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TWITT
NEWSLETTER

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MINUTES OF TWITT MEETING, 15 AUGUST 1987

The meeting began with a showing of the Davis Wing videotape, after which Marc de Piolenc got up and told what little he knew about the crash of the Davis machine, a summary of Mr. Davis' recent press release. John Chalmers rose to discuss his recent trip to Germany, in which he visited motorglider manufacturers. John is a motorglider enthusiast who has owned a Limbach-powered machine (your Editor didn't catch the name), a Scheibe Super Falcon 60 hp two-place and a Grob A, his current machine. The German motorgliders are now priced out of the American market because of the weakness of the dollar vis-a-vis the West German Mark. The Typhoon's wing fold mechanism is good...almost as good as that of a 1960 Super Falcon! Grob is building C-152 and C-172 clones in composite, but for the European market only because of the price barrier. Also in the works is a nine-seat business turboprop airplane. John examined an electrically-operated variable-pitch propeller and liked its compactness and low weight, but noted that it took ninety seconds to complete a full pitch cycle. John also mentioned the latest FAA power-grab in the form of the Super TCA NPRM and the "emergency" expansion of the Los Angeles TCA. He noted that the upcoming Sun Valley soaring meet will emphasize motorgliders and self-launch sailplanes. Jack Green got up to discuss his highly modified Monterey kit sailplane. Jack liked the fuselage, which went together quickly and easily, but disliked the slab wing and the V-tail. His now has a T-tail, a conventional control stick and tapered wingtip extensions. The mandatory spar root reinforcement prescribed by Monnett is very awkward to accomplish and makes assembly much more difficult. Jack likes the adhesive bonding technique and notes no debonding in his machine. The skin took only two days to apply. The adhesive is expensive, though. Jerry Blumenthal then rose with a grim, determined look on his face, and all noted with alarm that he was carrying a rifle! Fortunately for us, Jerry was not manifesting his displeasure with the previous speaker, but showing off another one of his many technical hobbies, unusual muzzle-loading firearms. The rifle he brandished first turned out to be electrically fired. A beautiful but technically more conventional percussion carbine with a Mannlicher stock was also on display. Bruce Carmichael discussed the 5 and 6 September Sailplane Homebuilders Association meet at Tehachapi. The technical forums will be excellent. Bruce had also been to Oshkosh, where he noted the presence of a Cirrus with a full-span cruise flap. Billy Gray gave his own Oshkosh report, but your Editor seems to have been too absorbed to take notes. Phil Burgers, Hernan Posnansky and Bruce Carmichael then launched

into a three-way aerodynamics discussion which started with slats, continued into riblets and touched on the advantages of highly-swept wingtips. The NASA people at Oshkosh said that riblets (tiny grooves oriented in the direction of flow), which were used on the hull of the successful America's Cup challenger, reduce drag in turbulent flow by as much as 8% in the laboratory. How they do this is not fully understood--at least the experts could not agree on an explanation. Apparently they inhibit turbulence near the surface, reducing the velocity gradient and hence the shear stress. The optimum depth of the grooves varies with local Reynolds number, but the shape of the grooves is not critical. This suggests that the manufacture of near-optimum riblet material may be cheaper than originally thought. Boeing is planning to test riblets on the wing of a 747 airliner. The discussion of highly-swept wingtips dovetailed nicely with Marc de Piolenc's note on deltas, etc. in the previous issue of this Newsletter. It seems that high local sweep at the tips allows a smooth transition between the bound, lifting vortex on the wing and the shed vortex forming at the tips. One result is that the core of the tip vortex is shoved outboard of its position on a normal wing, increasing the wing's effective aspect ratio. Marc closed the discussion with a discussion of the peculiarities of non-planar wing systems and a halting discourse on the virtues of his "scoopwing," a beveled ring wing with a dual-rotation propeller mounted inside so that the ring is also a propulsive duct. After that one of two things happened: either the meeting ended or your Editor stopped taking notes.

