuffing box. Between the shoulder and outer rim of the cup a spiral



PISTON ROD STUFFING BOX.

spring is interposed as shown. This spring is of such strength that it presses the cup tightly on the packing as soon as the steam is shut off. It does not, however, overcome the pressure of the steam which causes the packing to press against the concave surface of the cup and so hug the valve stem tightly. In this way the blowing through of the steam is prevented after the packing becomes worn and does not tightly fill the stuffing box. The interposition of the packing prevents the speedy corrosion of the spring by cutting off access of the steam to it. The arrangement of parts also enables the flange, C, to be fitted loosely to the piston rod, thus avoiding friction at that point.

The inventor informs us that he has had the device in use on locomotives on two railroads for two years, and that it effects a saving of fifty per cent in packing. He has used it on one side of his engine, with the ordinary stuffing box on the other, and he has found that after running down long grades when the old fashioned stuffing box would heat the piston so that oil poured on the rod would smoke, the parts on which the new box was arranged would be cooler than before steam was shut off at the top of the grade. For further particulars relative to sale of patent, address the inventor, Mr. Joseph M. Searle, Stanhope, Sussex county, N. J.

Wandering Needles.

The vagaries of needles which have been introduced in the body, and have escaped immediate removal, have in all ages attracted the attention of collectors of the marvelous in medicine. Hildanus related an instance of a woman who swallowed several pins, and passed them six years afterwards; but a more remarkable instance of prolonged detention was lately recorded by Dr. Stephenson, of Detroit—that of a lady, aged seventy-five, who last year passed, by the urethra, after some months' symptoms of vesical irritation, a pin which she had swallowed while picking her teeth with it in the year 1835—forty-two years previously. Occasional pain in the throat was the only immediate symptom, but in 1845 she was seized with severe gastric pain, which passed away, and she had no further symptoms until hæmaturia in 1876. This curious tolerance of such foreign bodies exhibited by the tissues is often observed in lunatic asylums. M. Silvy recorded some years ago the case of a woman who had a *penchant* for pins and needles so strong that she made them, in effect, part of her daily diet, and, after her death, fourteen or fifteen hundred were removed from various parts of the body.

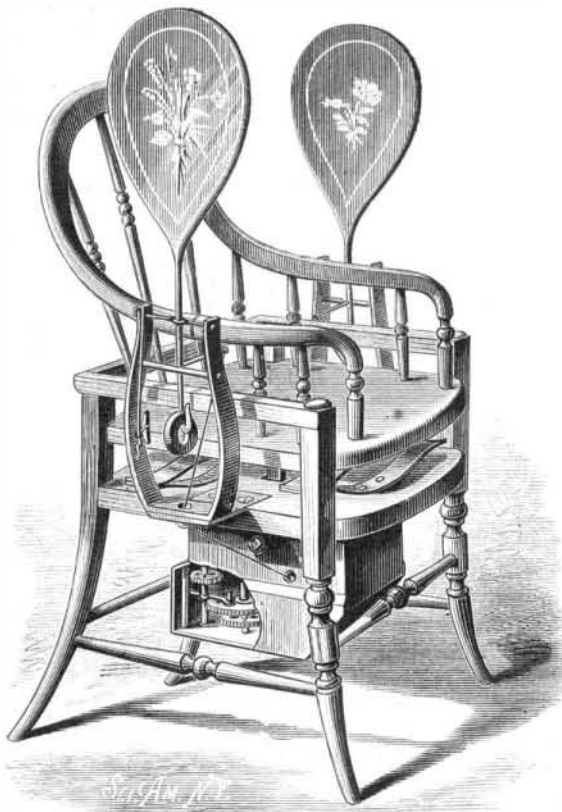
Another case, almost as striking, has been recorded by Dr. Gillette—that of a girl in whom, from time to time, needles were found beneath the skin, which they perforated, and were removed by the fingers or forceps. Concerning the way in which they had got into her system no information could be extracted from her. She was carefully watched, and in the course of eighteen months no less than 320 needles were extracted, all being of the same size. Most were black and oxidized, but some had retained their polish. The majority were unbroken. They passed out of various parts of the body above the diaphragm at regular intervals, but in a sort of series, and always in the same direction. Most escaped in the region of the left nipple, and a few escaped in the arm, axilla, thigh, temple, and cheek. Some-

