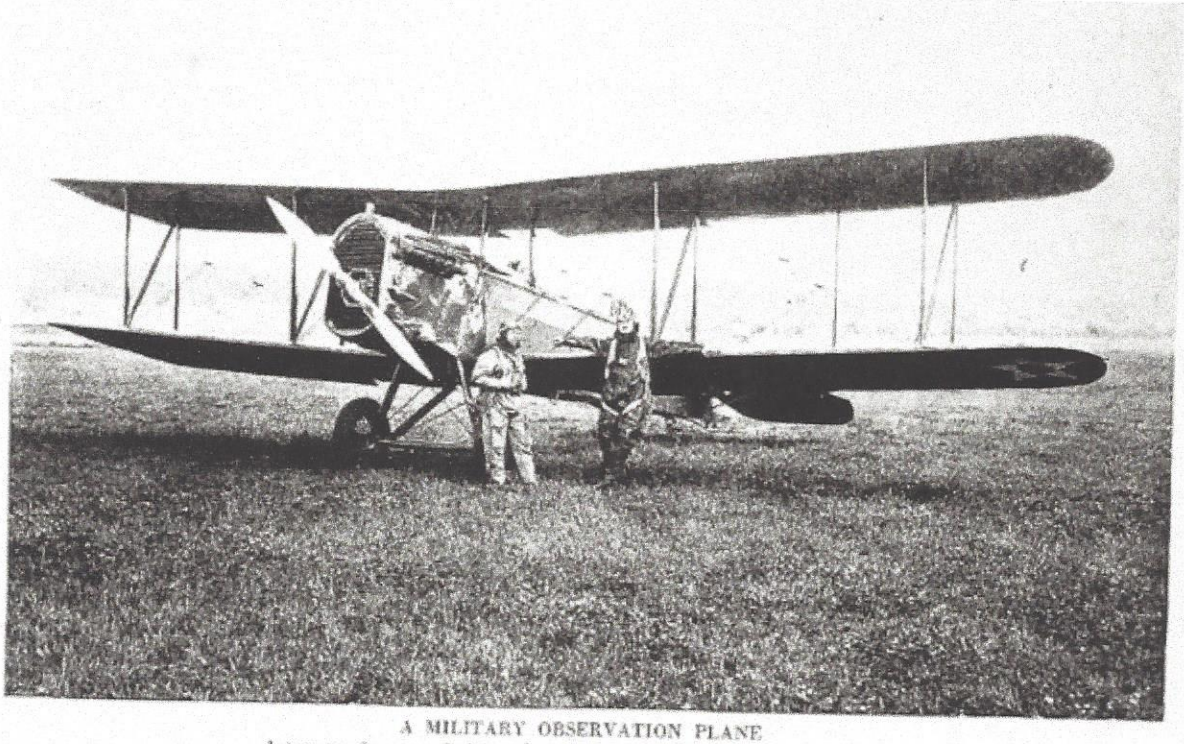


A MILITARY OBSERVATION PLANE
A two to six seater is best adapted for golf course mapping operations