Meeting at Carmichaels
clockwise; Hernan Posnansky,
John Krause, Karl Sanders,
Bruce Carmichael, Vern Older-
shaw, Phillip Burgers, Marc de Piolenc
picture by Bob Fronius

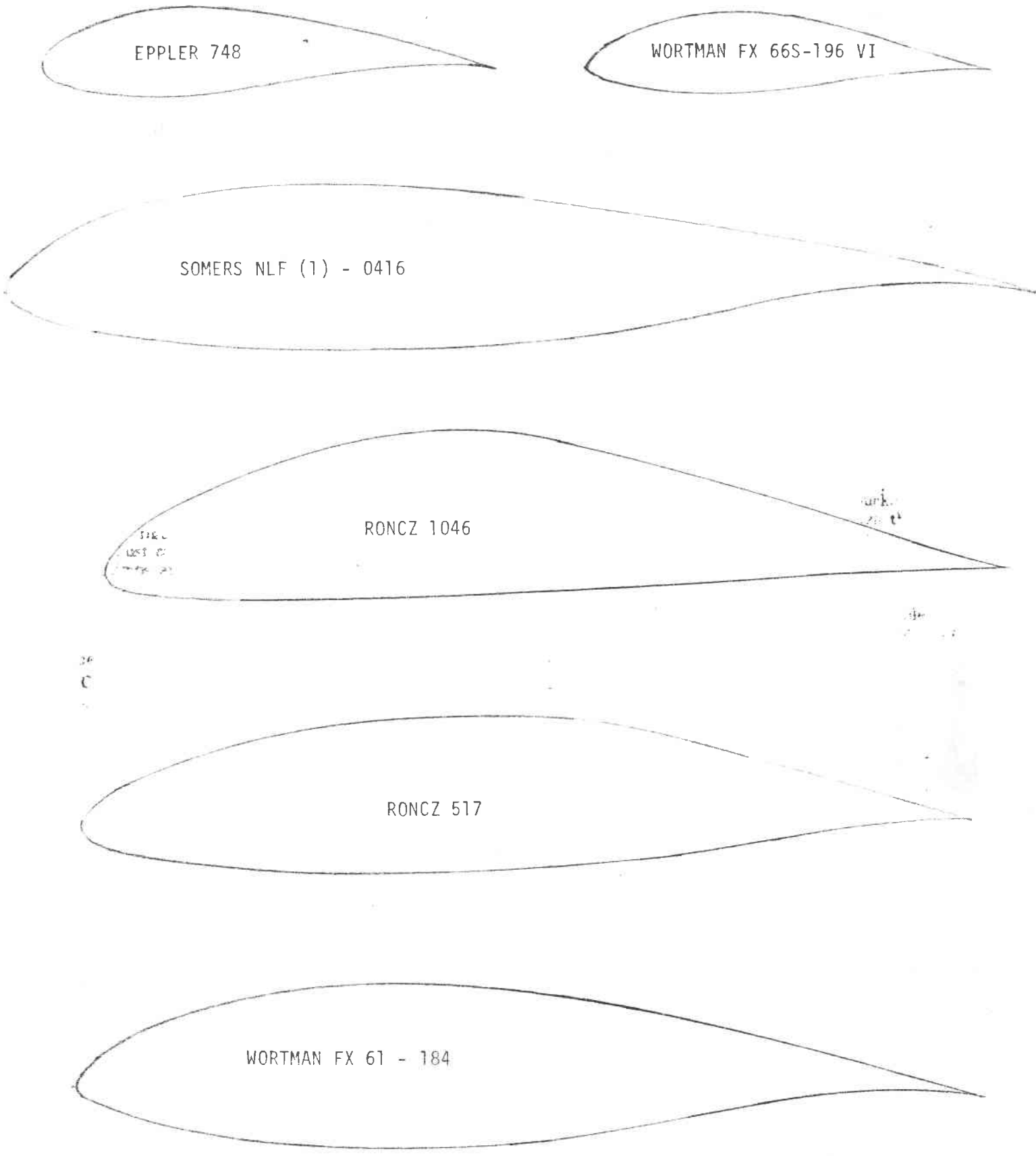
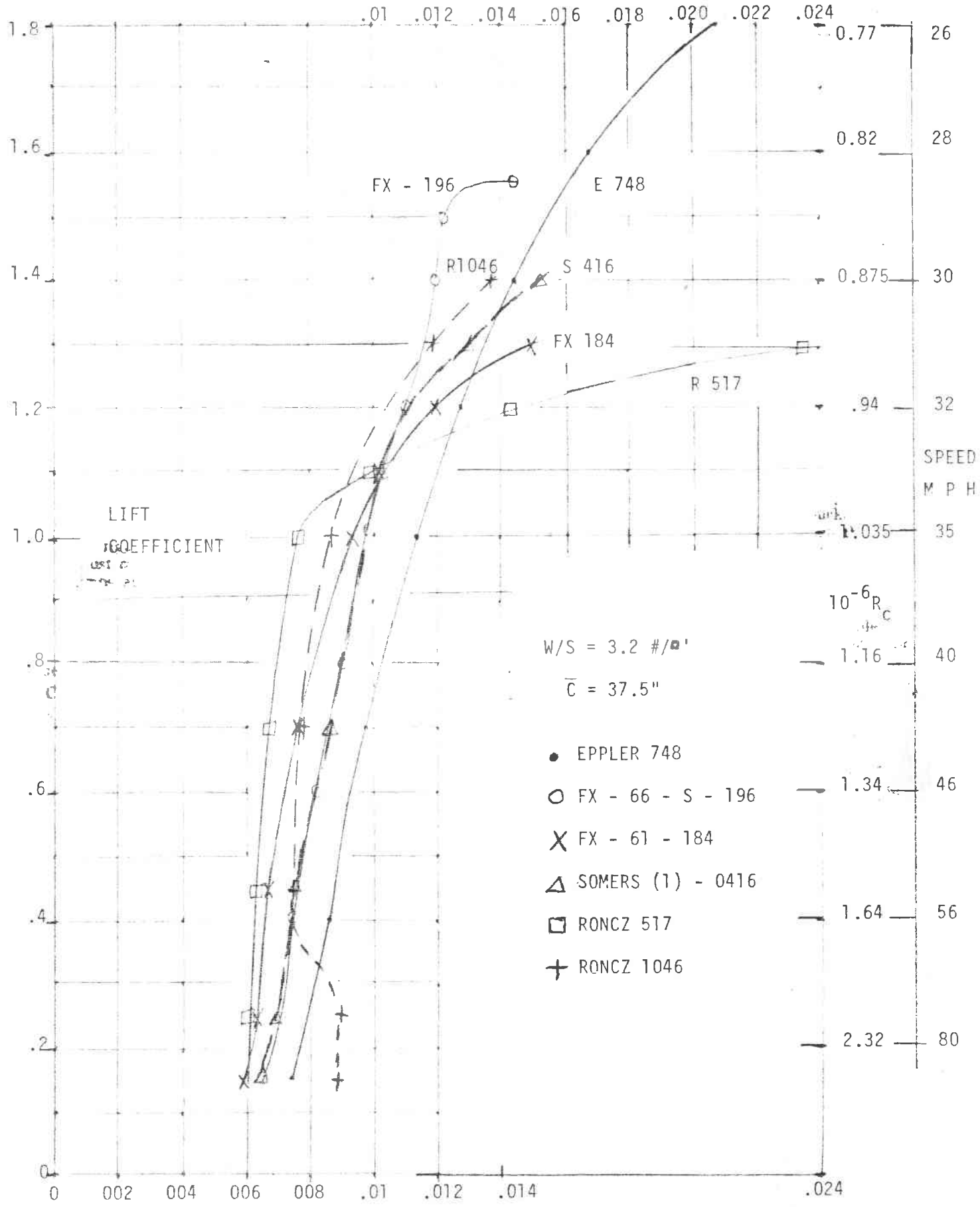