times several passed out of the same opening. The largest number which escaped in a single day was sixty-one. A curious phenomenon preceded the escape of each needle. For some hours the pain was severe, and there was considerable fever. She then felt a sharp pain, like lightning, in the tissues, and on looking at the place at which this pain had been felt, the head of the needle was generally found projecting. The needles invariably came out head foremost. No bleeding was occasioned, and not the least trace of inflammation followed. The doctor in attendance extracted 318. They were sometimes held firmly, and seemed to be contained in a sort of indurated canal. It was conjectured that they had been swallowed with suicidal intentions; but, on the other hand, the way in which the needles escaped in series, and their direction with the head outward, suggested that they had been introduced through the skin. That little weight is to be attached to the place at which the needles escape as proof of their mode of introduction is evident from a case recorded by Villars of a girl who swallowed a large number of pins and needles, and two years afterward, during a period of nine months, 200 passed out of the hand, arm, axilla, side of thorax, abdomen, and thigh, all on the left side. The pins, curiously, escaped more readily and with less pain than the needles.

Many years ago a case was recorded by Dr. Otto, of Copenhagen, and mentioned at the time in the *Lancet*, in which 395 needles passed through the skin of a hysterical girl, who had probably swallowed them during a hysterical paroxysm; but these all emerged in the regions below the level of the diaphragm, and were collected in groups, which gave rise to inflammatory swellings of some size. One of these contained 100 needles. Quite recently Dr. Bigger described before the Society of Surgery of Dublin a case in which more than 300 needles were removed from the body of a woman who had died in consequence of their presence. It is very remarkable in how few of the cases the needles were the cause of death, and how slight an interference with function their presence and movement cause. From time to time their detection by a magnetic needle is proposed as a novelty; but, as Dr. Gillette reminds us, this method was employed by Smee nearly forty years ago, and has often been adopted since.—*Lancet*.

IMPROVED AUTOMATIC FAN.

An ingenious device of timely interest now that the hot weather is at hand has been invented by Mr. Gustav A. C. Meyer, its object being to enable a person to fan himself without any of the usual muscular exertion. The invention may also be used to communicate power to sewing machines and other light apparatus. As shown in the engraving, the seat frame is guided by anti-friction rollers in rails of the corner posts of the chair. The lowering of the seat frame by the weight of the body causes the engagement by a fixed



IMPROVED AUTOMATIC FAN.

vertical rack bar of the seat with a suitable transmitting wheel train and mechanism. The rack bar is guided along an anti-friction roller bearing on its rear side, and the seat and rack bar are elevated by the spring by raising the body from time to time off the chair. The speed of the transmitting mechanism is regulated by an anchor escapement and fan governor.

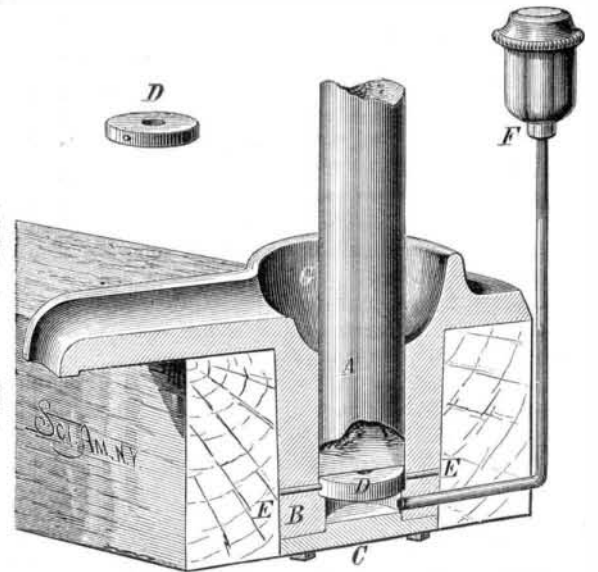
The inventor states that 25 minutes are required to cause the seat of the chair, represented in the illustration, to descend to its full extent, and during this period 1,257 strokes of the fan are made. It will be understood that the user of the device has simply to sit down and the motion of the fans at once automatically begins.

Patented May 7, 1878. For further particulars address Mr. G. A. C. Meyer, 20 Bowery, New York city.

IMPROVED STEP BOX.

The annexed engraving represents an improved device for lubricating the shaft in the step box, the construction and advantages of which will be readily understood from the following description: A is the lower end of a vertical shaft, B the step box, and C the bearing bar. The step block, D, is dropped into the box, and is sustained by the shoulder and fixed by pins at E. Beneath the block is an oil chamber, supplied with oil by an elevated cup, F, through the pipe shown. The oil is forced into the step box by capillary attraction and by the pressure of that contained in cup, F, and any surplus enters the annular cup, G, and runs off through the spout shown.

