

TECHNOLOGY

Laminated Baseball Bats

Dwindling hickory and ash forests threaten national pastime. Broken bats are largest ball team equipment expense. Stronger bats result from lamination.

By HELEN M. DAVIS

► A HICKORY stick no longer strikes the tune for the three R's at school, but it is decidedly in the center of things in athletics.

The baseball bat, symbol of the great American game, is not what it used to be. It used to be a hickory stick, if a heavy bat was wanted, or, if a lighter one was desirable, it was made of ash. The supply of suitable ash and hickory trees is getting very scarce. Something will have to be done.

High density wood from vigorous young trees makes the most resilient bats. The national pastime uses up millions of bats a year, however, and the production of new trees has not kept up with their consumption.

There is still a lot of old growth hickory around, but a solid hickory bat weighs 33 ounces, and the batter gets more distance with a lighter bat. Ash of any age, the favorite material, is in short supply.

The solution, in which baseball magnates and bat manufacturers have the cooperation of the U. S. Department of Agriculture's Forest Products Laboratory at Madison, Wis., is to stretch the supply of suitable wood.

Laminated Bat Adopted

The result is the laminated bat. The inside, extending down into the handle, is strong, tough hickory, which will take shock. The outside is ash, which will not splinter when it strikes the ball a glancing blow. The parts are glued together with the new resin glues that are stronger than the wood itself.

Conventional bats are just not strong enough. Whether the younger players as they come along pack a bigger wallop than the old-time giants did, or whether old-time trees were tougher than those cut today, the fact is that bats break at a rate alarming to the men who pay the bills. Their cost is now ahead of that of the baseballs, even including those swiped by sentimental fans. A team may start with 12 new bats and consider itself lucky if it has one good one left, after only one day's play. How can scientists of the Forest Products Laboratory help?

The experts on kinds of wood and their sources had first to acquire know-how on making bats. They studied the velocity of a struck ball. They determined that the center of gravity of a bat, to give it the right heft, must be so many inches from

the end. They studied the forces revealed by the types of break. They considered from the theoretical viewpoint how many ways a baseball bat can be sliced, and with what results.

There was, of course, prejudice against the first laminated bats. Umpires were afraid that sliced bats might be loaded illegally. But the scientists pointed out that putting a slug of lead into the shaft would certainly not make the bat any lighter, and that possible loading would be easy to detect. Soaring costs and actual scarcity of suitable wood finally led to acceptance of the new type of bat for college games. Professional baseball has just come to the decision to make laminated bats legal for organized baseball leagues, both major and minor. Such bats are being offered by manufacturers for the present season, and players have the opportunity to try them out. Next October may see the first use of the modernized slugging sticks in World Series play.

The scientists, with their interest aroused, are now trying to see whether they cannot make a better bat than a tree can. They

are studying the grain of the wood, to see whether laminations can be so arranged that the edges do not curl as wear and tear progress. They believe that a five-piece bat, with the center boxed in, may be better than a three-piece one, which is constructed more like a sandwich.

The problem for the Department of Agriculture scientists extends much farther than baseball. These experts on wood keep an eye on all the major uses for which trees are cut.

Ax Handle Problem

Changing forests can bring about an unexpected crisis in any industry traditionally attached to a particular material. For instance, ax handles have always been made of white wood. The supply of white ax handles is growing short. There is a more abundant supply of wood that could make just as good handles, but it is red. Considerable persuasion is needed to sell a man an ax with a red handle, because it is not like the one grandpappy used to make the clearing for the old home farm.

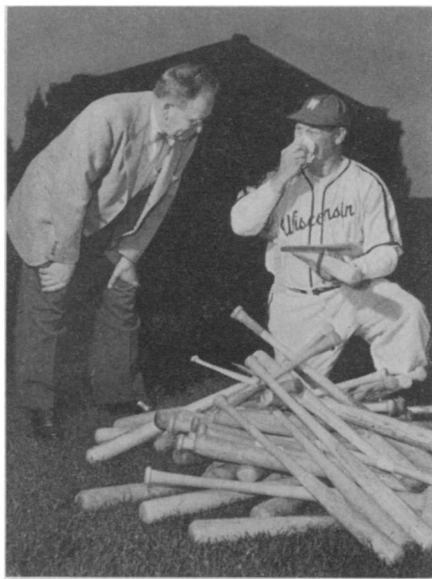
Close to the problem of the laminated baseball bat is the introduction of laminated bowling pins.