FIGURE 16 - SIX LOW DRAG AIRFOILS

FIGURE 17 - COMPARISON OF 6 AIRFOIL POLARS



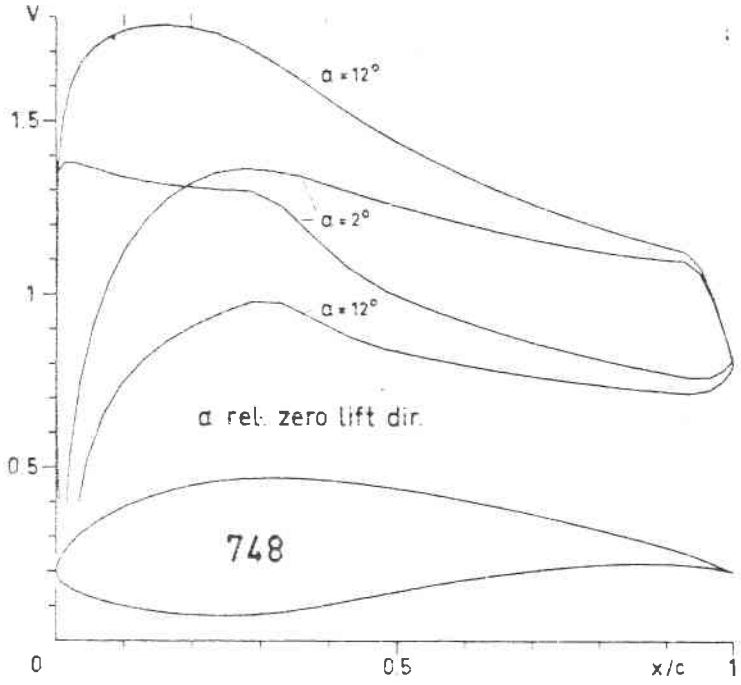


Figure 18.- Velocity distributions for airfoil 748.

