

Joseph Liston is an assistant professor of mechanical engineering on the University staff. Some of the interesting problems of aviation are recounted in the following article.



## Aeronautics at O. U.

By JOSEPH LISTON

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**T**O many laymen, the mention of aeronautics brings up visions of Sunday afternoons at the airport watching the transports come and go, or of sunburned tonsils from trying to follow the dizzy maneuvers of a stunt pilot or of beautiful formation flights of army planes. It is all very interesting, some times thrilling, and it has played an important part in showing the possibilities of aviation in peace and war, but those who have casually assumed that this was all of aviation are far from the truth.

Consider for a moment the things that make such flights possible. Before a plane can take the air, many hundreds of hours must be spent in its design, building, and ground testing. The designer must be versed in the principles of aerodynamics, efficient structural design, and the internal combustion engine. He must know the severity of the stresses encountered in flight and how to design the structural parts to withstand them. He must know how to shape the wings to efficient lifting surfaces. He must thoroughly understand the principles of streamlining for in no other form of transportation is wind resistance as serious an obstacle to good performance. He must be certain before the plane ever leaves the ground that it will balance and that the pilot can control it. The engine designer must know how to build a powerplant that will develop more power for its size than any other type of power producing unit in existence. For instance, many engines now in regular operation will develop more power than the turbo-generator that at present supplies practically all of the electric power for the entire University. And the weight of these engines is very small

in comparison. How often do you use the full power of your automobile engine? Aircraft engines must be capable of full throttle operation for many hours at a time, and there are few cases indeed where a failure is more serious.

The builder of airplanes must know how to fabricate from alloy steels of unbelievable strength, from aluminum, from fabrics, parts that can withstand tremendous forces. It is not enough for a plane's wings to support the weight of the plane. They must be capable of withstanding dynamic stresses such as you feel when you turn a corner at high speed. But in the air, these stresses may be many times greater than on the ground. A stunt pilot can easily subject his plane to conditions in which the effective weight or load on the wings is six to ten times normal. In some maneuvers he may "weigh" more than a thousand pounds, and it becomes physically impossible for him to rise from his seat. The plane is subject to these same forces, and if it is not built to withstand them, it will fall apart in the air.

Anyone who has seen the instrument board of a transport plane will readily agree that the designers and builders of these important aids to flight must be technicians of no mean ability. The engine instruments, the navigating instruments, the radio, the Gyro-pilots—all are essential.

Then there are the ground aids, the elaborate airports with their weather stations, radio equipment for keeping in constant touch with all transport planes, hangar and repair facilities, refineries for making special fuels, steel mills for structural materials and engine parts—literally scores of industries are contrib-

utors in one way or another to the "preliminaries" to a Sunday afternoon's entertainment.

The first engineers in aviation were men trained in other technical fields. Today, however, the work has become so highly specialized that specific training in aeronautical engineering is essential. But this should not be wrongly interpreted. Basic courses applicable to other branches of engineering, especially mechanical engineering, are just as necessary now as they were in the past. The close interrelation of aviation with many other industries is proof enough of this. It is a serious mistake to specialize in aeronautical engineering exclusively. Few if any aeronautical engineers have only aeronautical problems to solve; at least a part of their time is taken with mechanical, electrical or other work. It is because of this fact that students specializing in aeronautical engineering at the University of Oklahoma are required to take courses in other than aeronautical engineering subjects.

Aeronautical engineering courses were first given at O. U. in 1929. At present courses are given in elementary and advanced aerodynamics, airplane design, internal combustion engines, engine testing, engine design, and wind tunnel and instrument laboratory studies. Laboratory equipment has been gradually accumulated—instruments from the army, engines from the navy, a small wind tunnel built by the department with the assistance of various students, and the aeronautical fraternity, Tau Omega. It was very small as wind tunnels go, but it was the only available tunnel in the state.

