the ballast necessary for the crane towers the weight of the engine should be considered. Access to the platform is obtained by ladders fixed either inside or outside one of the queen legs. With the exception of the boards forming the working platform, which are usually spiked down, the timbers of a tower gantry should all be connected by screw bolts and nuts.

Swinging scaffolds are useful for executing light repairs to a building. Perhaps the simplest form of swinging scaffold is the “ boatswain’s boat,” so called from its being chiefly used for the painting or examination of the sides of ships, but it is dangerous to work from and a light wind will cause it to swing to and fro, and owing to the extremely awkward position occupied by the workman there is difficulty in doing good work from it. A better, safer and more comfortable arrangement, the “painter’s boat” (fig. 4), is suspended by blocks and falls from two cantilever “ jibs ” fixed in the upper part of the building. The positions of the jibs are altered as re- quired. The ends of the suspen- sion ropes are fastened securely to the cradle, and by altering their length the workmen can adjust it to the proper height for working. These boats are usually constructed with a framework of iron and fitted with edge boards and guard rails all round. Like the “ boatswain’s boat ” they

sway considerably in the wind.

An improved form of cradle has been patented which is swung on block runners working along a tight wire cable stretched between two jibs. Block tackle is used to raise or lower the cradle, and horizontal movement also is obtained by light guy lines working over pulleys at the jibs and secured to the tops of the suspension ropes. All adjustments can be made from the cradle with perfect safety. The guy lines steady the boat to some extent and prevent it from swinging in the wind.

Tall chimney shafts may be erected by internal scaffolding only, or by a combination of external and internal staging. The latter method is often adopted when the lower part of the shaft is designed with ornamental brickwork, string courses, panels, &c., and it is important that this work should be carefully finished. An external scaffold is therefore carried up until plain work not more than 2 or 2½ bricks thick is reached, when the remainder can be completed by “ overhand ” work from an internal scaffold. The offsets made in the brickwork on the inside are used to support the timbering. For the repair of tall chimneys, light ladders are erected one above the other by a steeplejack and his assistants, each being lashed to the one below it and secured to the brickwork by dog-hooks driven in the joints. When the top of the chimney is reached balk timbers are raised by pulleys and laid across the top. From these arc swung cradles from which the defective work is made good. If the work or weather demand a more stable scaffold, a light but strong framework of putlogs held together with iron bolts is fixed on each side of the shaft with iron holdfasts, and a platform of boards is laid upon them. For circular chimneys pieces of timber cut to a curve to fit the brickwork are clamped with iron to the putlogs to prevent them from bending when the bolts

connecting the two frames are screwed up.

In England, the Factory and Workshop Act of 1901 empowers the secretary of state to make regulations respecting any dangerous “ machinery, plant, process, or descrip­tion of manual labour.’’ No regulations affecting the building trade have been made, however, but a memorandum was issued in 1902 by the Home Office with the following

suggestions for the prevention of scaffold accidents:—

1. All working platforms above the height of 10 ft., taken from the adjacent ground level, should, before employment takes place thereon, be provided throughout their entire length, on the outside and at the ends,

(a) with a guard rail fixed at a height of 3 ft. 6 in. above the scaffold boards. Openings may be left for workmen to land from the ladders and for the landing of materials;

(*b*) with boards fixed so that their bottom edges are resting on or abutting to the scaffold boards. The boards so fixed should rise above the working platform not less than 7 ins. Openings may be left for the landing of the workmen from the ladders.

2. All “ runs ” or similar means of communication between different portions of a scaffold or building should be not less than 18 in. wide. If composed of two or more boards they should be fastened together in such a manner as to prevent unequal sagging.

3. Scaffold boards forming part of a working platform should be supported at each end by a putlog, and should not project more than 6 in. beyond it unless lapped by another board, which should rest partly on or over the same putlog and partly upon putlogs other than those upon which the supported board rests.

In such cases where the scaffold boards rest upon brackets, the foregoing suggestion should read as if the word bracket replaced the word putlog.

*N.B.* Experiments have shown that a board with not more than a 6 in. projection over a putlog can be considered safe from trapping or tilting.

4. All supports to centring should be carried from a solid foundation.

5. In places where the scaffolding has been sublet to a contractor, the employer should satisfy himself, before allowing work to proceed thereon, that the foregoing suggestions have been complied with, and that the material used in the construction of the scaffold is sound.

See J. F. Hurst, *Tredgold's Carpentry;* A. G. H. Thatcher, *Scaffolding.* (J. BT.)

SCALA NUOVA (Turk. *Kush-Adasi),* also known as New Ephesus, a well-protected harbour on the west coast of Asia Minor in the vilayet of Aidin, opposite Samos. The site of the ancient Marathesium is close by on the S. It is connected with the railway station of Ayassoluk by a diligence service. Before the opening of the Smyrna-Aidin railway its roadstead was frequented by vessels trading with the Anatolian coast, and it has often been proposed to connect it with the railway system by a branch line, and thus enable it to compete with Smyrna. In the absence of this the town is rapidly on the decline. The population is not over 7000. The trade is of merely local interest. (D. G. H.)

SCALD, an ancient Scandinavian bard who recited or sang at feasts compositions in honour of chiefs and famous men and their deeds. This word represents the Icel. *skãld,* Dan. *skald,* Swed. *skjald,* the regular term for a poet. Authorities differ as to its derivation. It seems certain that the word was originally derogatory in sense; some connect it with *skālda,* a pole, on which libels were cut. Others, *e.g.* Skeat, refer it to Swed. *skalla,* Icel. *skjalla,* to make a loud noise or clatter, and take the original sense to have been a “ loud talker.” This would link the word with “ scold,’’ to rail at, find fault with, which is formed from Dutch *schold,* past tense of *scheldan,* cf. Ger. *schelten,* in the same sense.

Of different origin is the verb “ scald,” to burn or injure the skin or flesh by hot liquid or steam (see Burns and Scalds); also to cleanse an object, or to remove hair, bristles, feathers &c., from an animal, by exposure to moist heat, such as boiling water, steam, &c. This word is derived from the O. Fr. *escalder, eschauder,* mod. *échauder,* Lat. *excaldare,* to wash with hot water (*caldus, calidus,* hot).

SCALE (1) A small thin flake, plate or shell. The word in O. Eng. is *sceale,* so *bean-sceale,* the husk or pod of a bean; cognate forms are found in Ger. *Schale,* O.H.G. *Scale,* from which the O. Fr. *escale,* modern *écale,* is borrowed. The ultimate root is seen in the closely allied “ shell,’’ and also in skull, scalp, shale and skill, and means to peel off, separate, divide. The word is used specifically (1) in botany, of the rudimentary flake- like leaf forming the covering of the leaf-buds of deciduous trees and of the bracts of the cone in conifers; (2) in zoology, of the flat, hard structures of the epidermis or cxoskeleton in fishes, reptiles. Thus in ichthyology the various types of scales are classed as *cycloid* (Gr. *κbκλ∞,* circle), where the growth is in layers, equally from the anterior and posterior edges; *ctenoid* (Gr. *κτήυ,* comb), where the posterior edge is toothed; *ganoid* (Gr. *yàvw,* shining), with a hard enamelled surface and usually rhomboidal in shape, and *placoid* (Gr. πλάξ, tablet), as in the ossified papillae of the cutis of the shark. In reptiles the term is applied to the structures which form the covering of the true reptiles, snakes and lizards. In entomology the downy covering