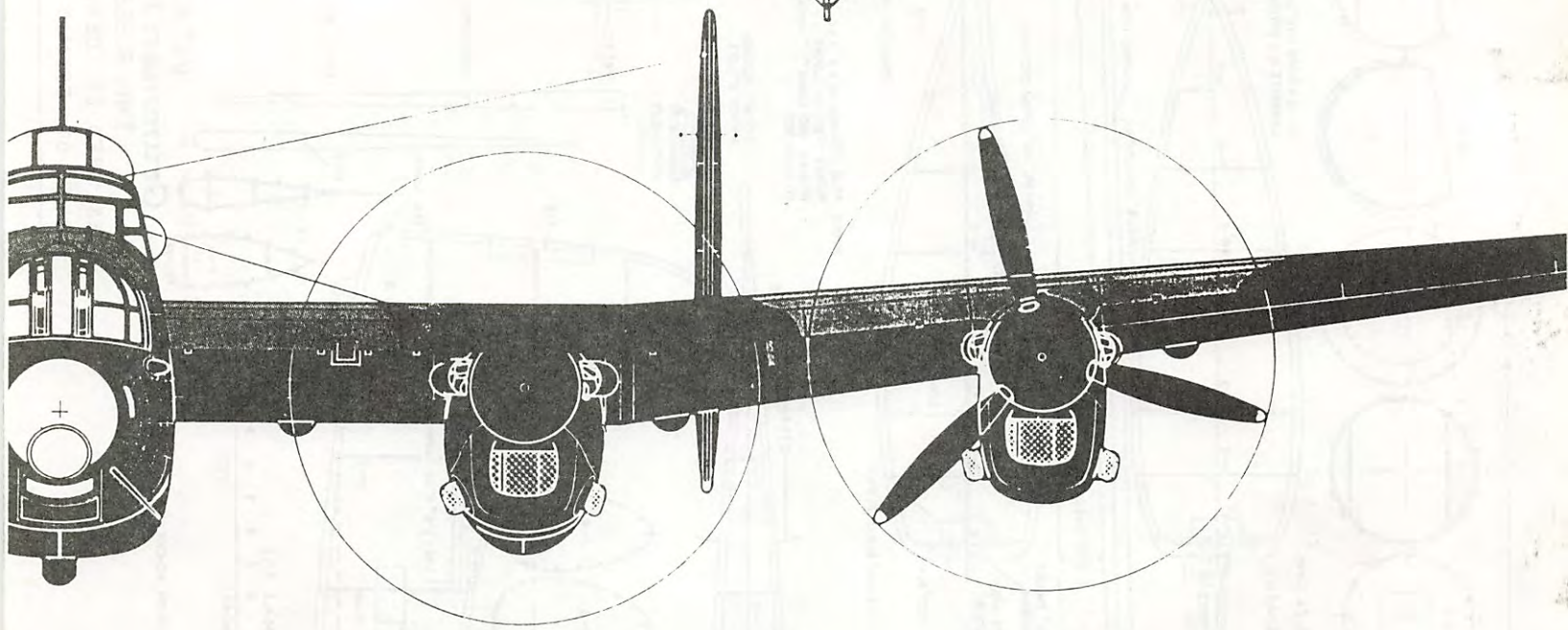
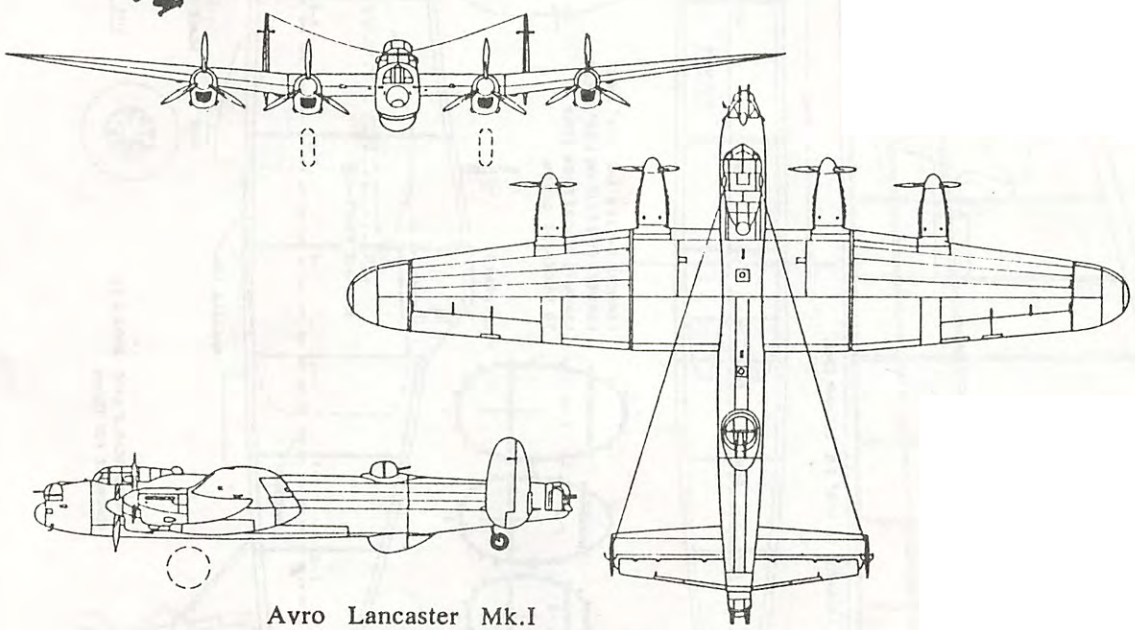
