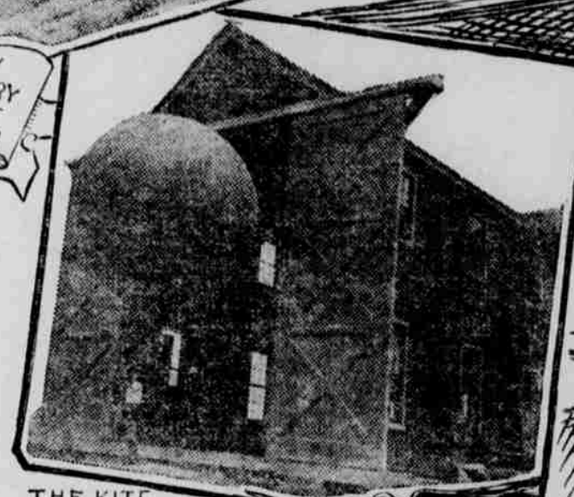
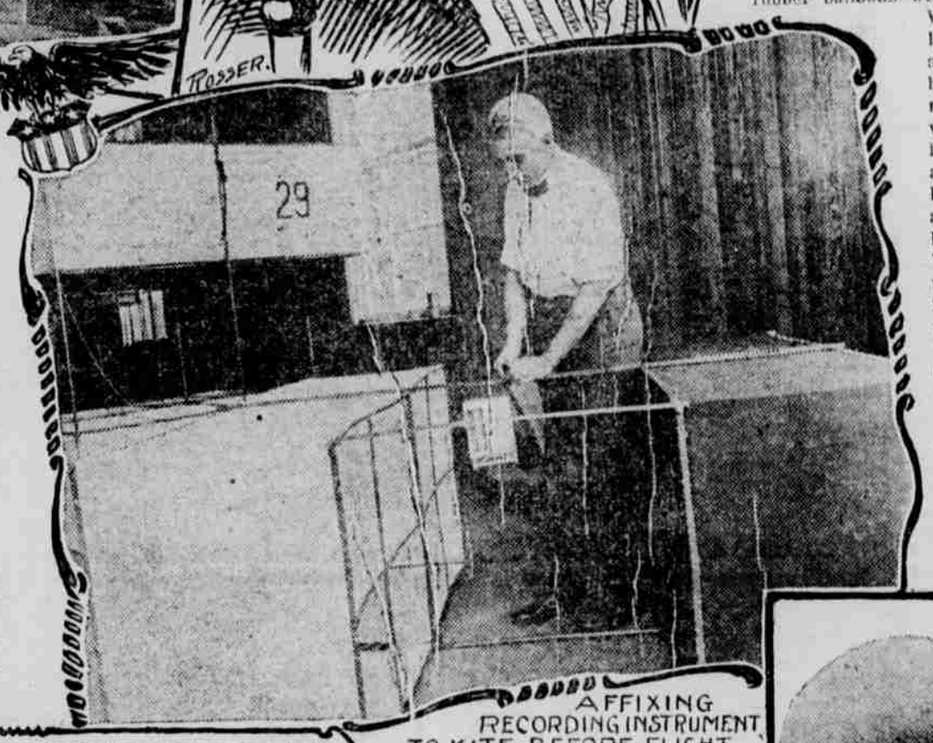
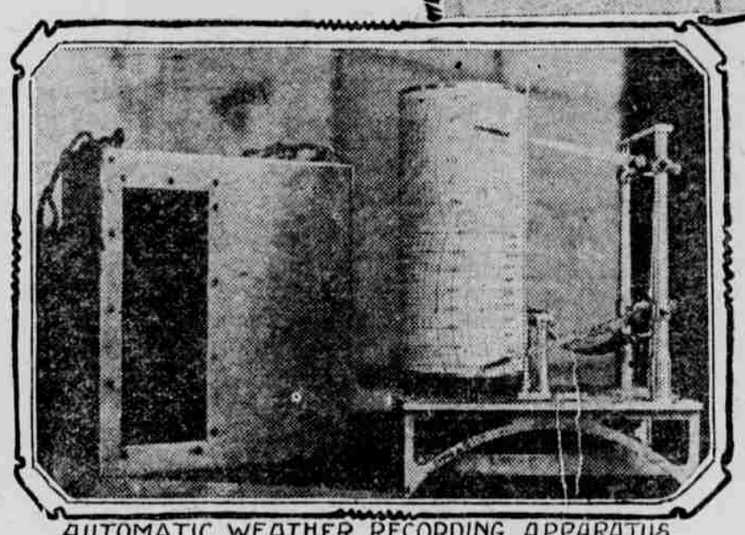
UNCLE SAM TO EXPLORE THE UPPER AIR