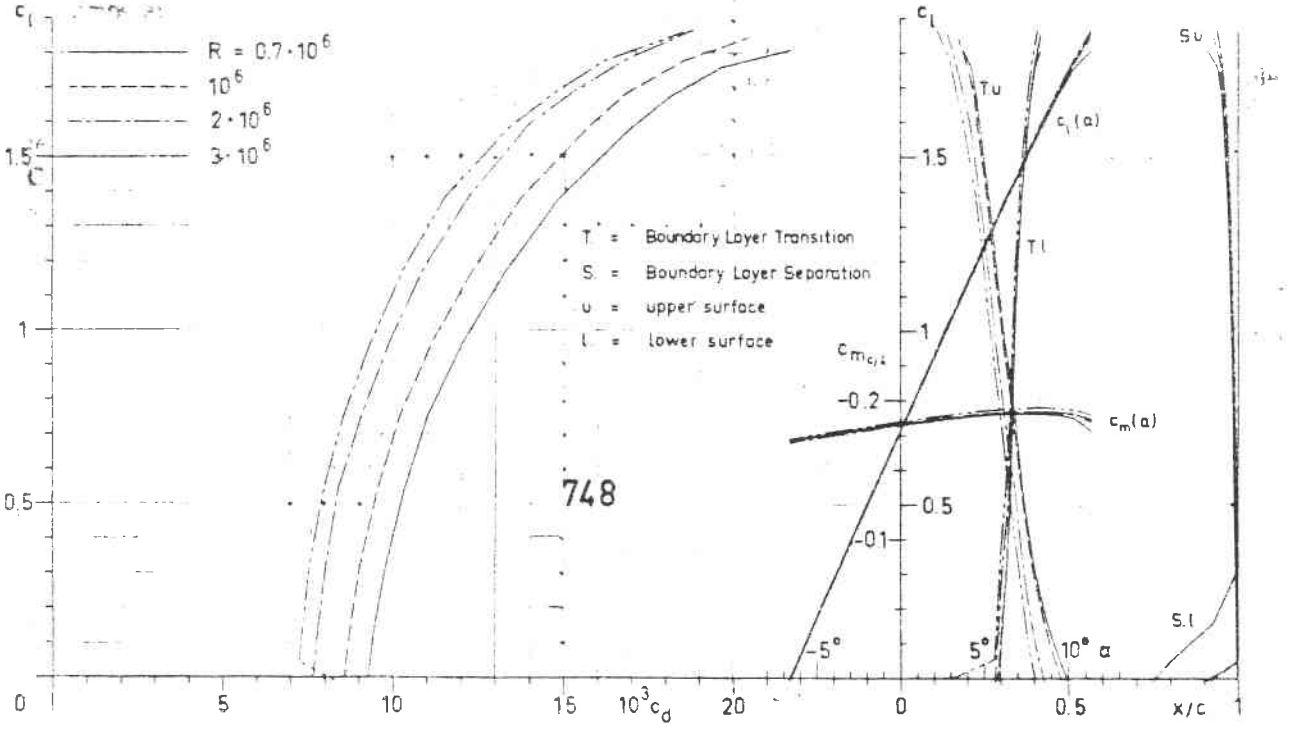
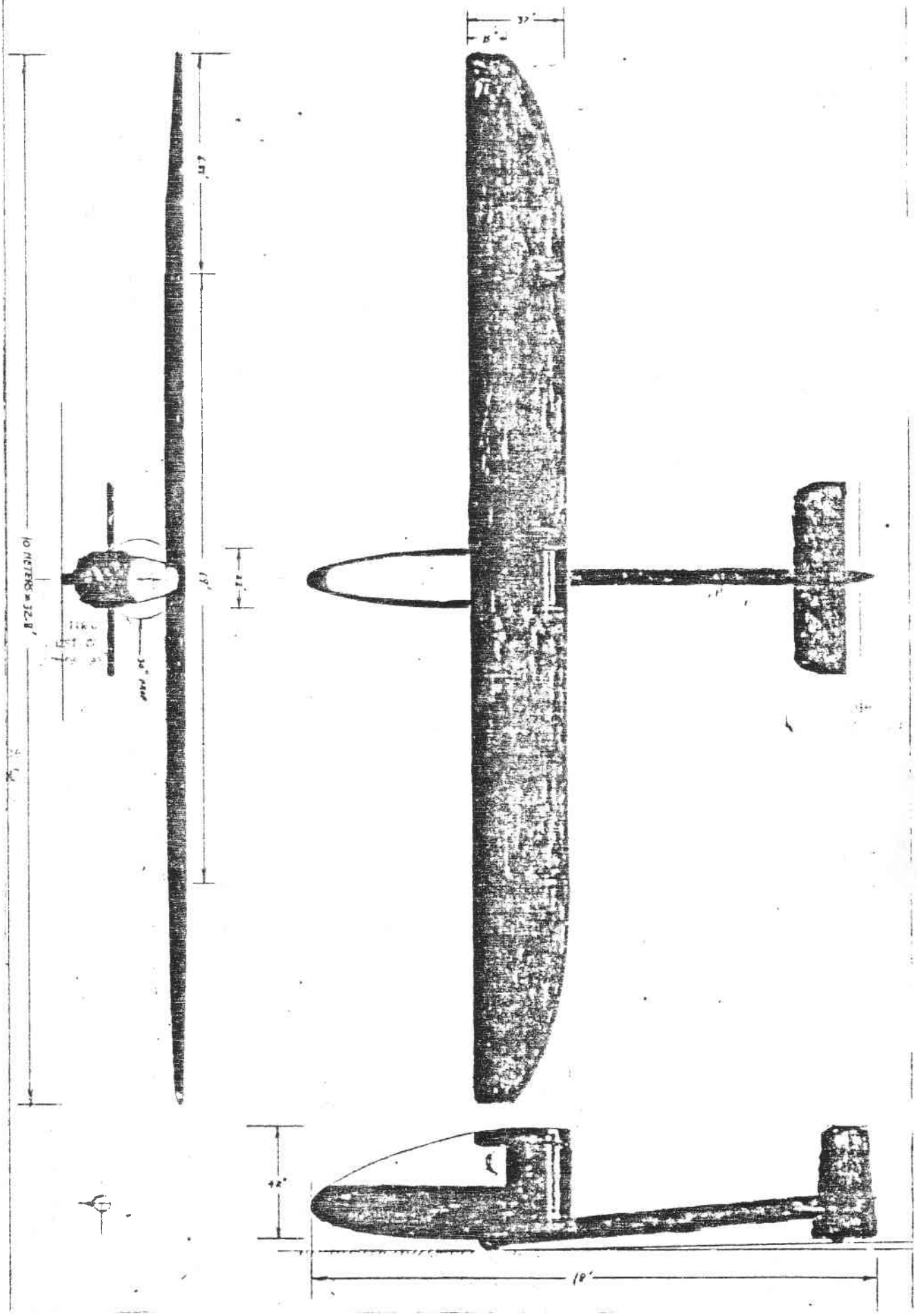
