slopes of the Sahyádris contain large numbers of wild animals, including the tiger, panther, leopard, bear, hyaena, &c. Snakes and other reptiles also abound. The state possesses no railway ; but there is an excellent trunk road through the territory.

The census of 1881 returned the population of Sáwantwári at 174,433 (males 86,061, females 88,372) ; Hindus numbered 166,080, Mohammedans 3970, and Christians 4213. Agriculture supports the greater part of the population. The staple product is rice, but excepting rice none but the coarsest grains and pulses are raised, both soil, which is stony, and climate being against the cultivation of wheat and other superior grains ; oil seeds, hemp, and pepper are also grown. The gross revenue of the state in 1883-84 amounted to about £34,000. Before the establishment of Portuguese power (1510) Sáwantwári was the highway of a great traffic ; but during the 16th and 17th centuries trade suffered much from the rivalry of the Portuguese, and in the disturbances of the 18th century it almost entirely disappeared. Since the establishment of order under the British (1819), trade has considerably developed. The present chief being a minor, the ad­ministration has been in the hands of the British since 1869.

SAW-FISH. See Ray, vol. xx. p. 299.

SAW-FLIES *(Tenthredinidae).* This subdivision of the *Hymenoptera* is characterized by possessing a sessile abdomen which hides the base of the posterior legs. The antennae vary in their structure and in the number of their joints. The ovipositor is modified to form two saws, which when at rest lie in a sheath formed of two valves. The larvae resemble caterpillars, but may be distinguished

by their greater number of legs; usually 9 to 11 pairs are present. When alarmed they have the habit of rolling themselves up in a spiral fashion; some also dis­charge a thin fluid from lateral pores situated above the spiracles. The females place their eggs in small incisions made by means of their saws in the soft parts of leaves. Usually one egg is placed in each slit. Some species merely attach their eggs in strings to the exterior of the leaves. With each incision a drop of fluid is usually excreted, which serves to excite a flow of sap to the wounded part. The egg is said to absorb this sap, and so to increase in size. One genus *(Nematus)* alone forms galls. These occur in the young leaves of the willow, a tree which the true gall-flies do not attack. *Nematus ventricosus* resembles the bees and wasps in the fact that the parthenogenetic ova produce only males; as a rule in the animal kingdom the absence of fertilization results in the production of females.

The injury which the saw-flies inflict upon crops or young trees is almost entirely brought about by the voracious habits of the larvae. These possess well devel­oped mouth-appendages, by means of which they gnaw their way out of the leaf in which they have been hatched, and then eat it. In this way the Turnip Saw-Fly *(Athalia spinarum),* not to be confused with the Turnip Fly (*Phyllotreta nemorum),* attacks the leaves of the turnip, often completely consuming the leafage of acres at a time. The Pine Saw-Fly *(Lophyrus pirn)* causes great damage to

plantations of young Scotch firs, devouring the buds, the leaves, and even the bark of the young shoots. Other species infest currant and gooseberry bushes, consuming the soft parts of the leaves, and leaving only the tough veins. The only effectual remedy in most cases is to col­lect and kill the larvae when they first appear. Syringing the affected parts with hot water or tobacco water is also recommended.

SAWS. Blades of steel with serrated edges have been used from time immemorial to rend or divide substances of various kinds, including metals and stone ; but the principal modern use of the saw is to divide wood. Modern saws are of the finest steel, but the ancients used bronze saws, and among uncivilized nations saws have been made with flakes of flint imbedded in a wooden blade, and held in place by means of bitumen (see Grimshaw, *History, &c., of Saws),* while obsidian has been used by the Mexicans, and shark’s teeth and even notched shells form the saws of certain savage islanders. The pyramid-builders in Egypt cut granite and other hard stones by means of bronze saws set with jewels (see vol. xx. p. 124).

Space would fail to describe minutely the various adaptations of the saw to mechanical uses. It is indispens­able to the carpenter, the furniture-manufacturer, the watch­maker, and manipulator of metals. It is one of the most trustworthy tools of the surgeon’s case, while without it the dentist would of necessity drop back to the barbarous customs of a past century. Iron, horn, pearl, india-rubber, and the thousand and one conveniences of civilized life are dependent upon this useful instrument, which is but an exaggeration after all of the sharpest of knives, whose edge when examined under the microscope exhibits an array of saw teeth so minute as to present a smooth plane to the unassisted eye. As the chief use of the tool is to saw wood, the enormous timber industry of America has given an impetus to the improvement of the saw and its manufacture, which has no parallel elsewhere.

Saws may be classified as (1) straight (reciprocating in action), having a flat blade and straight edge, making a plane cut, or (2) circular or disk-like, cutting at right angles to the motion, or (3) cylindrical or barrel-shaped, with a convex edge cutting parallel to its axis, or (4) band-saws, being a continuous ribbon or band running upon an upper and lower pulley, making a plane or curved cut, with a straight edge parallel to the axis of motion. The oldest and commonest, with the widest range of adaptability, is the straight saw, with reciprocating rectilinear blade. In this class is included the ordinary hand-saw with its varying range of uses from fine to coarse and from rip to cross-cut, and with teeth of forms as various as are the different duties which it is calculated to perform. The teeth are long or short, cutting one way or both ways according to the “ pitch ” or “ set ” which may be given, and which should be adapted to both the kind and character of the timber to be sawn. The “ pitch ” of a saw-tooth is the angle of the point with reference to the blade, and is found by sub­tracting the back angle from the front, 60° being the generic angle of saw-teeth, which, however, may be variously placed. From the smallest hand-saw to the largest “ mill-saw ” the same general rules apply. In the largest saws of this class may be named the “pit-saw,” used in the earliest manufactures of lumber or timber, and worked by one person standing over the log and drawing upward while another in the pit below follows with the downward or cutting thrust. From the pit-saw we advance to the “ gate-saw ” used in the earlier adaptation of motive power to the cutting of timber, thence to the “ muley-saw,” @@1 suspended without strain upon a pitman beneath, having its upper end hung in slides pendent from a heavy beam above. These saws must of necessity be thick, to sustain the heavy thrusts which they are expected to endure, and are consequently of “heavy gauge,” this being based upon the different sizes of wire, the largest gauge representing the

@@@1 According to some writers the term “muley” (or mulay) is de­rived from the German “Miihlsage,” mill-saw, but, as this form of saw, when introduced, differed only from the ordinary mill-saws long in use in the manner in which it was hung (free from strain), the name may have been given to signify “hornless, indicating the absence of the ponderous gate which was the essential feature of strained saws.