BY WALDON FAWCETT






AFFIXING RECORDING INSTRUMENT TO BALLOON


AUTOMATIC WEATHER RECORDING APPARATUS

THERE is now nearing completion in the mountains of northern Virginia a weather forecasting outpost upon which the United States government has expended thousands of dollars during the past two years and which is unique in the world. This institution, known as the Mount Weather observatory is one of the most important under the government and when its new buildings are finished and its equipment fully installed this autumn so that the scientists can enter in earnest upon their novel investigations it is believed that this experiment station above the clouds will contribute more than any other factor to increased accuracy in weather forecasting. The new institution is very different from the ordinary weather observatory to be found in every one of our large cities, and it is even dissimilar in scope and function to the headquarters observatory of the weather service at Washington. However, the new observatory will, through the exploration of the upper air contribute greatly to accuracy in weather forecasting in general and will especially point the way to new development in what is known as long range forecasting.

The project of this weather bureau station for upper air exploration is not a new one though the institution in its present guise, and particularly its home, now nearing completion, are of comparatively recent inception. Some years ago the scientists at various United States weather bureau stations and at the Blue Hill observatory near Boston, took up the study of the best methods for lifting self-recording instruments high above the earth's surface. Up to that time all human knowledge of the conditions of temperature, pressure, humidity, wind velocity and direction and other ingredients of the weather had been based upon observations made at or near the surface of the earth. Spurred by the necessity for a better knowledge of temperature and other conditions at great altitudes, the scientists first took up work with ingenious forms of kites, and this was supplemented in 1904 by the use of specially designed balloons as vehicles for carrying the thermometers and other instruments to heights that could not be reached by any other means.

Finally the United States took the lead among the nations of the globe with a project for a special observatory designed for and devoted almost exclusively to aerial research. A piece of land was secured in an isolated part of the Blue Ridge mountains in Virginia, and work was inaugurated on an establishment that is expected to do much to meet the future needs of meteorology and will play a most prominent part in ultimately enabling long-distance forecasting—that is, the forecasting of a type of season rather than the mere prophecies from day to day, such as are now given out. Unfortunately however, the weather bureau was greatly retarded in this new line of work by a disastrous fire which occurred at the newly established observatory on the morning of October 23, 1907, and which resulted in the total destruction of the main building, containing laboratories, offices, etc.

The whole project for this upper air exploration station represents a scheme so new and untried that it was feared for a time that there might be a difficulty in obtaining the appropriations necessary for the rebuilding of the structures needed, but this did not materialize and now the officials are ready to take possession of a new home that is much more complete and pretentious in every way than were the old quarters. More than $100,000 has been expended upon the buildings of this lofty sentinel post—the one and only institution among the weather bureau's 200 station in all parts of the country that is devoted especially to research work. Best of all, most of the new buildings are of the latest approved fireproof construction, so that the safe-keeping of the valuable instruments and the invaluable records to be obtained is well assured.

The restored Mount Weather observatory occupies the same site as the old, namely the tract of 77 acres purchased by the government in the autumn of 1902. As has been said, it is in a decidedly isolated locality, some 20 miles south of Harper's Ferry, and 47 miles in a direct line from Washington. Situated at an altitude of 1,725 feet above sea level on the very crest of the Blue Ridge mountains it overlooks to the west the entire Shenandoah valley from Strasburg to Harper's Ferry, while to the east all that portion of Piedmont, Virginia, between the Blue Ridge and the Bull Run mountains, is in full view. This extensive sweep of valleys, mountains and plains affords rare opportunities for the study of storms, but the construction of large buildings on this somewhat inaccessible site probably presented more puzzling problems for builders and contractors than have been involved in any other governmental undertaking of the kind. Mount Weather, as Uncle Sam has christened his mount in peak, is six miles from the nearest railroad station—that at Bluemont, Virginia. All the building material had to be transported to the observatory site by means of six and eight-horse freighting teams that found hard climbing on the steep mountain road that was specially constructed to give access to this outpost. Moreover, the bricklayers and other artisans who have gone from Washington to construct the new buildings had to content themselves with boarding places miles away from their scene of employment, for there are no habitations, other than those of the weather bureau officials, within some miles of the observatory.

