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GENERAL SCIENCE

Science Proves Hobby For Governors and Bankers

By JAMES STOKLEY

No longer is the typical scientist a stooped graybeard, who wears a long coat and spouts long words in Latin and Greek. As a matter of fact, he never was, but today there is even less justification for the myth than ever before. To people who still cherish the old tradition, however, a visit to a scientific meeting such as that of the American Association for the Advancement of Science, which was held in Philadelphia during the holidays, would be a revelation. Here were gathered nearly 4,000 workers in all fields of science, from archaeology to zymology in the alphabet, from astronomy down to geophysics in the subjects of which they treat. Among this 4,000 were many of the leaders in their fields, but the long beards were in a very small minority. Most of the men were clean shaven, while there were also large numbers of women, who would do credit to any social gathering.

On the whole, so far as one could tell from the appearance of those attending, such a meeting is no different from a convention of business men. And, in fact, this is not surprising, because many of the workers in science nowadays are business men, working in science as a hobby. Of course, Benjamin Franklin set the example for such scientific amateurs, for he was one of the first of them. A printer by trade, a diplomat by profession, Franklin was a scientist by avocation, and to read his autobiography, and to see some of his instruments which are still preserved in Philadelphia, one can hardly tell which side of his nature he was really most interested in. One has the sneaking suspicion, however, that he was chiefly interested in his science.

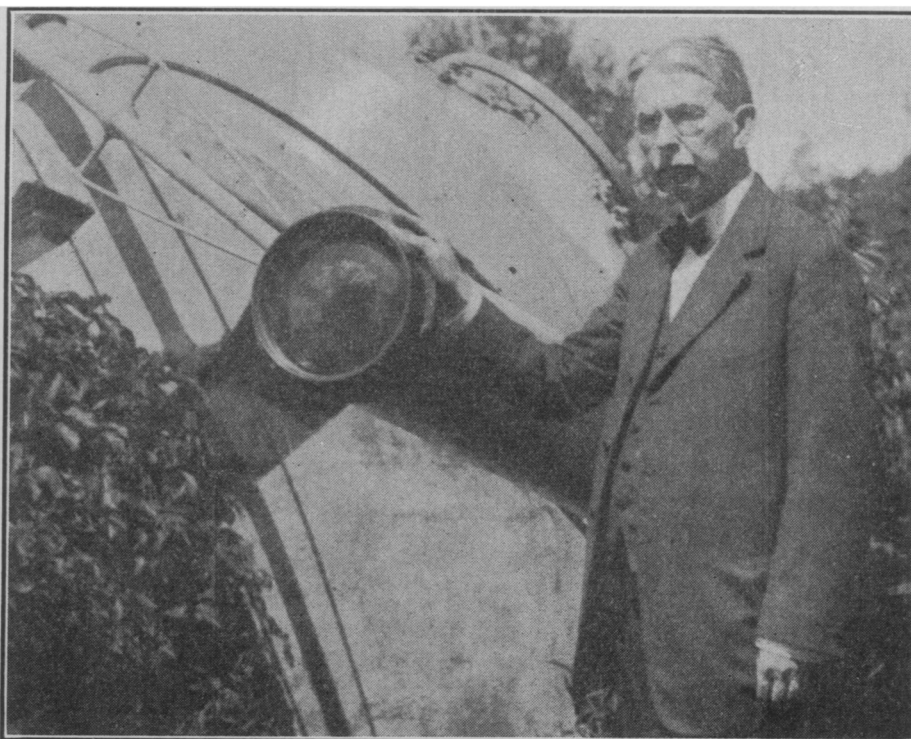
In England at the same time as Franklin there was another famous scientific amateur, using the word "amateur" in its best sense, a "lover"

of science, not necessarily a novice. This was a clergyman, named Joseph Priestley, who made for himself a permanent place in the history of science by the discovery of oxygen, the element in the atmosphere that makes our very life possible. England has produced many scientific amateurs. Sir William Herschel, one of the greatest astronomers of all time, was originally a music teacher at Bath; and today, the secretary of the Royal Astronomical Society, and one of the leading astronomers of his country, is the Rev. T. E. R. Phillips, the active rector of a parish of the Church of England.

But the United States also has its scientific amateurs. Up in the hills of Vermont, in the town of Springfield, is a factory which makes machine tools. The president of the company gives the business his per-

sonal attention, and a few years ago was honored by his fellow citizens by being elected to serve a term as governor of his State. But James H. Hartness, for that is his name, has another side to his nature, like Benjamin Franklin. If you pay him a visit, he will probably show you around his works, and then take you to his home, on a hill above the town. In back of his house there is a very curious looking structure, which he will delight in explaining to you. At first glance it bears some resemblance to a turret on a battleship, with a single gun sticking out from it. It is a turret, all right, but not a gun, for it is what Governor Hartness, who invented it, calls a "turret telescope."

