Brown-Forman Boosts the Barrel

For Eighty Years, This Famous Kentucky Distillery Has Placed Whisky in Cooperage for an Ever-Growing Market

UNHERALDED and unnoticed, George Garvin Brown began making his first whisky at St. Mary's, in Marion county, Ky., in 1870. From that humble beginning has grown the present-day Brown-Forman Distillers Corporation; a veritable giant among the nation's independent distilleries.

The corporation owns and operates distilleries, feed-producing units and warehouses in Louisville, Frankfort and Shively, Kentucky. The company also has established the Brown-Forman Experimental Farm on 456 acres of fertile land adjoining the Labrot & Graham Kentucky Dew distillery, at Frankfort.

In addition, the corporation produces highest quality tight wooden barrels at the Blue Grass Cooperage Company plant in Louisville. This particular company was formed as a division of Brown-Forman Distillers Corporation in 1945 and turned out its first barrel in January, 1946.

The whisky that George Garvin Brown produced in 1870 (one of the first bottled bourbons) was christened Old Forester. The bottle label carried this statement in the maker's own handwriting: "There is nothing better in the market."

An audacious touch, yet it evidences the confidence that the man had in his product. He knew the whisky was right. He felt the world should know about it, too. He made a simple statement of facts as he saw them.

This brand has been produced by the distillery ever since. The label currently appearing on a bottle of Old Forester carries the identical assurances of quality, flavor, etc., that the originator set forth in the distillery's swaddling clothes days.

Total number of employes in all divisions of the corporation is 1,200. About 450 employes man the great pulsating distillery or main plant at Louisville. Mutual cooperation is very high.

The distillery site is at 1908 Howard street, just three blocks off Broadway, the main street of Louisville. The plant occupies 14 acres of ground and 35 assorted buildings are spread out in impressive array on the property. This does not include county warehouses at Shively, which comprise 53 acres.

Three railroad spurs serve the plant and 15 cars can be spotted at one time. The distillery building proper is of brick construction and four stories high. It contains a yeast room, a meal room, cooking and converting floors and beer stills.

The column building is six stories high and contains alcohol columns. The mill building, 6-7 stories high, contains storage bins for nine carloads of grain, cleaning and separating machinery, and mill for grinding grain. The fermenting room is tile lined and has a tile floor and holds 12 fermenters each of 32,000-gallon capacity.

There is a brick dry house containing screening and pressing equipment, also a 50-foot rotary drying drum which recovers distillers dried grains. The evaporator building is brick and two stories high. It holds four giant evaporators which process 3-4 percent solids thin slop to syrup that is 30-35 percent solids. The syrup is then dried on drum driers to produce solubles at 92-94 percent solids (Distillers Dried Solubles).

There are four bonded warehouses of brick construction on the premises. They are 12 stories high and have a total capacity of 105,000 barrels. There is also an office building, laboratory, barrel shed, cistern room, carpenter shop, truck garage, paint shop, stock building, recooperage shop, bonded bottling house, new bottle house and numerous other buildings.

At Brown-Forman's none but the choicest grains are ever used in the whisky-making process. Grains selected are the best that money can buy. The corporation pays a premium to obtain them. When the grain is received it is distributed over a shaking screen for removal of cob and coarse trash. This is combined with air blast to remove dust and light dirt.

Frank Kenyon, National Distillers Products Corp., New York City; Herman Witte, John Stortz & Son, Inc., Philadelphia; Hector Q. Jackson, Sutherland-Innes Co., New York City; M. Edward Verdi, Verdi Cooperage Co., North Bergen, N. J.; George Neu, Acme Steel Co., New York City; and Harold Weissman, Weissman Company, Braddock, Pa.

National Packaging Week, during which the industry and the thousands of companies in all industries that use its materials, machinery, equipment and services traditionally celebrate also, will be observed May 9-13.

In announcing the dates for Packaging Week, J. D. Malcomson, AMA packaging vice president, emphasized that "the packaging is important not only because the industry has an annual dollar volume larger than the steel industry, but also because packaging is a concern of all those engaged in production, distribution, merchandising, sales, transportation, warehousing, insurance and purchasing—in fact to virtually all industrial organizations manufacturing or distributing products for industrial or consumer use."