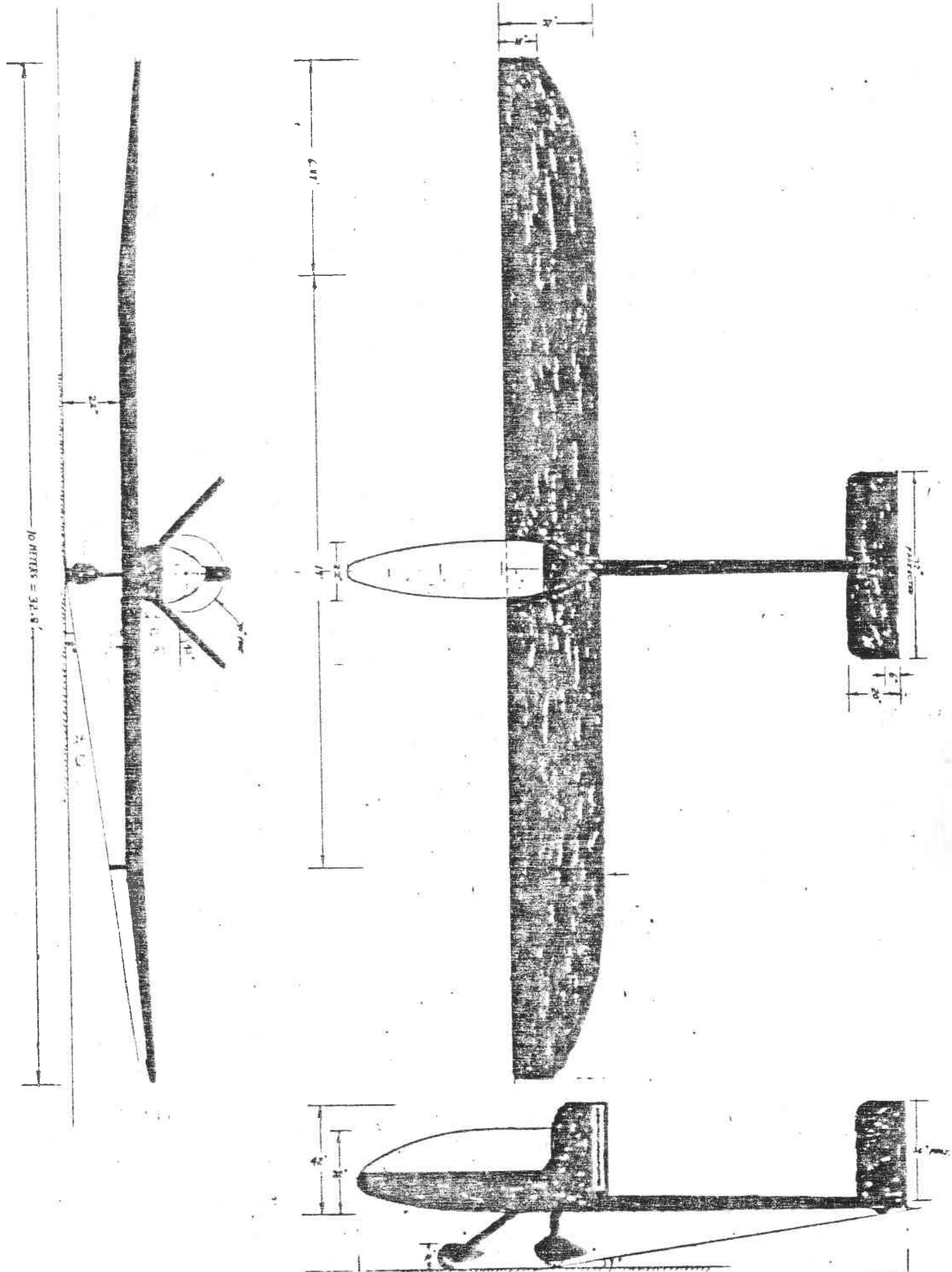


