

## 10,053 MILES TO MELBOURNE

By FRANK E. BARDROF

That's the distance from the center of the Druid's Circle near the Preston Laboratories in the hills of western Pennsylvania. But within a radius of a few hundred yards are found many things of more immediate interest to glass men.

When you arrive in Butler to call on Dr. Frank W. Preston you are aware that his old haunts know him no more and that he has moved his headquarters somewhere outside of the town, so you wisely find the nearest telephone to tell him you are in the neighborhood and ask for further directions. He seems really glad to know that you are in the vicinity and his guiding instructions are meticulous: "West on Route 422 to the outskirts of town, 1.9 miles; left hand fork on 68, following along for 0.6 mile; south, 0.7 mile; west, 0.7 mile . . . if you get lost find a telephone. . ."

All seems well until after the third or fourth turn, when you are pretty sure that this pleasant farming country cannot contain much of scientific interest to the glass business, but the woman at the gas station says that you are actually on the right road and a farmer's daughter shows you how to get around the WPA inactivities at the corner. Mostly hills and woods now and nothing in sight that bears the slightest resemblance to the breaking strength of glass bottles. A farmer stops his team in the furrow and tells you to go on down the hill and turn onto the cinder road just this side of the white house near the corner, the good old WPA corner again. You find the road all right and are now more mystified than ever for this road winds off through an open space, up the hill and into the deep woods. Signs of human habitation now appear in the form of a high wire-mesh fence, but the road is closed by a big gate. The gate is locked and a few automobiles parked nearby indicate that the rest of the way will have to be made on foot.

So you park the Chevrolet, or maybe the Packard, pass through the little gate at the side of the big one and start hiking down a well-built drive that suddenly brings you into a sun-lit clearing, and there, facing north toward a beautiful vista of miles of Pennsylvania hills and with

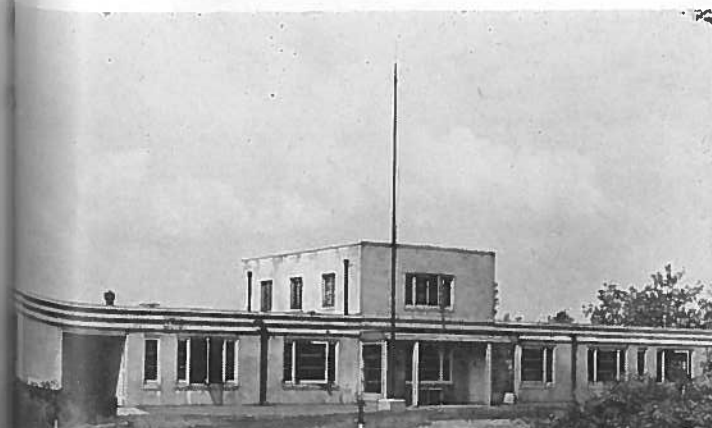
After you get through the entrance gate and walk down the drive this is your first view of the new Preston laboratory on a hilltop three miles west of Butler, Pa.

the thick woods at its back, stands the new Preston laboratory. Two lofty flag poles flank its entrance; in a clearing at the rear is the geometrical design of lawn and paths that you later find is the Druid's Circle (commonly known as "The Geography Lesson"); the rural quiet is broken only by bird songs and the plaintive cry of some guinea fowl wandering here and there; and you are pretty sure that the raucous squawk from back in the woods comes from a peacock. "Gosh," you say to yourself, "these glass fellows certainly do have bright ideas."

A tea-table and a couple of bright-colored chairs lend a sort of country club atmosphere to the entrance porch, which you later learn is at the back of the building and not the front, but the atmosphere changes immediately to one of quiet business-like activity as you open the screen-door and enter the spacious lobby and general office. The girl at the desk doesn't say a word when you ask for Dr. Preston, but just nods her head toward a table in front of the window where you recognize your host hunched over a microscope in the good light and the realization comes over you that your rural wanderings have, after all, finally led you to one of the important centers of scientific research in the glass industry. You follow him into his private sanctum, where the wide windows look off to the north over the woods and hills, and settle down for an informal chat, after he has rummaged around and found a laboratory crucible for you to put your cigarette ashes in.