Mr. Malcolmson, who is also technical advisor to Robert Gair Company, Inc., said that as a result of increasing management emphasis on improved methods for consumer and industrial packaging, packing and shipping, packaging is being regarded more and more as a key to lower production costs and greater sales. The program for AMA's Conference and Exposition is being arranged to aid industry to achieve these goals, he said.

According to information from packaging producers and users, Mr. Malcolmson said, 1949 will probably be "the most important year of the last decade insofar as the advancement of certain types of new packaging and packing methods, machinery and techniques are concerned." New design ideas and production improvements are being prepared in many types of packaging, he said. Among these he listed:

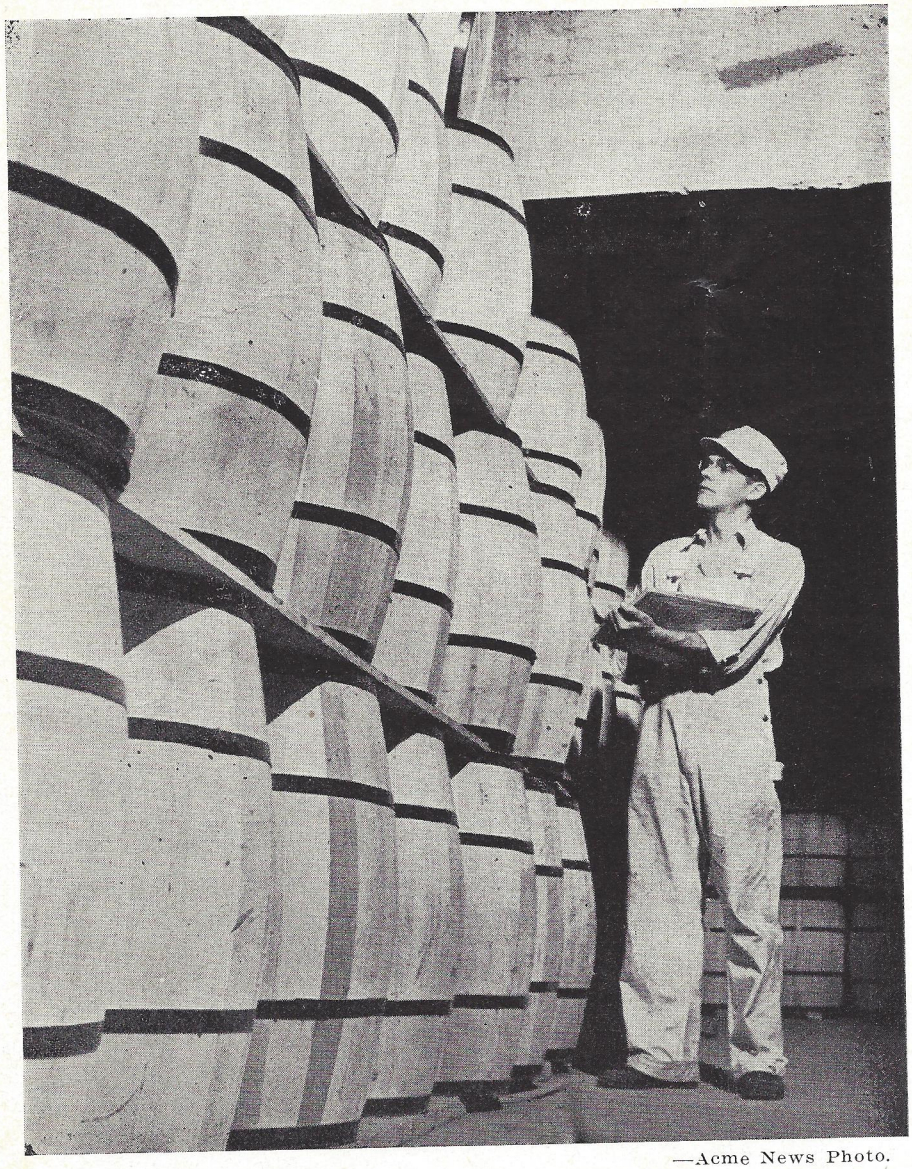
Visibility packaging, transparent window cartons, cellophane bags, and over wrap trays, colorful display cartons, carry-home containers with handy straps, dispenser packages, reusable containers, pre-packaging for meats and foods, and unit packages designed for both attractiveness and self-protection.