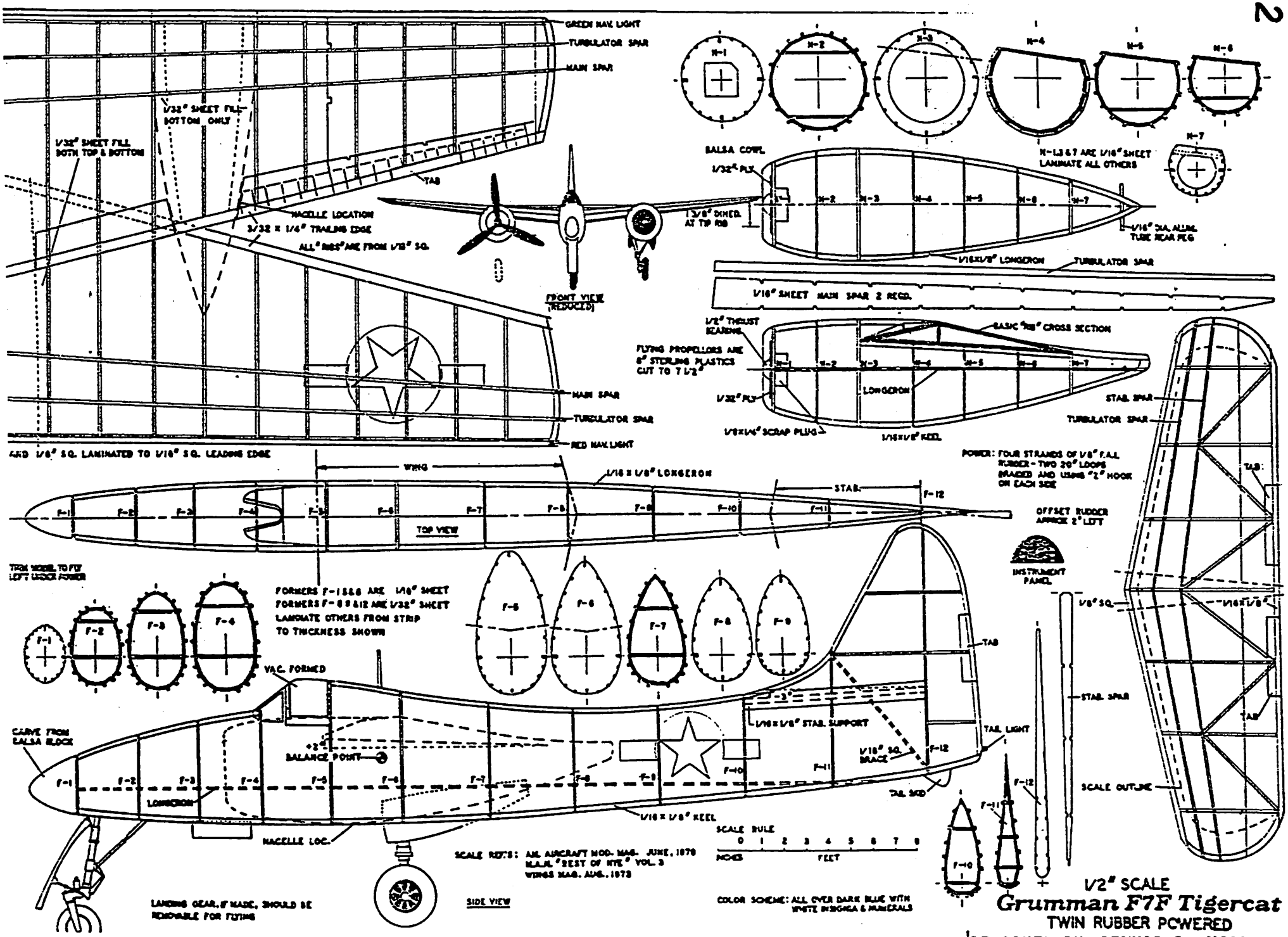
CROSSWINDS 78