Figure 19.- Theoretical section characteristics for airfoil 748.

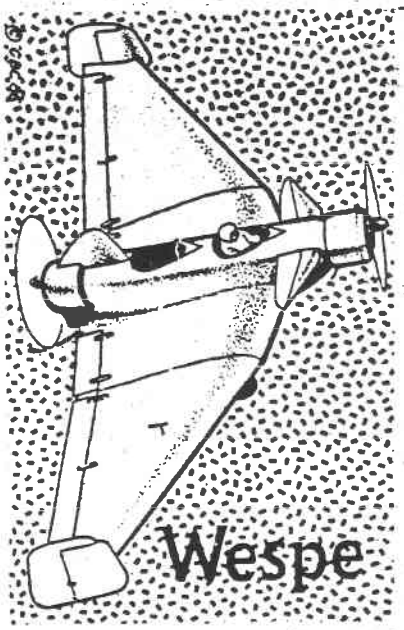



10 METERS = 32.8'

Capsule History No.29 WESPE

In 1924 under the German Ministry of Transport, the Rhön-Rossitten-Gesellschaft was responsible for soaring and gliding schools. Alexander Lippisch was director of its Aeronautical Department. Like Northrop in USA, Hill in England and later the Hortens in Germany he had a passion for the so-called "tailless" aircraft and was determined for it to become a successful and useful type of airplane. He built a whole raft of examples, both glider and powered versions with straight and mildly-swept wings. Flying qualities always proved poorly so that financial backing was difficult and few thought these odd airplanes were a worthwhile endeavor.