Designing Courses From the Air

BY GEORGE H. DACY

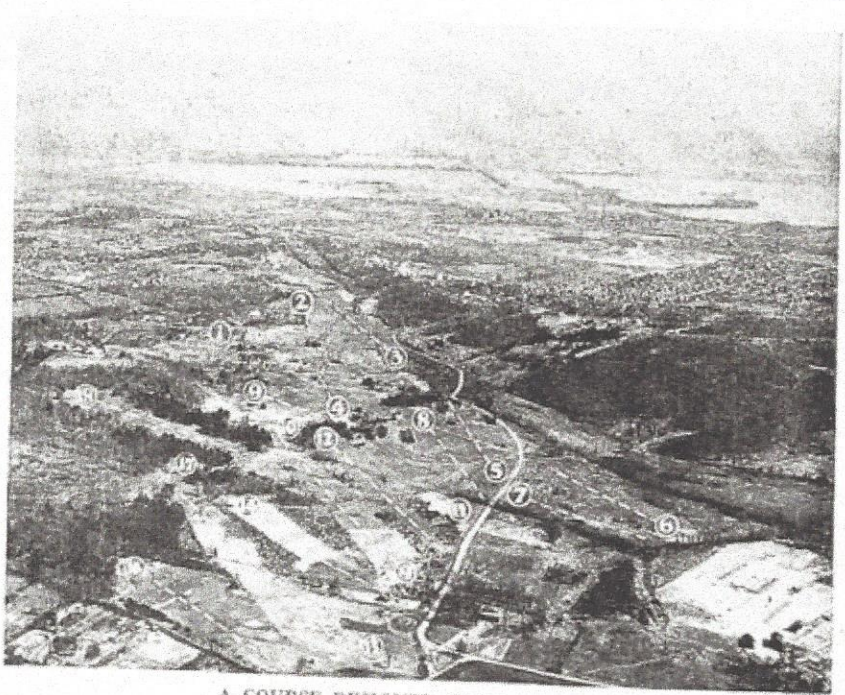
THE utilization of the modern airplane as the golf architect's most valuable potential assistant promises to neutralize the golfers objections to occasional low-flying planes while they are playing. Let those whose golfing acres adjoin airports and flying fields contest their rights in the courts, or move to new and better locations. Let the rest of us pay homage where it is due. And right at present, plenty of credit is owing creation's newest and greatest vehicle which navigates the Empire of Skyland.

The airplane now enables New York golfers to play Florida or California courses a day or so after they decide on such trips. Bird-line transportation via the atmosphere shaves the erstwhile tedious jaunt to a favorite country club to a fraction of its former interval. And now, the two-mile-a-minute aerial speedster has been capitalized as a unique architectural office for the improvement of future golf links here, there and elsewhere.

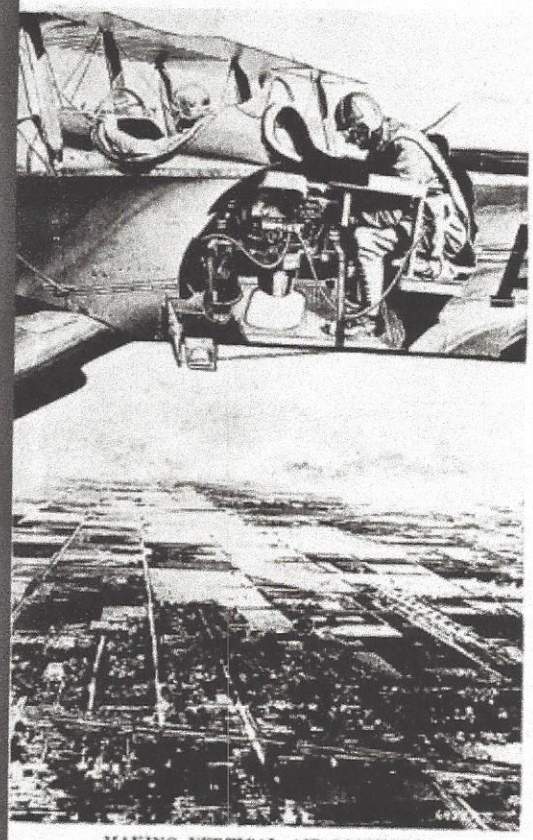
This latter innovation has come into actuality because a cavalryman mastered the art of flying, gained proficiency in aerial photography, tested out his aeronautical ability in the location of ducking blinds and sink boxes in the Texas wilderness and finally yoked it to the unusual task of designing golf courses from the sidelines of skyland.

Just to illustrate that this novel consummation is not a "flash in the pan," it is notable that Major R. D. Newman, originator of aerial surveys for country clubs, has planned and built a quintet of golf courses from "on high." The first of these golfing playgrounds was completed 5 years ago at Fort Riley, Kansas. From then to now, the golfers at the Cavalry School at that army post have competed against General Par when they were not wrestling with the mysteries of militarism, veterinary science and animal husbandry. That pathfinding air-planned course convinced Uncle Sam that Major Newman's scheme was sound.