With the usual form of telescope in an observatory dome, the inside
(Just turn the page)



HON. JAMES HARTNESS, former governor of Vermont, with the turret telescope which he invented and constructed. A tunnel connects the observatory with his home, a few hundred feet away.

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Amateur Scientists

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of the building must be at the same temperature as the outside, otherwise the warm air from within will rise and go out through the slit in the dome towards which the telescope is pointed. This has the same effect as hot air rising from a stove, and plays havoc with distinctness of what the observer sees. But with the turret telescope, the instrument itself is mostly in the open air, outside the turret, and the image is brought inside by a reflecting prism. The inside of the turret may be kept as warm as desired, as there is no opening for warm air to leave. As anyone knows who has gone through the rigors of a Vermont winter, this is a distinct advantage, and as a further convenience, Governor Hartness has an underground tunnel connecting the observatory with the cellar of his house.

With their chief so interested in astronomy, it is not surprising that many of the men in his works have followed Mr. Hartness' example. Under the guidance of another versatile individual, to whom he refers as the "Leonardo of Springfield," an active group of amateur telescope makers has been established. Their leader, Russell W. Porter, started out as an architect, and the Springfield Public Library stands as evidence of his skill in this profession. But he afterwards went on several arctic expeditions, he is a painter of ability, and during the war he served as an optical expert at the Bureau of Standards in Washington. He also has designed several original forms of telescope mountings, one of which has been adopted in the preliminary plans for a huge telescope of the Mt. Wilson Observatory, which will dwarf all existing instruments. The telescope makers are a group of machinists, pattern-makers, draftsmen and others, who

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News-Letter Features

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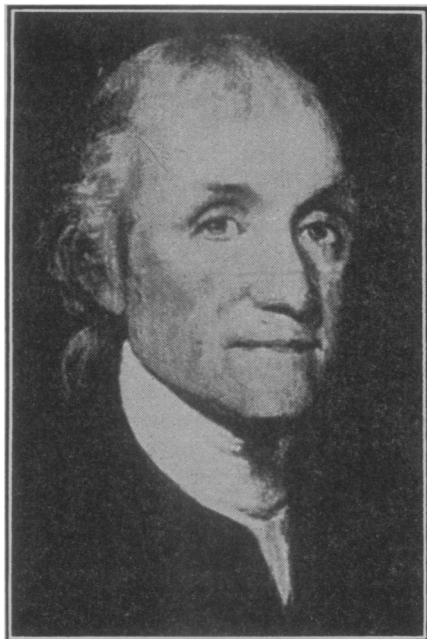
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CLASS STUDY HELPS

Articles on following pages will be found especially useful in science class work.

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JOSEPH PRIESTLEY, the 18th century clergyman who distinguished himself by the discovery of oxygen. In the later years of his life, he was forced to leave England for religious reasons, and he settled near Philadelphia.

Amateur Scientists

(Continued from Page 50)

have erected a sort of astronomical clubhouse on one of the nearby hills, where they frequently spend the night, observing the heavens with reflecting telescopes of their own construction. One of the requirements of membership in the group is that they grind their own mirror, the concave disc of glass that brings the light from a distant star to a focus in a reflecting telescope.

But there is still another group of amateur astronomers, spread throughout the country, who perform scientific work of real value. This is the American Association of Variable Star Observers, which was established under the aegis of the Harvard College Observatory. With the building of the great telescopes in modern observatories, many people think that these instruments are essential to any observations of value. But while these telescopes have made possible the great advances in modern astronomy, there is still a large amount of work that can be done satisfactorily with smaller instruments. To use a great reflector for such a purpose would be about as sensible as to roll bread dough with a steam roller, for there is enough work to be done with the "Big Berthas" which only they can do, to keep them busy all the time.

There is a large class of stars known as "variables" which change in brightness more or less periodic-

ally. Most of these are bright enough to be seen with a small telescope, but to check up on their variations, a large number of observations, made fairly close together, are required. The A. A. V. S. O., as it is called, with its large number of small telescopes, watches these and its members report regularly to the Harvard Observatory. These amateur astronomers are drawn from all walks of life—one very active member, until his recent death, was a Pittsburgh locomotive engineer, who came in from his run about midnight, and then observed until daylight.