New materials and methods are also constantly being tested and developed, he also pointed out, to do a better job of perfecting the contents of the package through containers that are more economical and more resistant to damage of the product in transit. Among developments in this category: new plastic formulations, bonding techniques, disposable pallets, unit packs, improved container testing, further refinement in handling techniques, and better domestic and expert shipping practices.

The AMA statement noted that almost 99 per cent of all items that reach the consumer through retail outlets move in some type of container or package and that the packaging industry also is instrumental in the packing and shipping of bulk goods, industrial machinery, and products as large as aircraft, automobiles and other large items.

The Association also pointed out the value of the paper and paperboard products alone used in packaging annually is over $1,000,000,000; conversion of paperboard into containers and boxes amounts to more than $500,000,000; metal cans account for another $500,000,000 a year; glass containers, specialty paper products about $250,000,000 each; and to this must be added the value of fabrication and materials including wood, cork, steel, soft fibres, adhesives, printing inks, and many hundreds of others which have special application in packaging, packing and shipping.

Yes, Sir, They're All Okay!

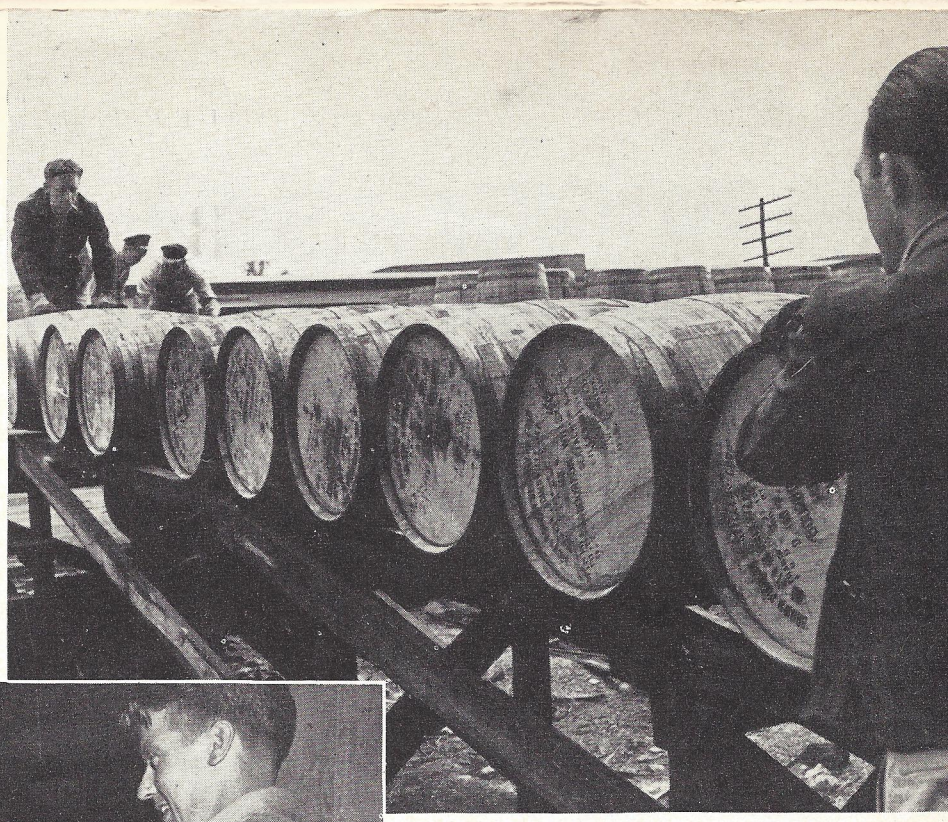


—Acme News Photo.

Inspector at Springfield Mo., checks barrels of powdered eggs bound for Britain.

The grain is doubly cleaned. Brown-Forman buys re-cleaned grain from elevators and then runs it through the distillery's own cleaning equipment when unloaded. Only one grain car can be unloaded at a time because of the necessity of passing through the cleaning apparatus. The entire mill system is equipped with separate blower and collector system to reduce dust.