Before your visit is over you will have spent as much time as you can wangle across the desk from this quick-witted conversationalist; he will have shown you through the building which his resourcefulness and foresight have erected on this wooded hilltop; and you will have enjoyed with him a fundamental interest in the flora and fauna of the domain as you wander with him along the

Another view of the Preston laboratory. This is the south side of the building, the right, or east, section, being occupied by the physical and chemical laboratories, Dr. Preston's office and the drafting room. The west section houses the experimental machine shop, testing room and staff office.



paths and through the woods. He will have a slightly deprecatory air as he tells you about how the place came into being and about his future plans for its embellishment, but you can discern that Frank Preston has put the headquarters of his business into an environment that he likes and from which he gets a lot of quiet satisfaction.

This business began back in 1926 when he began to practice as an independent consultant in the glass industry after several years of similar work in the United States as the representative of a British firm. By 1928 a laboratory and experimental machine shop had been started in Butler and the list of clients, at first mostly plate and window glass manufacturers, had enlarged considerably. By 1936 the old plant facilities had become insufficient and the new laboratory was completed and occupied early last summer. Many locations in the vicinity of Butler were canvassed and the present site was selected for several common-sense reasons, as well as for the pleasant surroundings. First, necessary laboratory services, such as electric power, natural gas and telephone were available at the corner of the property. Second, the sandstone hill top is three miles from Butler and free from such city disturbances as vibration, electrical interference, smoke, etc. Forty-five acres are inside the nine-foot fence, and some 25 are outside.

The activities of Dr. Preston and his staff, in addition to his private consulting practice, are directed primarily toward research on the mechanical properties of glass and glassware, and especially toward its behavior in breakage. The procedure involves the development of special and standardized tests for various types of ware, the design and construction of special equipment for performing such tests, the evolution of legal evidence and procedure for the protection of glass manufacturers in suits involving breakage, and a considerable amount of fundamental research in the mechanical properties of glass under a variety of conditions and in both the fabricated and unfabricated state. Specific projects are also sponsored by manufacturers or trade associations and,

In the physical laboratory Physicist Baker watches the oscillograph during a quick-loading test for glass rod breakage. Load is produced electrically by means of a voice coil and accurately timed to endure for 1/100 sec. by means of the big pendulum on the floor. This project is sponsored by Hartford-Empire Co.

in addition, technologists from various plants in the U. S. and Canada frequently spend a week or two at the laboratory for special training.

With this appreciation of what it is all about, a tour of the building is in order. Constructed of concrete blocks with stucco finish, the structure is about 116 ft. long and 32½ ft. wide and was designed by Edwin Howard, architect, son of George Howard of Hartford-Empire, by the way. A basement under the center of the building contains such service accessories as the well and pump, the high-tension vault and transformers, steam boiler, fuel storage, etc. The ground floor accommodates offices, laboratories and machine shop, and a penthouse on the upper floor provides living quarters for the superintendent of building and grounds. As mentioned before, the lobby and general office occupies the center section of the ground floor. The east section houses Dr. Preston's office, the drafting room and the chemical and physical laboratories. The western half includes the well-equipped experimental machine shop, the experimental and testing laboratory and another staff office. The glass for the lower sections of the windows was furnished by American Window Glass Co. and ground and polished by Clearview Glass Co. Heat-absorbing, actinic glass for the upper sections came from the Pennsylvania Wire Glass Co. Owens-Illinois glass blocks are installed in the front of the building and Owens and Corning glass wool is used for roof insulation.

The laboratories, shop and testing room are amply equipped for the specialized work done. Some of the equipment is shown in the accompanying pictures, together with members of the staff whom we can now meet before looking around outside. John M. McCormick, chief designer, in the drafting room evolves specialized testing and other mechanisms. T. C. Baker, physicist, is now working on a glass strength project involving very special loading conditions and sponsored by the Hartford-Empire Co. Dr. L. G. Ghering, physical chemist, is delegated by the G. C. A. for diversified research and testing work, mostly on bottles. The experimental ma-

Dr. Ghering demonstrates the thermal shock testing machine for bottles in the testing laboratory. In the left foreground is a special machine for sawing glass containers into test sections. Other equipment in this room includes sustained pressure, "snap" pressure, and impact testing machines.

chine shop is manned by James Carrie, long associated with Dr. Preston, and George Weist, with Alexander Shott as assistant. The secretarial work is handled by the Misses Betty Bush and Muriel Beattie. Gene Sherwood acts as superintendent of building and grounds and supervises the maintenance staff. Until recently, R. G. Hunter, Owen-Illinois physicist, was also a member of the staff specializing in law cases, and Hayes Perkins, F. R. G. S., was in charge of outside activities.