Somewhat similar to him is an amateur astronomer in South Africa, Mr. R. Watson, who already has the discovery of several comets to his credit, as well as a "nova," a new star which flashed out from previous obscurity into brightness for a time, then dying out again. Mr. Watson is a telegraph operator, on a night shift, and when he returned to his home early one morning, when other respectable people were sound asleep, he noticed a star in the constellation of Pictor, the "Painter," which he had never noticed before. This was the new star or nova, and its discovery was immediately spread far and wide to astronomers throughout the world. Another amateur discoverer of comets, as well as of "asteroids," or small planets, was the late Rev. Joel H. Metcalf, a Unitarian minister of Winchester, Mass.

But astronomy is by no means the only science that has its amateur devotees. Take the instance of a prominent New York investment banker, who lives in one of the city's suburbs, Tuxedo Park. This man, Alfred L. Loomis by name, has established at his home a private laboratory where he is experimenting himself, and aiding other scientists to experiment, on "long shots"—scientific problems that offer too little immediate return for the average university laboratory to investigate, but that may develop into something of importance.

Already, in cooperation with Prof. Robert W. Wood, of Johns Hopkins University, who is considered one of the world's leading experimental physicists, Mr. Loomis has investigated the super-sound waves that Prof. Wood first observed during the war when he was working at the Toulon Arsenal in France. By passing a powerful oscillating electric current through a crystal of quartz, it is made to vibrate as fast as 200,-

000 times a second. The waves from this are similar to sound waves, except that they vibrate far too fast to be heard. The ear is not sensitive to vibrations faster than about 20,000 a second.

When the crystal is placed in the bottom of a vessel of oil, and its vibrations are passed upward into a glass of water, they produce strange effects. A fish placed in the water is killed almost instantly, microscopic plants are literally disintegrated, and when the curious investigator placed his finger in the water, a sharp pain, which extended to the very marrow of the bone, was experienced. Just what use this powerful new tool will be in science is still uncertain, for only the preliminary steps have been made in its investigation. It is where X-rays were a generation ago.

In an entirely different field of science, that of archaeology, a hard-worked factory executive in Illinois has distinguished himself, George Langford, of Joliet, has taken up Indian mound excavating as many men take up golf. At that, he gets more exercise than most golfers, because what he has to do in his hobby is to work all day, when he has one to spare, with a pick and shovel like an ordinary laborer, with only one volunteer assistant to help him. But already his hobby has developed into a real pursuit of science, with important results, which has already won for him a place in the circles of his chosen science.

His digging has been at the "Fish-

(Just turn the page)



ALFRED L. LOOMIS, New York Banker, in whose private laboratory at Tuxedo, N. Y., with the aid of Prof. R. W. Wood, of Johns Hopkins University, important researches are being carried out with super-sound waves.

Biologists!

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Amateur Scientists

(Continued from Page 57)

er mounds," near Joliet, and is important because he has unearthed three, and perhaps four, layers of remains of Indian civilizations, that existed on the spot at various times in the past. In Old World archaeology several layers of culture above each other are not unusual, but it is rare in America. Another important outcome of Mr. Langford's work is that for the first time a possible clue has been found to the earlier home of the Iroquoian Indian nation, who played an important part in our colonial history. Previously, no remains of the Iroquois have been found west of Ohio, but in the second layer of the Fisher mounds pottery, ornaments and weapons suggestive of the workmanship of this race have come to light after remaining buried for many centuries. And under them are relics representing a still earlier group of Indians, about which little is yet known. Altogether, Mr. Langford has found hundreds of skeletons, as well as enormous quantities of the other relics.

So science is not the dry study of uninteresting facts, nor is it necessarily a solemn pursuit fit only for greybeards. When men, and women, from all walks of life take it up as a hobby, and are able to help advance it, there must be something in it of interest!

Science News-Letter, January 22, 1927

The active career of a modern steel skyscraper is about 27 years.

Prehistoric cave men of the Alpine region depended on the bear for food, clothing, and hunting tools.

Tests of 19 three-year-old children showed that their vocabularies ranged from 48 words up to 1,807.

In the reign of Henry the Eighth in England, 72,000 people were hanged or beheaded for various offenses.

A main ingredient of attar of roses is a chemical substance that can now be made from coal tar, called phenyl-ethyl alcohol.

A fog is a cloud on the earth, and a cloud is a fog in the sky, according to Dr. W. J. Humphreys, of the U. S. Weather Bureau.

Canadian chemists are making tests to determine whether asbestos waste can be used instead of lime in correcting acidity of soil.