There are eight bins holding a car each and two bins each holding one-half car that are used for the grain. Their capacity is 17,000 bushels. The distillery can process 3,300 bushels of grain per day.



Small grains (rye and malt) are handled in the same way. Malt usually does not require cleaning. There are two bins for each of these grains, their combined capacity being 2,142 bushels each of rye and malt. The distillery uses 800 bushels of malt every two days and 1,600 bushels of rye every two days.

The grain is ground to meal on two high speed, three break roller mills with a capacity of 3,300 bushels per day. The meal is carried by a system of vertical and horizontal conveyors to the meal room to be stored temporarily. It is weighed up as needed and the corn is dropped to the pastifier or cooker, where it is mixed with hot water and cooked.

The pastifier has a capacity of more than 10,000 gallons. Cooking is done with steam and the mixture of corn and water is constantly agitated. In the Brown-Forman process, the temperature is kept low to avoid any possibility of a burnt flavor in the whisky, although it would be possible to get a much greater yield of whisky if high temperatures and pressures were used.

When the mixture of corn and water is cooked, it is pumped into one of two "mash" tubs. Here additional water and some set back stillage, residue from a previous distillation, is added, and in this stage of the process serves to give a suitable acid reaction to the cooked "mash," as the corn-water mixture is now called.

The mash is cooled slightly and ground rye added. Rye added in this manner gives less whisky yield but a much finer flavor to the finished product than if it were cooked at the same temperature as the corn.

Following this operation, the mash is cooled rapidly, and ground barley malt added. The constant agitation to which the mash is being subjected in the mash tub mixes the malt so intimately that the enzymes in the malt are able to convert the starches, which were in the mixture of grains, into a form of sugar know as maltose.

This "mashing" process (cooking and converting) can be likened to the mashing process in the brewing of beer, except that in the making of whisky, the enzymatic saccharification is carried further with a view to obtaining a maximum of fermentable sugars, and a minimum of dextrins and other unfermentable materials.

Distillers malt is always barley, which has been allowed to sprout just long enough to develop the right amount of amylase and other starch converting enzymes. It is then dried with artifical heat which stops further growth of the barley sprout but does not destroy the enzymes.

The entire mashing process is conducted under very exacting conditions and controlled by automatic instruments at every step. No short cuts are allowed and nothing is ever hurried at Brown-Forman. Quality is never sacrificed for quantity.

Once the mash is converted into sugar it is ready for the fermenting room, and is then pumped through water jacketed coolers into one of the big 32,000 gallon fermenters. Two mashes, water, spent stillage and yeast are required to fill one of these fermenters.

The addition of yeast is necessary to bring about fermentation, in other words, a series of changes due to the action of certain complex nitrogenous bodies upon organic compounds. These bodies, known as ferments or enzymes, are secreted in living organisms.

The commonest is the one in the yeast cell, which produces alcohol and carbon dioxide from sugar, but bacteria, molds and animal secretions also set up fermentation of various kinds. We have already noted that diastase in germinating seeds change starch to sugar. Enzymes are also the cause of the fermentation of lactic and acetic acids.

Brown-Forman uses what is known as a sour mash yeast. A special mash of rye and water is cooked up and then malted in the same manner as a regular mash. This mash is stocked with a bacterium, Lactobacillus Delbruckii. which forms a moderate amount of lactic acid in about four hours. This acid is an enemy of other bacteria harmful to fermentation, hence it is of vital importance that lactic acid be fostered in order to prevent contamination.

Nothing is quite so important to the distiller as his own distinctive strain of yeast. Although all distillery yeast belong to the genus saccharomyces and are of the cerevisiae species, there are dozens of strains or variants, each of which is capable of imparting a distinctive flavor to whisky.

To the experienced whisky taster, these flavors are as distinct as the odors and scents given off by the flowers of higher plants. This analogy is interesting, for yeast is botanically one of the simplest forms of plant life.

Brown-Forman's strain of yeast, which is used to make Old Forester, has been with the company so long that its true origin is lost in antiquity. Other strains are used to produce Early Times and Kentucky Dew, two other brands put out by Brown-Forman.

All of these strains are carefully preserved on solid media in test tubes at carefully controlled temperatures two or three degrees above freezing. The yeast remains in a state of suspended animation, and little change in individual characteristics has been found, throughout many generations.