In days of plenty, perhaps about the time of Rip Van Winkle, the village carpenter thought nothing of cutting tenpins from the hearts of sturdy oaks. But when modern duckpins came to be manufactured by machinery, it was discovered that one tenth of a tree goes into one bowling pin. The old-fashioned carpenter burned the waste for firewood. Today there are many more economical things to do with waste wood. Again the government experts are helping conserve America's forest resources by wiser use of more parts of each tree.

Plywood's Strength

Lamination is familiar in plywood, in which a layer of wood is peeled from the surface of a revolving log. This layer is then spread out flat and glued to other layers turned cross-wise so that the grain of each layer runs at right angles to that in the layers above and below. Glued and dried under pressure, the alternate directions of the grain strengthen the sheet of finished plywood and make a material that is becoming more popular all the time for walls and surfaces.

Laminated materials are making progress also as structural members, formerly cut in one piece. Not only beams, stringers and rafters for houses have been satisfactorily formed of layers of wood glued together, but curved shapes have been built up to be used as arches in barns, gymnasiums, auditoriums, churches and other buildings



SPLIT BATS—Coach "Dynamite" Mansfield of the University of Wisconsin tearfully shows George Heck of the Forest Products Laboratory, U. S. Forest Service, the pile of bats his baseball team has used up.

where a large floor space free from pillars is desirable. The strength is satisfactory even for some railroad trestles. The degree of curvature that can be built into laminated structures even allows boats to keep their streamlined outlines, yet have greater strength and stiffness than similar hulls mechanically joined.

Success of laminated structures depends largely upon the glue used to join the sections. Many new types of glue have been developed by modern chemists to supplement the old fish and animal glues, so that the woodworker can now choose from a number of bonding materials.

Casein glue, made from waste milk products, is generally used to hold plywood sheets together. Several kinds of new adhesives are made from resins, allied to plastics in composition.

Studies of each of these types of glue

were undertaken by the Forest Products Laboratory during World War II. The armed services wanted to determine which types would hold up best in the kinds of joints usually used in making boxes and furniture. Packaging for the tropics was the immediate problem, as the extreme heat and humidity of tropical conditions is hard on glued furniture.

Variations in durability of glued joints were found, depending on how the pieces of wood were put together. Side-grain to side-grain joints are those used for laminated construction. These joints stood up better in all the tests than the side-to-end joining used to put furniture together. A synthetic phenol-resorcinol-resin type of glue gave the best durability, under conditions far more rugged than those found on any baseball diamond.

Science News Letter, March 13, 1954

METEOROLOGY

Tornado Warnings

► LIVES CAN be saved and property damage minimized if local communities set up a tornado warning system.

At the present time, tornado forecasts cover a wide area, such as a Midwestern state, warning that twisters may occur, but Weather Bureau experts are not yet able to pinpoint the exact time and place they will strike.

A tornado can be spotted as a spinning, funnel-shaped cloud extending toward the earth from the base of a thundercloud.

In addition to a local warning system, such as visual reports to police, communities can use outdated radar sets obtained from the Weather Bureau to keep a vigilant watch for the twisters. (See SNL, Feb. 13, p. 106.) These sets can be modified, for about \$10,000, to scan the skies for tornadoes within a 200-mile radius. This is \$50,000 less than a new one costs.

Over a dozen communities in Texas are now part of such a tornado-warning system, having raised on their own the money needed to modify the radar sets.

The network will work like this:

Weather Bureau forecasters will alert areas that have conditions most likely to produce severe thunderstorms, from which tornadoes are sometimes spawned. When the bright picture that means a thunderstorm is spotted on the radar screen, the weather observer will try to find out directly from the community what kind of storm is hitting the area.

Knowing that a tornado exists, the weatherman can plot the path it will follow, pinpointing the time it will hit a particular town or city. An advance warning to residents in the twister's path should give them a chance to take proper precautions.

The following safety rules have been suggested by Weather Bureau experts:

1. When time permits, go to a tornado cellar, cave or underground excavation.
2. If you are in open country, move at

right angles to the tornado's path. If there is no time to escape, lie flat in the nearest depression such as a ditch or ravine.

3. In a home, the southwest corner of the lowest floor or of the basement offers the greatest safety. If you are in a city or town, seek inside shelter, preferably in a steel reinforced building. Stay away from windows.

Science News Letter, March 13, 1954

TECHNOLOGY

Coal-Burning Turbine May Challenge Diesels

► A MCGILL University professor has invented a coal-burning gas turbine engine which he believes will challenge the oil-burning diesel's favor with railroad men. By pulling a train four times as far for a given amount of coal, it also is expected to outclass its steam-powered ancestors.