It will be observed that the center bearing is left intact, and the part of the shaft exposed to the oil hole is carried around into contact with the bearing surface of the box,



COLLET'S IMPROVED STEP BOX.

so that it wears equally with the rest, and also carries oil by mechanical action between the surfaces. As one hole is made eccentric, the oil will cause indirect contact with the part of the lower end of the shaft that comes in direct contact with the face of the bearing block, and consequently the introduction of oil between the surfaces is positive, and it will spread out over the whole of the bearing surface by capillary attraction.

Patented April 30, 1878. For further information address the inventor, Mr. John W. Collet, Upper Alton, Madison county, Ill.

Heat Conductivity.

The conduction of heat by substances that are poor conductors has recently been investigated by M. Less, in the laboratory of M. Wiedemann, for the same purpose as Hopkins had in view, and by a similar method to the one adopted by that experimenter. The substances examined were varieties of stone and wood. Plates were cut off them and placed on the bottom of a vessel equally heated with steam. On the other free surface was placed a soot covered copper plate. In a dry inclosed space, protected from all external radiation, a thermopile was exposed at different distances to the radiating copperplate, and from the deflections of the galvanometer inserted in the circuit, after a short exposure (always the same), the heat conductivity of the plate under examination was determined. The experiments were performed with great care, and are detailed in a recent number of the *Annalen der Physik*. We give the following table of results (in it the conductivity of the best conductor is put = 1000):

Substance.	Sp. Gr.	Conductivity.
Marble from the Pyrenees.	2.616	1000
Saxon granite (containing albite).	2.629	804
Carrara marble.	2.668	769
Marble from Italy.	2.682	763
Basalt of Idar, near Oberstein.	2.712	726
Seeberg fine grained sandstone.	2.130	721
Granite from the Thuringian forest.	2.545	713
Strehlen sandstone.	2.324	701
Red gneiss of Tharandt.	2.540	696
Nephalin—Basalt of Mitterteich.	2.853	690
Serpentine of the Saxon Erzgebirge.	2.418	678
Gneiss of Tharandt.	2.654	673
Carlsbaden Shiver.	2.731	537
Sandstone of Postelwitz.	1.997	487
Clay slate from the Schwartal.	2.685	469
Sandstone with kaolin cement.	1.951	420
Common clay.	2.003	275
Maple wood (with the fibers).	0.634	192
Oak wood (with the fibers).	0.621	161
Box wood (with the fibers).	0.790	135
Box wood across the fibers = the rings.	0.754	96
Oak wood across the fibers = the rings.	0.508	86
Maple wood across the fibers and rings.	0.571	86
Maple wood across the fibers = the rings.	0.607	85
Oak wood across the fibers and the rings.	0.571	75

The numbers obtained for the stones show that, in general, density and compactness greatly favor the passage of heat; still, the values of the conductivity by no means depend on the specific gravity alone. The stones of crystalline texture conduct better than those mechanically mixed, and the stones with fine grains better than those with coarse. The few observations made on woods show that in them, as was long

since demonstrated by Tyndall and others, there is a much more rapid passage of heat in the direction of the fibers than in that at right angles to them. The ratio numbers, however, are somewhat different from those formerly obtained.

New Volcano in Peru.

A Peruvian newspaper, the *Bolsa*, says that extraordinary phenomena have been observed in connection with the "Corpuna" volcano in the Province of Castilla, which have caused great alarm among the population. The immense banks of snow which have crowned its summit from time immemorial have suddenly melted away with such rapidity as to cause torrents to rush down the sides of the mountain, washing out immense quantities of stones and earth. The river below, being unable to contain the great body of water so suddenly added to it, overflowed its banks, causing great damage and distress. A great chasm or lateral crater next opened on one side, throwing out volumes of smoke and steam as well as tongues of flame, which were distinctly visible at night, accompanied with loud subterranean rumblings. It had never been supposed that the Corpuna was or could be a volcano, and there is no tradition that it was ever in a state of eruption. Nor within the memory of man has its crown of snow ever been absent.

WOOD CARVER OF SIMLA.