Nevertheless Lippisch kept turning them out, going through a number of test pilots and supplementing building activity with all sorts of theoretical studies. Maybe the laws of aerodynamics would relent and there would be no more problems which of course were all caused by the burning desire to eradicate the tail. By early 1932 a welcome build-order came from Fiesler Aircraft Company for a small two-seater with folding wings. They wished to enter the European Rally to be held later that year. A typical Lippisch "Delta" class airplane emerged named the Wespe (Wasp) carrying two Pobjoy engines in push-pull fashion. A small fin was quickly added over the rear engine, to bolster the weak directional stability provided by the wing-tip finnage, the rudders of which operated outwardly. Longitudinal stability and control were as usual- minimal.



However, ol' Al kept tinkering. Because of the need for adequate rear-propeller clearance, the airplane assumed an almost level attitude while on the ground. After a period of acceleration when the pilot raised the elevators to rotate, the CL actually diminished which then required a lot more speed before lift-off could be accomplished. So a small forward-wing with flaps was mounted, allowing a quicker ground-break.

But the fix, in turn, created another snag. The tiny wing acted like a slat to retard separation over the main-wing inboard-area. Consequently the tips stalled early. The resultant pitch-up was beyond the control power of the short-coupled elevators. The Wespe (also known as the Fiesler F-3) subsequently crashed and Fiesler Aircraft not unaturally suspended further sponsorship. After the Wespe and from 1933 to 1938 under the Hitler regime, tailless airplanes continued to be produced by Lippisch and his group in Darmstadt-Griesheim, though nothing of consequence resulted. Then, the impending war and its preparation provided money for a tailless fighter that would be a rocket-powered super-

glider with construction to be done by Heinkel in Warnemünde although the airplane eventually known as Me163 was designed largely by Lippisch and his people who had moved to Messerschmitt A.G. in Augsburg and where production took place.

Though a spectacular climber, the 163 had an extremely narrow operating and strategic envelope. Its Walter motor used a highly dangerous fuel and the whole effort scored little success. Of the 279 Me163 aircraft built, only 25 percent achieved anything resembling military action.

It is difficult to abandon a dream even if it is finally conceded as impractical. Certainly Lippisch had given it a good long try. While he was reluctantly designing greater and greater sweep (and twist) into the wings of his beloved "tailless" as the sensible way to bring about adequate longitudinal stability and pitch control, logic again prevailed and the idea was born of closing the space between the highly-angled wings. This allowed the placing of a sufficiently aft-located central-fin for more acceptable directional stability as well. In 1943 he left Germany and the 163 project to work on his new concept in Vienna. Shock-wave delay and drag reduction were features of the developed wing-form, which had assumed the long-used Delta name. Lippisch finally had a winner. It was to prove most valuable with many applications in world civil and military aviation

from newsletter of Camarillo EAA Chapter 723 dated 11-86

Cover Art by Ed Leiser

All efforts to duplicate John Montgomery's claimed controlled flight in 1883 have ended in failure. Early rogallo types were able to glide when copies of the 1883 machine were unable to leave the ground.

TWITT Meeting
Brad Powers speaking

Henry Jex
Gossamer and Northropi
controls

Load testing Mitchell U-2

THE PROGRAM FOR SEPTEMBER 19th

Karl SANDERS will discuss Alexander Lippisch's landmark paper, "The Development of Tailless Airplanes." The paper covers Lippisch's work up to WW II. It was translated into English by the US Government's technical intelligence teams after the War, but copies are available only through the Library of Congress at considerable cost. Even the original German paper, like many wartime publications, is hard to get in this country. The TWITT library has a copy of an abstract, in German, from the proceedings of the German Academy of Aeronautics.

Don Westergren
1/33 scale shuttle

Luau after TWITT meeting
Bob Fronius, Phillip Burgers,
Joe Price