

Boeing drops the swing wing

After months in the rumor mill, the likelihood has become official fact. The controversial variable-sweep wing is no longer a part of plans for the U.S. supersonic transport.

The Boeing Co., builder-to-be of the aircraft, had hung tenaciously onto the swing-wing idea, even when heavy structures necessitated by the wing pushed the plane more than 25 tons overweight, almost enough to wipe out its ability to carry passengers.

Then the strain began to show. Last February the Federal Aviation Administration announced that Boeing was being allowed to delay construction of the prototype aircraft for a year while it reevaluated its design, although the FAA's development director for the project, Maj. Gen. Jewell C. Maxwell, said that any changes would not include dropping the swing-wing. A few months later, rumors began appearing that Boeing was indeed looking at a fixed-wing design among others, and by September it had become the leading candidate (SN: 10/5, p. 340).

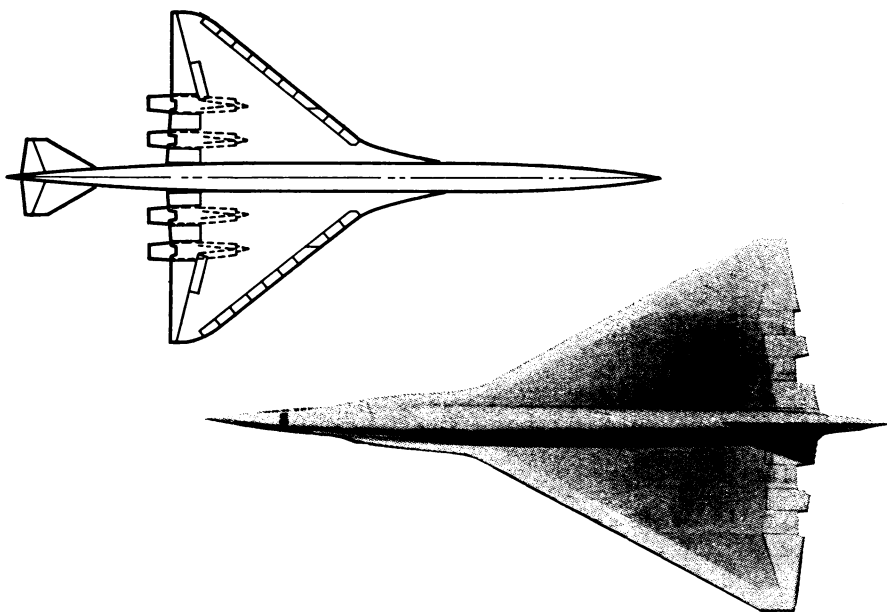
Last week it publicly became the only candidate. In Philadelphia, at the annual meeting of the American Institute of Aeronautics and Astronautics, Boeing engineer John M. Swihart revealed that "work on the variable geometry wing design for commercial application has been discontinued."

Within Boeing's private offices, however, the decision may well have been made weeks earlier, and with good reason. By Jan. 15, the company has to present its final design recommendation to the FAA, and it faces a severe penalty if it doesn't come up with a winner. Should the new design fail, Boeing will be out some \$45 million, the cost of its year of grace.

Then, barring additional extensions, the competition could reopen.

In principle, the new design is more like the one with which Boeing's competitor, Lockheed, lost the supersonic competition 22 months ago than that with which Boeing won it. Both aircraft feature fixed delta wings that attempt to resolve the conflict between maximum wing area for lift at subsonic speeds and minimum area for streamlining at supersonic speeds.

In fact, Boeing's new version is like a compact sports model compared to the massive swing-wing design. The fuselage is 280 feet long, compared with the 318 feet to which its predecessor grew as engineers drew in more seats and bigger fuel tanks to try and keep the increasingly expensive bird profitable. The fixed-wing plane should carry 280 passengers, less than the 300 plan-



Boeing/Lockheed

Fixed wing shared by new Boeing (top) and old Lockheed supersonic designs.

ned for the swing-wing, but more than equal to what its capacity was before the worries set in.