Simla is best known as a place of refuge from the intolerable heat of the Indian plains, and as a resort where the surroundings have been Anglicized to the greatest possible extent. The natives are by no means deficient in artistic design and execution. It is in their tools, principally, that they are at a disadvantage; and the wonder is that they can do so well with such sorry appliances. There are few of us who have not had opportunities of examining and admiring Indian workmanship, whether in the case of the celebrated chains from Trichinopoly, or of chessmen, or of curious boxes made of various woods; and some of us may possess specimens of the skill with which the wood carver of Simla plies his vocation. He has, at any rate, wood enough and to spare in his neighborhood; he has the magnificent *cedar* or Himalayan cedar, the pine, the oak, and the rhododendron.

He may seem, in the picture, to set about his work in a style which would not recommend itself to the civilized wood carver; and he may appear to be handling an implement such as is used in this country for a game of ball; but he contrives, nevertheless, to turn out some good work.

Natural History Notes.

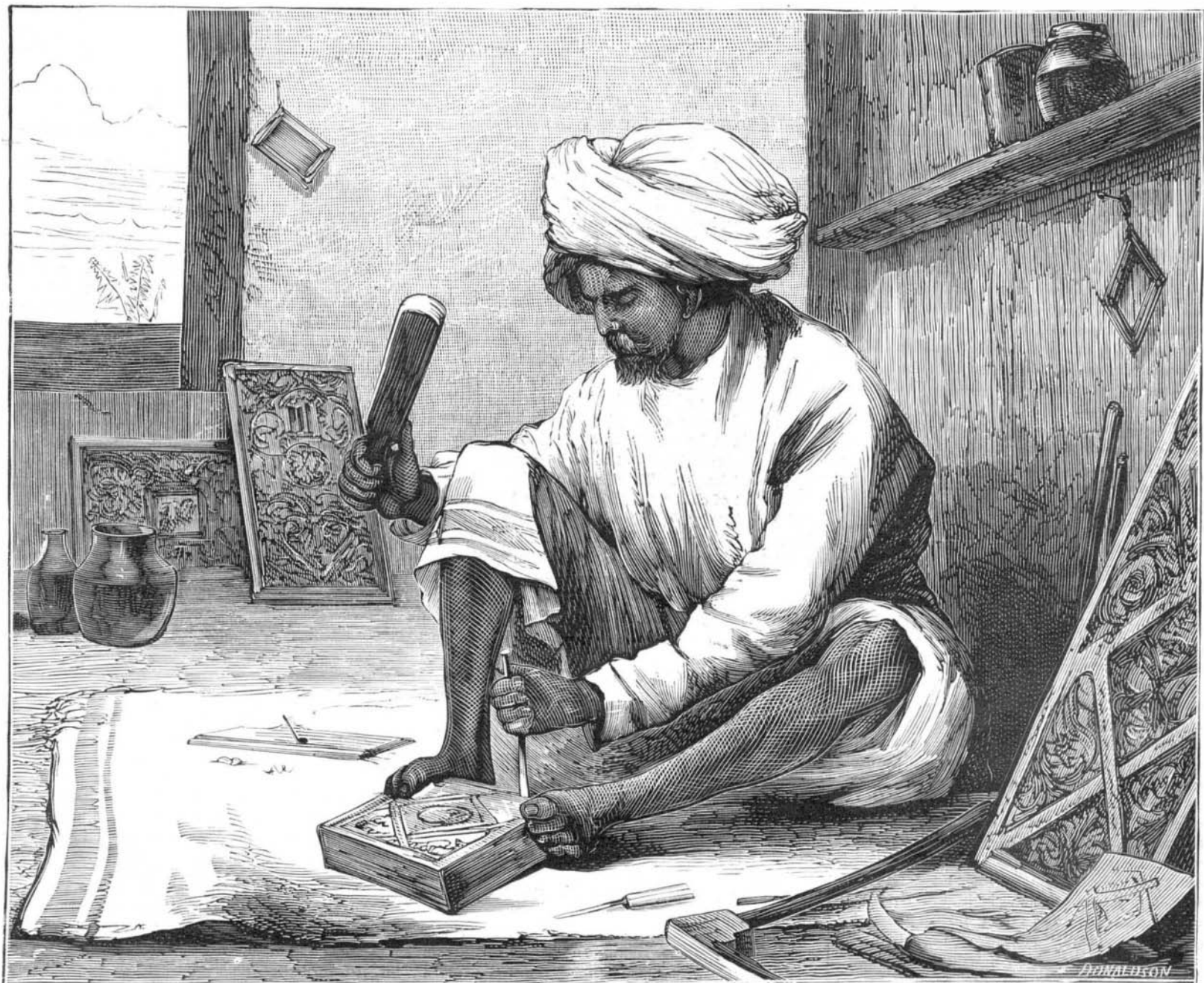
Influence of Trees on Rainfall.—From observations made by M. Fantrat relative to the comparative influence of leafy woods and resinous woods on rain and the hygrometric state of the air, recently communicated to the Paris Academy, it appears that pine forests have a much greater influence on the hygrometric state than others; so that if the vapors dissolved in the air were apparent, like fogs, we should see forests shrouded in a large screen of moisture, and in the case of resinous woods the vapory envelope would be more distinct than in that of leafy woods. M. Fantrat also shows that pines retain in their branches more than half of the water which is poured upon them, whereas leafy trees allow 58 per cent of the precipitated water to reach the surface of the ground. He suggests, therefore, that in planting with a view to oppose inundations, it would be advisable to choose by preference resinous trees, as offering a better covert.