This isolation which, as may be surmised, has had its disadvantages is exactly what the government wanted for its observatory. There are a number of reasons for this. In the first place, the study of the upper air, demanding as it does, the use of kites or balloons, requires a locality with a high average wind velocity—one where sometime during each day there is a strong possibility of having a wind of at least eight or ten miles per hour. It also calls for a location ten miles or more away from cities and electric light wires, since in a populous section loose wires falling down as the result of accidents to kites or ballons in a storm, would prove very troublesome, and even a source of danger. Besides, the surrounding country for 15 or 20 miles should be comparatively open so that lost kites and the costly instruments they carry can be readily recovered. Secondly, magnetic work of the most important character is a feature of the operations of this laboratory, and this requires a location remote from cities. Thirdly, solar investigations which are likewise included in the research work call for a place away from the smoke and dust of cities and above the haze of the valleys. Fourthly, the physical laboratory which is a part of the institution, must be free from the disturbing jars of heavy traffic. Added to all these specifications was the supplementary consideration that it was desirable to have this very important part of the weather bureau's work done as near as practicable to Washington, in order that the central office may be as closely in touch with it as possible. The varied requirements made it no easy task to find an ideal site for the new institution, but the domain finally discovered in the Old Dominion seems to have proven itself possessed of exceptional qualifications.

One of the principal buildings in the group of new structures recently erected at Mount Weather is the physical laboratory. This is a three-story structure of stone construction throughout, and with immense pillars of solid concrete supporting the portico. The whole building is to be given over to scientific purposes. Departments for the testing of instruments and the invention and construction of all forms of apparatus will be conspicuous features. The third floor of this $30,000 building will be given over to spectroscopic work of the most important character. A short distance from this laboratory building is a handsome frame dwelling of the type usually found in residential suburbs. Since the fire this has served as living quarters for practically the entire staff of Mount Weather, but when work at the observatory is on a permanent status it will be converted into a two-family residence for the use of a couple of scientists who will bring their families to the mountain top.

The main observatory and administration building which will serve, in a sense as the keystone of the Mount Weather group, will cost $45,000 and is a three-story structure of fireproof construction. The first story is constructed of solid concrete, while the upper stories have a facing of brick, backed with terra cotta. Alike to all the buildings at Mount Weather the whole construction and especially the fittings of windows and doors has been planned with especial care in order to afford protection against the high winds that sweep over the mountain in winter. The first floor of the main building is to be given over to offices, while the second and third floors will be occupied for the most part by living rooms for the scientists. Beyond the administration building in the most isolated part of the grounds are two buildings from which the visitor is barred if he carries a watch, or offers a disturbing influence of any kind. These frame structures constitute the magnetic observatory, and contain many delicate instruments.

One of the most important acquisitions of this scientific community amid the mountains is a new central heating and power plant. The power house, of stone and concrete construction, cost with its equipment more than $15,000. It contains a 45 horse power engine, directly coupled to a 25 kw. generator which supplies the current for lighting and heating the buildings; operating the machinery in the laboratories; producing the hydrogen needed to inflate the balloons; making liquid air; and operating the great reel upon which is wound the wire that holds captive the kites and balloons that are sent aloft with recording instruments.

The stone and frame building which served as a power house in the early days of the Mount Weather observatory is now used as a kite and balloon house, and is the headquarters of the five men who devote all their time to aerial work under the general direction of William R. Blair, and with the supervision of Prof. Alfred J. Henry of Washington, the executive officer in charge at Mount Weather. More than 25 kites are constantly kept on hand, including the models used by all the various foreign governments that have undertaken scientific kite flying. There have lately been added to the equipment several specially designed kites for use in the high winds which prevail during the winter. The ordinary kites will fly in any wind with a velocity of ten miles per hour, or more, but are not adapted to use when the wind exceeds 25 miles per hour. However, the new style emergency kite at Mount Weather, weighing eight pounds, and having a lifting surface of 58 feet, has made successful flights more than a mile in height when the wind was blowing a gale of 46 miles per hour.

Fewer balloons than kites are on hand, for the reason that balloons are used only when the wind is too light to permit of kite flying. Originally small rubber balloons were used at Mount Weather, but latterly there have been adopted spherical balloons of varnished cotton cloth which have a capacity of 905 cubic feet, and cost several hundred dollars apiece. Kites have been flown at Mount Weather at the remarkable altitude of 23,000 feet, and captive balloons are frequently sent to a height of several miles. The weather bureau officials are just inaugurating particularly interesting experiments wherein small rubber balloons carrying self-recording instruments of especially light weight are being liberated and allowed to make their own way in the upper air currents. By this way records at elevations of from 30,000 to 50,000 feet will be obtained.