As a consequence, the Major who has been an enthusiastic golfer since he first began to play the game at the age of eight, has also planned and constructed other notable military links at West Point, Fort Meade, Maryland, Bolling Field near Washington and the Army, Navy, Marine Corps course in Northern Virginia. For more than three decades, Major Newman has been a devotee of golf. During this period, he has played all the leading courses in England, Scotland and Wales as well as those in the



A COURSE DESIGNED FROM THE SKY
The Army, Navy and Marine Corps Country Club course near Washington, D. C., designed from the air by Major R. D. Newman



MAKING VERTICAL AIR PICTURES
These pictures are made with the lens straight downward

ited States. Golf is his favorite hobby and the use of the air-ne in the planning of American links according to his belief is most practical system for decreasing the existent high cost of course struction. This builder has proved the verity of his contention in case of the five courses which he has constructed.

The most satisfactory season for planning a new course from the air during the late autumn when the leaves have fallen from the trees observers can secure the best views and aerial pictures of proposed sites from the upper atmosphere. Army type observation planes ich accommodate from two to six passengers are well adapted for scouting trips. Mapping cameras of standard type which give the atest detail at various altitudes are suitable for making the mosaics vertical and oblique photographs.

The most effective utilization of the airplane in golf course design ossible in a densely covered country of rugged topography. Under ditional methods of golf course design, the fairways and greens on a contemplated course would be nothing more than imaginary alizations until considerable clearing and construction had been con-mated. From cloudland, the entire links layout can be characterized kly. A general survey is made at an altitude of 3,000 feet while details are studied in circling flights at an elevation of 1,000 feet ve terra firma.

Experiments have demonstrated that aerial pictures made at an altitude 3,000 feet will reproduce on the approximate scale of two miles to one h. Such pictures can be enlarged as desired for greater detail while supplementary use of a powerful magnifying glass will increase the of the photographed landmarks such as streams, depressions, ridges trees from 40 to 50 times.

Vertical pictures are made by placing the camera in the bottom of the elage so that the lens is exactly parallel to the earth's surface. When speeding plane is directly above the site to be photographed, the tative is exposed. Vertical pictures logically lack perspective and sent what looks like a flat surface. Oblique pictures made with the era mounted on the side of the plane are taken to show the heights trees, hills and other hazards. A more detailed composite picture of entire property can be made in the form of strip mosaics which are ched together and mounted as one unit after the negatives are eloped.

Data on the topography of the site for the future course are also essential in the accurate development of the design. Such information is available in the voluminous federal files of U. S. Geological Survey. Uncle Sam is spending more than one-tenth of a billion dollars in making a gigantic topographic map of our 48 states and the District of Columbia. This Gargantuan map when completed will cover several acres of wall space. It will reproduce every upland and depression, hill and valley, every mountain and plain. Our Government is mapping every square inch of land surface and preserving this valuable engineering information for posterity in the guise of copper engravings, topographic maps and photographic reproductions. U. S. Geological Survey is prepared to furnish topographic maps of any unit or fraction of a unit of this vast area which has thus far been surveyed. This information is of immeasurable importance to railroad and highway builders, mining developers, golf course architects and others interested in the multiplicity of bumps and dents which speckle the American terrain.

By using this accurate national information and the aerial pictures of any tract, the planning of a new golf course is simplified, while the more efficient capitalization of the natural hazards such as the roll of the land, trees, hills, dales, meandering streams and the like, is facilitated. A case in point is the total absence of artificial sand traps at the new Army, Navy and Marine Corps Golf Club near Washington. Major Newman designed this course along a broad valley penetrated by a winding stream. The roll of the sloping hills which neighbor the Potomac River as well as the clever use of meandering streams, forest cover and adjoining swamps make this course difficult for him whose shots stray from the straight line.

If you think this course, located only two and one-half miles air line from the White House, is as civilized as a public park, read what follows and change your opinion. As soon as the 17th fairway was cleared of undergrowth, a white-tailed Virginia buck standing over six feet and weighing about 600 pounds made that vicinity his headquarters. For two years, from various points of concealment, this deer watched tee shots that were pulled and putts that hung on the edge of the cup.