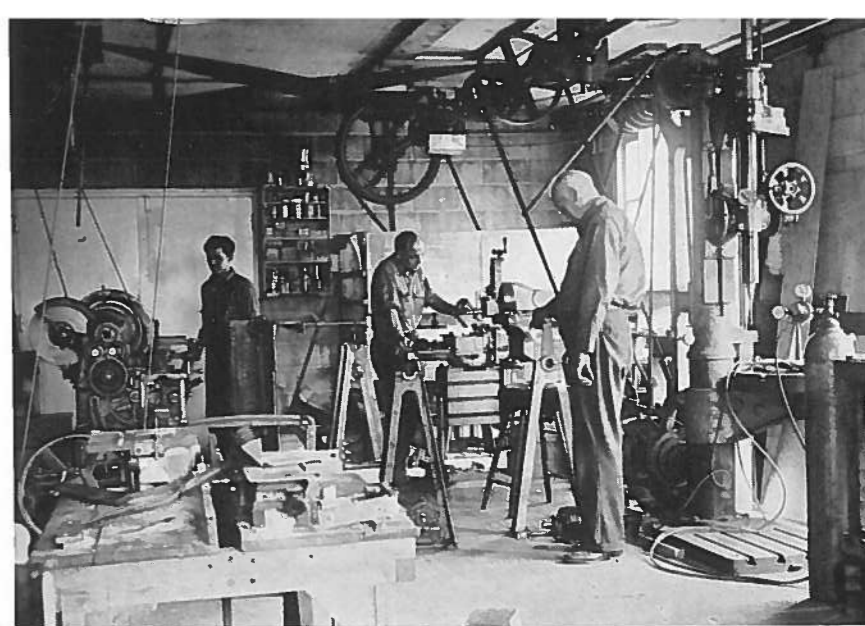
Looking south from the entrance portico at the center of the building the first point of interest is the Druid's Circle, to and from which a path leads straight away into the woods. This path is on the center line of the building which is intersected by another path lying on the true north and south line through the property. The intersection of these lines is the datum point for the layout of the whole plot, as well as the center point for the path of the circle. At various points around the circle are located small signs, such as the one forming the title for this article, and they form a nice little lesson in geography. It seems a little weird to look practically due north to Singapore and Mandalay, but you suddenly realize that the sign is on the great circle and the various directions begin to make some sense.

The rest of the domain consists of oak woods and grass land, through which run paths and drives in various stages of completion, opening up cool vistas of greenery. Dr. Preston observes that he doesn't know whether it will ever be finished and you, with some knowledge of the ways of an Englishman in his garden, know that he will be building and changing for some time to come. He shows you a nice patch of bracken at the edge of the woods and tells you that the natural fauna on the place include coon, pheasant, grouse and quail, as well as rabbit and squirrel. To all of which he has added wild turkey, wild goose, peafowl, guinea fowl and fancy pheasants. And even a deer was accidentally fenced in.

To see these added attractions you go off down the slope a ways and arrive in time to see Gene Sherwood fussing around some prosaic brooder pens in each of which is a bantam hen with a brood of brownish little chicks that turn out to be wild turkeys and pheasants in the early stages of existence. It is all very interesting and you can't help but wonder what those bantam hens will do when the youngsters begin to revert to type. Then over to some other pens to see the geese, pea fowl and pheasants, where you find that the colorful birds you have glimpsed from time to time driving through the country are almost drab-looking compared to the scions of the upper levels of pheasant society.

Farther down the hill you find a cool spring beneath the roots of a big tree, the drinking facilities consisting of a milk bottle, of course, and after a while you retrace your steps in the lengthening shadows. Miss Beattie suggests that you sign the visitor's book, so you squiggle your name at the end of this list of the great and near-great in the glass industry and start off down the drive toward the big gate, with the cordial invitation of your host to come again soon. You get around the WPA corner again safely and, as you straighten out in the direction of Butler, you wonder why the heck you didn't get into the kind of business where you could go out on a hilltop and raise wild turkeys with the aid of a bantam hen.

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The experimental machine shop with Messrs. Carrie, Weist and Shott (right to left). The variety and versatility of the equipment for the manufacture of all sorts of experimental machinery is apparent.



The Preston laboratory staff. Back row (l. to r.): Gene Sherwood, T. C. Baker, J. M. McCormick, James Carrie, George Weist. Front row: Dr. L. G. Ghering, Betty Bush, Muriel Beattie, Alexander Shott.



The Druid's Circle, south of the laboratory building. You are looking down the path on the center line of the building and the intersection of this line with the diagonal north-and-south line is the survey datum point for the 70-acre plot. The geography lesson is provided by the small signs near the circular path.