On the kite and balloon field at Mount Weather is a reel house or circular tower mounted so as it can be rotated. Its double doors may thus be made to face in any direction and this facilitates kite flying, no matter what the direction of the wind. The interior of this revolving tower is largely given over to the three horse power electric motor and the monster reel of forged steel carrying the line upon which the kites are flown. The terrific strain involved in kite flying in high winds served to break in quick succession two cast-iron drums which were installed, one after another, at Mount Weather, and each of which gave way under the pull of 20,000 feet of wire, but now the kite flyers have installed a forged steel drum capable of carrying 50,000 feet of piano wire line, and believe that they are prepared for all emergencies.

THE SWEET TOOTH VINDICATED.

Sweetness is to the taste what beauty is to the eye, affirms Dr. Woods Hutchinson—nature's stamp of approval and vindication of wholesomeness. Sugar, says this authority, is one of the most universal flavors of foodstuffs known. One-half of our real foods taste sweet or sweetish. About one-third taste salty. Not more than one-tenth taste either bitter or sour. The experience of millions of years, reaching far beyond even our arboreal ancestors, has taught us beyond possibility of forgetting that, while there are hundreds of things that taste salty which have no food value and scores of things that taste bitter that not only have no food value but are even poisonous, and thousands of things, like leaves and sawdust and cocoanut matting, which have no food value at all, there are comparatively few things that taste sweet which are not real foods. A very few of these sweet tasting things, while real foods, are also poisonous, but these we soon learn to detect and beware of.—Current Literature.

THE ONLOOKER

WILBUR D. NESBIT

"New Hearts for Old"

There came a pedler, bent and brown,
Who cried: "New hearts for old!"
He trudged the highways through the town,
His voice was sharp and cold.
But many a man and many a maid
Ran after him that they might trade
An old heart for a new—
For many a maid and many a man
Believed it was a splendid plan
And one of profit, too.

The peddler lifted up his pack
And took their hearts away,
He swung it gaily to his back
And said he might not stay.
And many a man and many a maid
Smiled merrily as off he strayed
With their old hearts for new.
Aye, many a maid and many a man
To sing with joy at once began
As he went out of view.

To-day the folk in all that town
Who have new hearts for old
Watch for the peddler bent and brown,
Whose voice is sharp and cold.
For many a man and many a maid
Since then would goodly sums have paid
For the old hearts anew—
And many a maid and many a man
The broad highway will daily scan
The peddler man to view.

The peddler man—Ah, where is he?
None knows which way he strolled.
He may be near or oversea
Trading new hearts for old,
But many a man and many a maid
Has sorrowed over that rash trade—
An old heart for a new.
And many a maid and many a man
Sighs that it was a foolish plan
For old hearts aye are true.

The Subject and the Speech.

Careful observation this last year discloses the fact that our public men are losing their co-ordinate powers of mind. In no instance under scrutiny has one of them delivered a speech that had any particular bearing upon the topic assigned or the occasion utilized for the delivery of the speech. For example:

In a Memorial day address on "Our Fallen Heroes," Hon. Goingsome spoke for two hours and forty minutes on the need of a thorough re-arrangement of the management of railways.

In a Memorial day address on the advertised topic of "Our Country in Peace and War," Hon. Whoopit took 85 minutes of the time of a perspiring audience to make a demand for the free coinage of silver, or something of the sort.

In a Fourth of July address, said to have been on "Heroes of Yesterday and To-Morrow," Hon. Gabbso spoke for two hours on the necessity for a high protective tariff on tobacco and hairpins.

In a banquet address on "True Manhood in Public Life," Hon. Votechaser told his way of building the Panama canal and intimated that he would like to see a tunnel under the Rocky mountains.

In a commencement address on "What Citizenship Demands of the Young Man," Prof. Dryerndust demanded simplified spelling of a list of nine hundred words, which he read to the audience.

Dedicating a Masonic temple, Hon. Hangon defended his bill authorizing a fleet of military airships.

Just So.

Lives of toothless men remind us
We must reach our meals on time
Or the lift boys else will find us
Fletcherizing as we climb.

Same Thing.

"I suppose you are satisfied now as to Throttlem," says the friend. "You used to be criticising him all the time because he talked so much about his automobile and why he bought it in preference to some other make. He has sold the machine, I understand."

"Yes," replies the man with the dislocated eyebrows, "but now he talks all the time about the reasons that impelled him to sell the thing. I wish he had kept it."

What Wealth Will Bring.

"You want an airship, madam?" inquires the suave salesman. "Certainly. We are now taking orders for the latest model aeroplane."

"Aeroplane?" sniffs the haughty lady, whose husband happened to strike the right side of the market. "Plain? I want you to understand that we want the fancy kind, with as many trimmings as can be put on it."

Wilbur D. Nesbit.