Weight of the new plane, Swihart says (and Boeing profoundly prays), will be some 635,000 pounds, fueled and ready to go. This is 45,000 pounds heavier than Lockheed claimed for its proposal, but it is also 45,000 pounds lighter than the weight that the swing-wing prototype was struggling vainly to meet.

A major difference between Lockheed's old design and Boeing's new one is that the Boeing plane has a horizontal tail. Lockheed instead employed a huge wing that stretched back almost to the rear of the fuselage. One advantage of the tail (Boeing again hopes) is that it provides control leverage from the rear of the plane while eliminating a lot of drag-producing wing area. Boeing's wing is some 17 percent smaller in area than Lockheed's old design, and is even some 13 percent smaller than the lifting surface of the swing-wing design, which would have combined wing and horizontal tail during supersonic flight into a continuous 9,000-square-foot surface. The new wing is less streamlined than the earlier fixed wing, however, with a leading edge that angles back at only about 50 degrees, compared to Lockheed's 65.

The resemblance between the two fixed wings, however, at least in approach, has caused some observers to wonder anew about the basis for selecting the winner of the SST competition in the first place. "They didn't make a technical decision—they made a political decision," says a Lockheed official, who nonetheless claims that Lockheed would not now want to develop the first U.S. supersonic airliner anyway. "The investment costs are too great,"

he says. "It'll take years to start making a profit."

If all goes smoothly from here on, Boeing's SST will still not fly before 1972, and will not be delivered to the airlines until four years after that. Meanwhile, the slower but still supersonic Anglo-French Concorde is expected to make its first flight this year, as is the Russian SST, the Tupolev 144.

MONKEY TRIAL

Evolution reaches highest court

William Jennings Bryan, three-time Presidential candidate, was there to defend the Word of God.

Clarence Darrow, famed advocate of lost causes, was there to defend the right of teachers to pass along the insights revealed by science.

The nation's best journalists, led by H. L. Mencken, were there to telegraph the results to a waiting nation.

Bryan, who won, died of a stroke immediately after the trial. Darrow, who lost, became an even more respected lawyer. The reportage of Mencken is still studied in Journalism 101.

But the Monkey Trial petered out—John T. Scopes, convicted of teaching evolutionary theory to the innocent youth of Tennessee, was let off on a technicality by Tennessee's Supreme Court, and Darrow was unable to appeal to the Supreme Court of the United States for a constitutional ruling. That was what he really wanted.

Now, 43 years from the funeral-parlor chairs and the sweat-soaked galluses of Dayton, Tenn., the Supreme Court finally has the issue before it. From the verbal encounter it appeared very likely that the infidel Darrow might finally win

his point. Ironically, few people outside Arkansas and Mississippi—the two remaining states with anti-evolution laws—seem to care anymore. Tennessee has repealed its anti-evolution statute. A key question now is whether the high court will rule on basic constitutional grounds or will take a more technical tack in the case.

Arkansas' 1928 statute forbids the teaching of any theory holding that man has descended from a lower order of animals. It was challenged in 1965 by Mrs. Susan Epperson, at that time an 11th grade biology teacher, backed by the Arkansas Educational Association.

In 1965 the association began a drive to overturn the law. It publicly attacked the statute and passed word it was looking for a teacher to make a legal challenge. Susan Epperson, a 24-year-old teacher at Central High School in Little Rock, decided to pick up the challenge. That December she filed a petition in Arkansas' lower court asking that the law be declared unconstitutional. She had not as yet taught evolutionary theory, but was prepared to do so.

Unlike Scopes, Mrs. Epperson won her original case; when she taught evo-



Mrs. Epperson: latter-day Scopes.

lution, it was legal. The state then appealed the ruling to Arkansas' high court, where it was reversed. In a two-line decision, the court simply stated that determining school curricula is a valid state exercise. It declined to define teaching, and offered no opinion as to whether evolution could be discussed in school, even if it was not taught as fact.