When actively growing yeast is required, either for plant use or study purposes, a few cells are removed on the tip of a sterile platinum needle and transferred aseptically to a small flask of sterile malt extract.

Successive growths in increasingly large amounts of liquid media soon give sufficient volume of yeast either for stocking in the plant yeast tubs or for laboratory experimentation.

When that stage is reached, each cubic centimeter of the media will contain over two hundred million individual yeast cells or plants.

The mash is completely sterilized by heating to pasteurization temperature, then inoculated with ripe yeast taken from the finished yeast tub of the previous day. In 18 hours this is ready for the fermenters.

When two mashes, water, spent beer or stillage and yeast are added to each giant fermenting tub, alcoholic fermentation is allowed to proceed with the necessary precautions. The process which follows decomposes sugar by means of secretions from the yeast cells and results in the transformation of sugars into alcohol and carbonic gas.

It requires from 72 to 96 hours for this transformation to occur. As the action proceeds, the surface of the fermenting liquid is severely broken by countless carbonic gas bubbles. A constantly thickening and agitating cap of foam is formed.

In time the entire mass seethes and bubbles on an expanding scale and the temperature rises. If you should get close enough by thrusting your head through an opening at the top of the tub, you could well nigh be overpowered by what arises from the churning mass.

The action continues until the sugar is completely transformed into alcohol. When this climax of the fermentation is reached, the result is known as beer.

The apparatus that separates the alcohol from the beer and residue from distillation, and accomplishes it in a way to avoid rectification or separation of the fusel oil and other congeneric substances which are valuable as flavors, is a tall copper cylinder having a series of perforated copper plates.

The spaces between plates are known as chambers. Steam applied at the bottom of the apparatus drives the substance therein through the various chambers. During the process the volatile whisky vapors from the beer rise to the top of the apparatus, and pass into a modern straight tube condenser, which is more efficient than the old spiral "worm" condenser used in by-gone days.

The condensed vapors pass through a glass try-box which enables the still operator to determine the clarity, proof, and temperature of the distillate. From the try-box it goes to a temporary receiving tank.

In short, the whisky goes up in the still and out at the top, and all the while the high pressure steam keeps the whisky from going out with the residue at the bottom of the still.

The product of this first distillation is known as low wines, and is redistilled or doubled. The product of the second distillation is known as hi-wine or new whisky. Excess fusel oil, etc., goes out the bottom of the doubler when it is drained.

Distillation at Brown-Forman is

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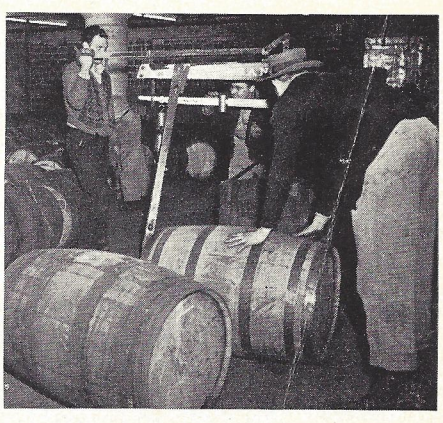

Brown-Forman

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slow—110 to 120 degrees proof to keep in the flavoring compounds. The new whisky is cut to 103 proof when put into the barrels.

The residue of the beer which has not been vaporized, progressively passes downward through the chambers and out at the bottom of the still, and is pumped to the by-product recovery building.

Part of this residue is strained, cooled to the proper temperature, pumped back and mixed with each new batch brought into the fermenting tubs, thereby influencing the same type of fermenting action in the new mash to insure uniformity in each succeeding batch.

The rest of the spent beer is used to make two high protein animal feeds. The coarser particles, or bran, are screened out, pressed, then dried in a huge rotary drum. This is packaged as Distillers Dried Grains.

The semi-solid and soluble matter which passes through the screens —is pumped to a special building where it is evaporated under a high vacuum to a syrup which is dried on a special set of drum driers called dehydrators.

The product produced here is known as Distillers Dried Solubles, and when fortified with additional Vitamin A and D, is marketed by Brown-Forman under the trade name, *SuperSol.* On a pound for pound basis, the food value of these two feeds together is three times the value of the grain originally processed by the distillery.