Nutrition of the Sundew.—Dr. Francis Darwin communicates to *Nature* the results of some experiments on the *Sundew* (*Drosera rotundifolia*) which are not without interest. A number of the plants were freely supplied with meat, while another set were kept without animal food. At the end of the season the two sets were compared in various ways with the object of deciding whether or not "Carnivorous plants" profit by an animal diet. The advantages gained by the fed plants were found to be numerous. In continuation of his experiments, he tells us that the plants on which he worked were cultivated in six soup plates, and after all the flower stems had been cut the plants in three of the plates were removed from the moss in which they grew, and were counted and weighed. The plants in the other plates were left with the object of comparing the new plants which should spring up from the winter buds of the two sets in the following year. They were then removed to the hothouse that they might rapidly send up next year's leaves. By the middle of January, 1878, it became clear that more leaves were springing up from the winter buds of the plants that had been fed than from the others. Both sets were now kept without food, and, on April 3, removed from the plates, counted, dried, and weighed. The result showed that there was only a comparatively small difference (18 per cent) between the number of not fed and fed plants. Numerous minute offsets were found among both sets and counted as separate plants. But, judging either by the total or average weights, no doubt could be entertained of the great advantage gained by the fed plants. One of the most striking facts was that in spite of the far larger yield of flower stalks, seeds, etc., produced during the previous

summer by the fed plants, they were nevertheless enabled to lay by a far greater store of reserve material than their not fed competitors. The results reached by Dr. Darwin agree very well with those obtained by Drs. Kellerman and Van Raumer, who conducted a like series of experiments with the *Sundew*, in Germany, at about the same time.

The Cause of the Brilliant Hues of Animals.—Mr. Wallace, in his new book, "Tropical Nature, and Other Essays," just published, gives a theory to account for the diverse colors, the special adornments, and the brilliant hues which distinguish certain male birds and insects, which is quite different from that of Mr. Darwin.

The theory of the latter, it will be remembered, was that all, or almost all, the colors of the higher forms of animal life are due to voluntary or conscious sexual selection, and that diversity of color in the sexes is due at least, first of all, to the transmission of color variations either to one sex only or to both sexes, the difference depending on some unknown law and not being due to simply natural selection. Mr. Wallace regards this view as erroneous. He finds, on close examination, that neither the general influence of solar light and heat, nor the special action of variously tinted rays, is at all an adequate cause for the many wondrous complexities of color with which we are acquainted. He would therefore take another view, dividing the colors into groups, as they are protective to the creature, act as warning colors, or sexual colors, or typical colors, or simply (as in floras) attractive colors. To him the very frequent superiority of the male bird or insect in brightness of color (even when the coloration is the same in both sexes) seems to be due primarily to the greater vigor and activity and the higher vitality of the male. He reminds us that the colors of an animal usually fade during weakness or disease, while robust vigor and health add to their intensity. This intensity is most developed in the male during the breeding season. It is also very general in those cases where the male is smaller than the female. This greater intensity of color in the male would be further developed by the combats of the males for the possession of the females. Increased vigor acting thus on the epidermal system would soon produce further distribution of color, and even new tints and markings. Indeed, even the remarkable display by so many male birds of their peculiar beauties of color and plumage may be thus accounted for; for at the pairing season these birds are in a state of the greatest energy. At such a season even those birds that are not ornamental, flutter and spread their wings and erect their head-crests and tail feathers; and there would be a progressive development of these ornaments in all



WOOD CARVER OF SIMLA.