At present a large tunnel, designed by P. O. Tauson, is being built, under the

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supervision of A. D. Oliver, both graduates in aeronautical engineering at O. U. Judging from the questions asked, this tunnel is somewhat of a mystery to all except those closely connected with it. To answer some of these questions, the tunnel is a large closed circuit tube through which air can be circulated at high velocity by means of a propeller. The model airplane can be mounted in this air stream in such a way that the lift of the wings, the wind resistance, the balance, and many other things can be studied and measured far more effectively and with much greater safety than in actual flight in a full size airplane.

Wind tunnel research has been responsible for the vast majority of the improvements in airplane design and performance from the days of the Wright Brothers to the present, and it is with the aid of such equipment that all of the record breaking planes are now being developed. Oklahoma is fortunate indeed in obtaining this tunnel, and it will have much to do in aiding the aircraft industry in this state, both in the training of personnel and in the testing of new designs.

While facilities for wind tunnel testing are being stressed, engine and fuel studies are not being neglected. Certainly, in a state that supplies so large a share of the fuels and lubricants for aircraft engines, emphasis should be placed on studies toward the betterment of engine performances and reliability. Students are encouraged to investigate special problems, and evidence that this is of importance lies in the number of recent engine research connections of graduates.

Aeronautical engineering courses have been given at O. U. for a relatively short time, but already many graduates have found connections in the industry.

Richard McBrien is with United Air Lines in Cheyenne, Wyoming, Lewis McBride is with the Istmithan Airway in Panama, Ralph Wassell is in the research department of Lycoming, builders of aircraft engines and propellers. Dick Sneed is with the research department of the Ethyl Gasoline Corporation. Rex Reed is with the Army Air Corps in Virginia. Karl Ritter is in the engine research department of the National Advisory Committee for Aeronautics at Langley Field, Virginia. Cecil Armstrong is teaching aeronautics at the University of Kansas. Bob and Tom Mayrath are with the Stromberg Carburetor Company. Evertt Strong is with an aircraft company in Wichita. Jessie Neal is arranging to go with Transcontinental and Western Air. Phil Klein is reported to be flying for an airline. When we recall that most of these former students graduated during the trying years of the depression, there is every reason to believe that commercial organizations are favorably impressed with O. U. aeronautical engineering graduates.

## Queen's Mamma

(SOONERLAND TOPICS)

**Q**UEEN VERNA HOLCOMB, presiding royalty at last year's St. Pat's Day festivities, did not come back to the University this year.

Engineering students are blaming no one except themselves, at least no one outside their own green-shirted organization.

"It was like this," one of them explained recently. "There are just one thousand engineering students, and almost half of them had the occasion to go through Fort Worth last summer.

"They'd go through at two, three or four o'clock in the morning and decide they ought to call up Queen Verna and just say 'howdy.'

"Of course, some stayed longer and wanted to be shown the sights. Eventually, the Queen's mother began to get a little tired of the telephone ringing at any and all hours. Queen Verna just had too many loyal Knights interested in her welfare.

"So, the Queen's mother decided it wouldn't hurt anything if the Queen just spent the next year at a girls' school. That's why she's at C. I. A. at Denton this year."

▲

There is an old saying that an artist should be married to his art.

Since getting married often means changing one's name, it might be concluded that several Sooners have gone into their fields whole-heartedly. The list of aliases is ever growing.

Of course, everyone knows that Joe Benton is the same guy as Joseph Bentonelli and Guiseppi Bentonelli. It's a matter of geography: Oklahoma, New York and Italy, respectively.

Erik Rhodes, of course, was president of the Phi Delta Theta chapter as Ernest Rhoades Sharpe. Stanley Vestal, everyone knows, is none other than Walter Stanley Campbell, honorary alumnus, member of the English department faculty and writer.

Pinky Tomlin was plain Truman when he was on the campus and Harriet Russell, also of movie fame, was graduated as Hattie Mae.

The new one that should win first prize is the new name of Elizabeth Klein, '35mus, former Norman girl who appeared on the west coast with a Russian choir. Her singing name was derived by turning her last name backward and adding ski.

Threby arriving at—Santya Nielnski. Whoops!