This increase in the food value is due both to the fermentation process and to the fact that a large portion of the solubles consists of recovered yeast. Distillers light grains have long been universally accepted for cattle feeding, but only recently has research revealed the valuable and nutritive vitamin and protein qualities of distillers dried solubles.

Distillers dried feeds are the fifth largest source of high protein supplement. Since only 80 per cent of the starch is removed from the grain during processing, 95 per cent of the effective feeding value of the grain is recovered for animal nutritional purposes, and because of the enzymatic action of the yeast, the proteins in the grain are in a "predigested" form and are almost 100 per cent available to the animal. Vitamins, minerals, protein and valuable growth factors are also added in the fermentation process.

Brown-Forman has been a leader in research and development of solubles. Not only have solubles been widely marketed through the feed blenders, but the corporation is packing and promoting the sale of its SuperSol direct to pure-bred livestock growers.

Whisky is pumped to cistern or receiving tanks in the cistern room. Each tank holds up to 25,000 gallons of new whisky and is suspended on a scale so that reducing to proper proof can be done by weight. The whisky that is distilled from 110 to 120 proof is reduced to 103 proof for barreling, with demineralized water. This is an improvement over distilled water and contains only 1-2 parts per million of total hardness.

It is in the cistern room that the new whisky is put into wooden barrels. There are six automatic barrel fillers here. As new or raw whisky is crude and harsh in taste it is subjected to aging or storing in tight wooden barrels for a number of years, a minimum of four years at Brown-Forman.

Government regulations make it mandatory that straight whisky produced in this country be stored or aged in charred new oak barrels. When first distilled the whisky is perfectly colorless and harsh to the taste.

During the aging process the flavor of the whisky is softened and refined, extracting color and some flavor from the casks in which it is stored. In fact, all of the color of straight or bonded whisky comes from the barrel. Government regulations prohibit addition of coloring or flavoring compounds to anything except spirit blends.

The quality of genuine whisky is dependent both on the care and skill used in processing and upon the barrel in which it is aged. Type of warehouse, humidity, and heat also affect the aging process. Color and flavor are especially pronounced in Kentucky whiskies due to special methods of processing and to the prevailing custom of charring the inside of the barrel.

Brown-Forman stores its whisky in barrels now being made by the Blue Grass Cooperage Company of Louisville. In the past, the corporation experienced difficulty in securing all the barrels needed for the aging of its whisky.

In order to insure an adequate supply of the highest quality oak barrels, the cooperage company was formed as a subsidiary of the corporation, and since its inception a little over two years ago, the plant has produced in excess of a half million tight barrels. Brown-Forman has used two-thirds of this output: the remaining third was taken by independent distillers.

"In the early days, barrels were made by coopers in nearly every settlement," says the corporation. "Most distillers had their own cooperage shops and made their barrels from the native white oak that grew in abundance in the Kentucky territory.

"The practice of heating the staves to make them bend more easily was rather common. Sometimes this heating resulted in burning or charring the inside of the stave. It was found that when whisky was stored in barrels with such charred staves, it took on distinctive color and pleasing taste.

"The taste is affected by the natural juices in the oak which are turned to wood caramel when the stave is charred and by the tannic acid in the wood during the process of aging. Today, the nature of the oak staves used in the barrels, the amount of charring, and the temperature changes during the aging of whisky, are carefully controlled," states the corporation.

The barrels used by Brown-Forman are made of prime white oak, are thoroughly air dried, and otherwise faultlessly made. Inside the barrel, under the char, is the all-important "red layer" which determines the flavor, the bouquet, the clean aftertaste the consumer expects in good whisky.

The slow-firing of the barrels used by Brown-Forman, and which is precisely timed over a controlled fire, assures the quality and uniformity so essential to good whisky production.

After leaving the cistern room, the filled barrels are rolled to warehouses on the 18th street property in Louisville. Barrels are also shipped to county warehouses by truck. Brown-Forman has seven county warehouses, each holding 50,000 barrels.

The four warehouses in Louisville hold 105,000 barrels. Labrot & Graham and Early Times have warehouses with a capacity of about 36,000 barrels. Total warehouse capacity is 495,000 fifty-gallon barrels.