At a recent unveiling of the experimental model, Prof. Donald L. Mordell told high-ranking Canadian government and railroad officials that his engine is more economical, more compact and more powerful than its diesel counterpart.

It burns all grades of coal, even low grades that steam engines cannot use. It extracts 20% to 24% of the thermal energy from coal in contrast to the steam engine's six percent figure. It gets around one engineering "bug" that has plagued previous engines of this sort through use of a new operating cycle which permits only clean air to drive the turbine blades. Formerly, coal-ash damage to these blades was considerable.

Prof. Mordell and his research team in Montreal developed the engine under sponsorship of the Department of Mines and Technical Surveys and with a \$300,000 grant from the government.

Science News Letter, March 13, 1954

OPTICAL BARGAINS

IMPORTED MICROSCOPE
100, 200, 300 Power **ONLY \$14.95**

Good optical qualities. Fine focusing. Definition is surprisingly clear and good in fact amazingly so at this price. Revolving disc-light, adjustable mirror. Square Stage (2 1/4" x 2 1/4") with slide clamps. Serviceable construction. The greatest microscope bargain on the market! TRY IT FOR 10 DAYS... if you're not completely satisfied your money will be refunded in full. Instrument comes packed in sturdy, hardwood case. Accessory Eyepieces and objective available.
Stock No. 70,008-Q.....\$14.95 Postpaid



New! 2 In 1 Combination Pocket-Size

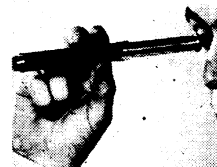
50 POWER MICROSCOPE

and

10 POWER TELESCOPE

ONLY \$4.50

ppd.



Useful Telescope and Microscope combined in one amazing, precision instrument. Imported! No larger than a fountain pen. Telescope is 10 Power. Microscope magnifies 50 Times. Sharp focus at any range. Handy for sports, looking at rare objects, just plain snooping.

Send Check or M.O. Satisfaction Guaranteed

Order Stock #30,059-Q \$4.50

Just Arrived from Germany—

ANASTIGMAT ENLARGING LENSES



Make your own enlargements. It's lots of fun and easy. Three popular sizes of high quality anastigmatic enlarging lenses. Coated for increased contrast, and to cut down exposure time. Corrected for color separation. Flat field. Excellent overall definition. Click

stops. Iris diaphragm. Retaining ring for mounting. COVERAGE: 55 MM size—35 MM, 75 MM size—2 1/4 x 2 1/4, 105 MM size—2 1/4 x 3 1/4.

Stock No. 30,123-Q... F/4.5—55 mms. focal length

click stops 4.5-5-6-8-11-16 \$19.50 Postpaid

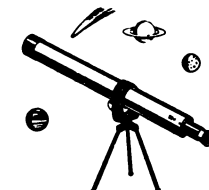
Stock No. 30,124-Q... F/4.5—75 mms. focal length

click stops 4.5-5-6-8-11-16-22 \$16.50 Postpaid

Stock No. 30,125-Q... F/4.5—105 mms focal length

click stops 4.5-5-6-8-11-16-22 \$19.50 Postpaid

IMPORTED 30 POWER TELESCOPE



Complete With Tripod Unusual Bargain Price

Excellent for amateur astronomers. All metal body—focuses from approx. 40 ft. to infinity. Achromatic objective—40 mm. dia.—outside

surface low reflection coated. Smooth slide focusing eyepiece. Eyelens outside surface coated. Lens erecting system. Images right side up. Sturdy tripod 8 1/2" high. Can be used also for camera. Max. length 26 1/2". Barrel diam. approx. 1 1/2". Weight 1 1/2 lbs. Stock No. 70,018-Q.....Only \$21.95 Postpaid

F/1.4 16 MM MOVIE PROJECTING LENS

Also Used for 8MM Projectors



Focal length only 1" or 3/4" that of standard projecting lens. Gives you a big picture—4 times the size normally obtained in same projecting distance. Lens unit is mounted in a standard sleeve with O.D. of

1-3/16" which fits most projectors—otherwise adapters available for mount sizes ranging from 1" to 1 1/4". Back of this lens must come within 5/16" of film. Worth \$30.00.

Stock No. 30,119-Q.....\$9.50 Postpaid

WE Have Literally Millions of WAR SURPLUS LENSES AND PRISMS FOR SALE AT BARGAIN PRICES. ALSO DOZENS OF LOW COST IMPORTED INSTRUMENTS.

Write for Catalog "Q"—FREE!

Order by stock No. Send Check or M.O. Satisfaction Guaranteed!

EDMUND SCIENTIFIC CORP.
BARRINGTON, NEW JERSEY