The greenkeeper scattered food for the buck during the winter when the ground was blanketed in snow. The handsome specimen of wild life was venerated as the official mascot of the world's finest military golf club. Until a poacher one day stalked and (Continued on page 46)

HOW STRIP MOSAICS ARE MADE
Sections are matched and mounted in one composite picture

TAKING OBLIQUE PICTURES
The camera is mounted on the back of the plane which circles the proposed course about a mile in the air

Designing Courses From the Air

(Continued from page 23)

killed the beautiful animal. Wild deer within rifle range of the halls of Congress prove that the Army, Navy and Marine Corps course was really carved from a virgin wilderness.

It only takes about two hours to make an aerial survey of a prospective 18-hole golf course. The total expenses of such a scouting flight will range from $100 to $300 where commercial birdmen are employed to do the work. It is essential that the golf course architect in charge of the job be experienced in flying. He must accompany the aviator and must dictate exactly where the air pictures be taken, as that location is extremely important. He must also be qualified to study the resultant mosaics as well as the oblique and vertical pictures in order to unravel all their secrets. It is practical and profitable insurance for any new club which is laying out a course to employ this new and novel air method of architectural approach.

The Army, Navy and Marine Corps Country Club was once the cradle of interesting Civil War history. In fact, the Confederacy "dubbed" a remarkable chance to capture Washington and win the war as a result of epochal events hatched where golfing greens and fairways now beautify the pastoral landscape.

At a time when the Yankees were centralizing all their fighting men near Gettysburg, the approaches to our National Capital from the south were guarded by a force of only 600 armed defenders. "Jeb" Stuart, dauntless Rebel leader led the van of 6,000 Confederate cavalry which masked the oncoming of some 16,000 infantry as far north as the present military golf links. At that point several skirmishes were had with the Union forces. By some curious quirks of warfare, Stuart and his staff gained the impression that the Unionists in great force were mustered to turn back his thrust. Forthwith, the Southern leader changed his plans, detoured from his contemplated charge on Washington and retreated. A military mistake which aided measurably in ending the war several years later and giving the victory to the Northern Army.

Potentiality will see the Army, Navy and Marine Corps Country Club the American center of international horse shows and polo matches. An outdoor natatorium, two polo fields, an aviation field, batteries of tennis courts and two 18-hole golf courses will make this air-planned sports center the future rendezvous and recreational hub of our national defense system. Major Newman has not planned championship golf courses on that historical ground but he has utilized all natural hazards to best advantage which will test every shot in the expert golfer's repertory. The first course now in play is 6,109 yards in length and will be longer by several hundred yards when certain contested property can be secured which will admit of lengthening of both the ninth and tenth holes. Civil War redoubts and gun emplacements have been preserved as natural hazards. Major Newman plans to identify some forty different historical spots on the course with concrete and bronze markers. Historical facts will be inscribed on each of these monuments.

Major Newman maintains that the best holes in world-wide golf are those designed by nature. For example, the celebrated holes at St. Andrews, Gleneagles and Muirfield are God-made creations. The big opportunity for American golf designers is to capitalize on natural normal topography instead of featuring artificial holes broadcasted with bunkers and sandtraps. There is plenty of food for thought in Major Newman's suggestion that instead of copying famous foreign courses, we design and develop better original and natural holes in these United States.

It will frequently happen that when a new club is to be formed there is very wide latitude as to its locat within a central distance of the nei hoohood which it is to serve. In such a case the expense of surveying several localities to find the one most ideal would probably appear so prohibitive that some place would be chosen on the best judgment that could be made on a limited knowledge of the merits of the various possible locations and the terrain which was really best suited to the needs of a good course might very well be missed. With a series of aerial photographs covering all available sights the best portion of the finest available ground could be determined at a cost of a very small fraction of the cost of making comparative studies of several possible sites by ordinary surveying methods.

After the selected course has been laid out based on photographs made as above, its final filling to the natural contour and scenery will entail much less changing of location and destruction of natural features—so abhorrent to a true lover of nature—that occurs in the construction of the usual very artificial course as finally finished.

INDUSTRIAL GOLF

Professional and business organizations desiring to hold Golf Tournaments may secure private courses by addressing The Service Department, Golf Illustrated.