During the 35 minutes the U.S. Supreme Court spent on the case Oct. 16, Associate Justice Thurgood Marshall

suggested that since the Arkansas court had disposed of the case in two sentences, perhaps the Supreme Court could settle it in one. Which one, he didn't say.

The final decision, expected in November or December, could be determined on several grounds. Mrs. Epperson's attorney, Eugene R. Warren, is basing his case on both the First Amendment guarantee of free speech and the 14th Amendment's due process clause.

The law violates due process, says Warren, because of its vagueness. Teachers are uncertain as to whether they are forbidden to discuss the matter or to permit classroom discussion. Moreover, they are almost certain to violate the act since it also bars the use of textbooks containing evolutionary theory.

"There is no biology text without some explanation of the theory of human evolution," Warren told the Supreme Court.

Typically, Arkansas teachers skip those chapters or tell their students it is illegal to read them, thereby assuring

that they will be read. In many places, the law is simply disregarded. No teacher has been prosecuted under it. However, rural areas can and have used the statute to threaten teachers disliked for other reasons.

Should the Supreme Court rule against the law on the basis of the 14th Amendment, it might find some precedent in a 1923 Nebraska case. The Nebraska law, aimed at foreign language schools, particularly German schools, barred teachers in both private and public schools from teaching any subject in any language other than English (a hangover from World War I). Languages themselves could only be taught after the eighth grade in Nebraska schools.

In striking down that law, the Supreme Court ruled that it violated due process.

A decision based more directly on freedom of speech, which is also possible, would put the court into the controversial area of state employe rights. It has in the past extended constitutional guarantees to state employes through the 14th Amendment.

RADIATION PROTECTION

Law first; the muscle later

A Federal effort to protect the public from harmful man-made radiation was signed into law last week, amid some debate over its regulatory strength. Strong or not, it gives the Federal Government its first direct role in the regulation of medical and dental X-ray equipment.

The radiation protection act authorizes the Secretary of Health, Education and Welfare to set standards for permissible radiation in electronic products such as color television sets, microwave ovens, lasers and diagnostic X-ray machines.

Since the legislators were convinced that not enough is known about the harmful effects on humans of man-made radiation, the bill also directs HEW to conduct research to find out specifically what the biological effects are, and at what levels, and for what products. As this data is generated, HEW will further refine its regulatory standards.

Whenever the standards are set, the law provides, for non-complying manufacturers, penalties ranging from \$1,000 to \$300,000.

The debate over the regulatory effectiveness of the bill centers largely around two provisions that were stripped from the Senate version in conference with the House. These provisions would have given the Government power to seize products deemed dangerous by HEW, and for HEW to

conduct in-plant inspection of products at any time, rather than wait until after a violation had been proved. During hearings on the bill, industry objected strenuously to these two provisions.

Senator E. L. Bartlett (D-Alaska), who sponsored the Senate version, considers plant inspection vital to the radiation control program and plans to introduce an amendment to provide for it in the next session of Congress.

While concern over the possible damage to humans of man-made radiation—largely from clinical equipment—has been around for some time, responsibility for control was in relation to use, not manufacture, and was a state responsibility. It took a well-publicized incident with color television sets last year to spark Congress into action.

In early 1967 it was discovered that some 150,000 of General Electric's large screen color TV receivers were emitting excessively high levels of X-radiation because of an improperly shielded voltage regulator tube. To reduce X-ray emissions of high voltage tubes to safe levels, manufacturers equip the tubes with metallic shields that absorb most of the radiation. Because of a manufacturing error, the shields inside many of the GE tubes were misaligned. As a result, part of the X-rays emitted could leak through the bottom of the tube. The company recalled all the sets, but the resulting