RM 1930
ARGO-TECH
23555 EUCLID AVENUE
CLEVELAND, OHIO 44117



Avro Lancaster Mk.I



1/2" SCALE

Grumman F7F Tigercat

TWIN RUBBER POWERED

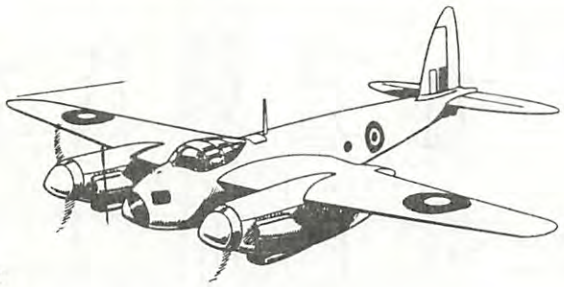
DESIGNED BY: DENNIS O. NORMAN

DRAWN BY: DENNIS O. NORMAN

CROSSWINDS

THE JOURNAL OF THE CLEVELAND FREE FLIGHT SOCIETY 2nd 29

ISSUE NO. 78



THIS ISSUE'S EDITOR:

DENNIS O. NORMAN
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EDITORIAL COMMENT:

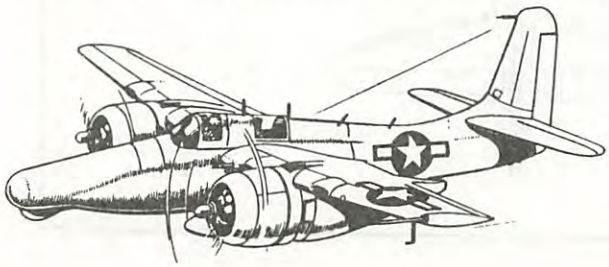
Why do people climb mountains? The classic answer, of course, is "because they are there." Something in human nature (or perhaps in the nature of some humans) triggers the impulse to climb, to cling to the craggy slopes, to defy gravity and "common" sense and ascend ever higher to the lofty peaks.

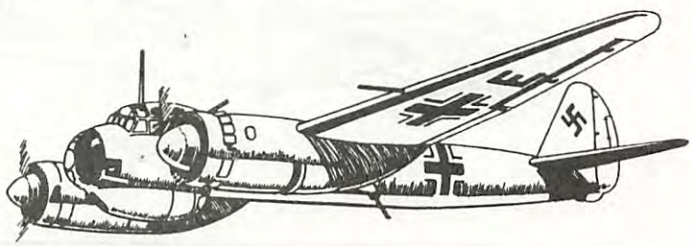
I confess I have never done any mountain climbing, but I suspect that before the first step is taken the mountain climber is inspired by the thought of the peak and of the personal satisfaction to be savored in reaching it. Surely, the climber's spirit and imagination soar to the pinnacle before the first step is taken to reach it. No doubt the continuing thought of reaching the pinnacle inspires the climber to persist even in the face of fatigue and impending exhaustion. It is the goal, the peak, that beckons, that inspires, that draws the climber's spirit and body ever higher.

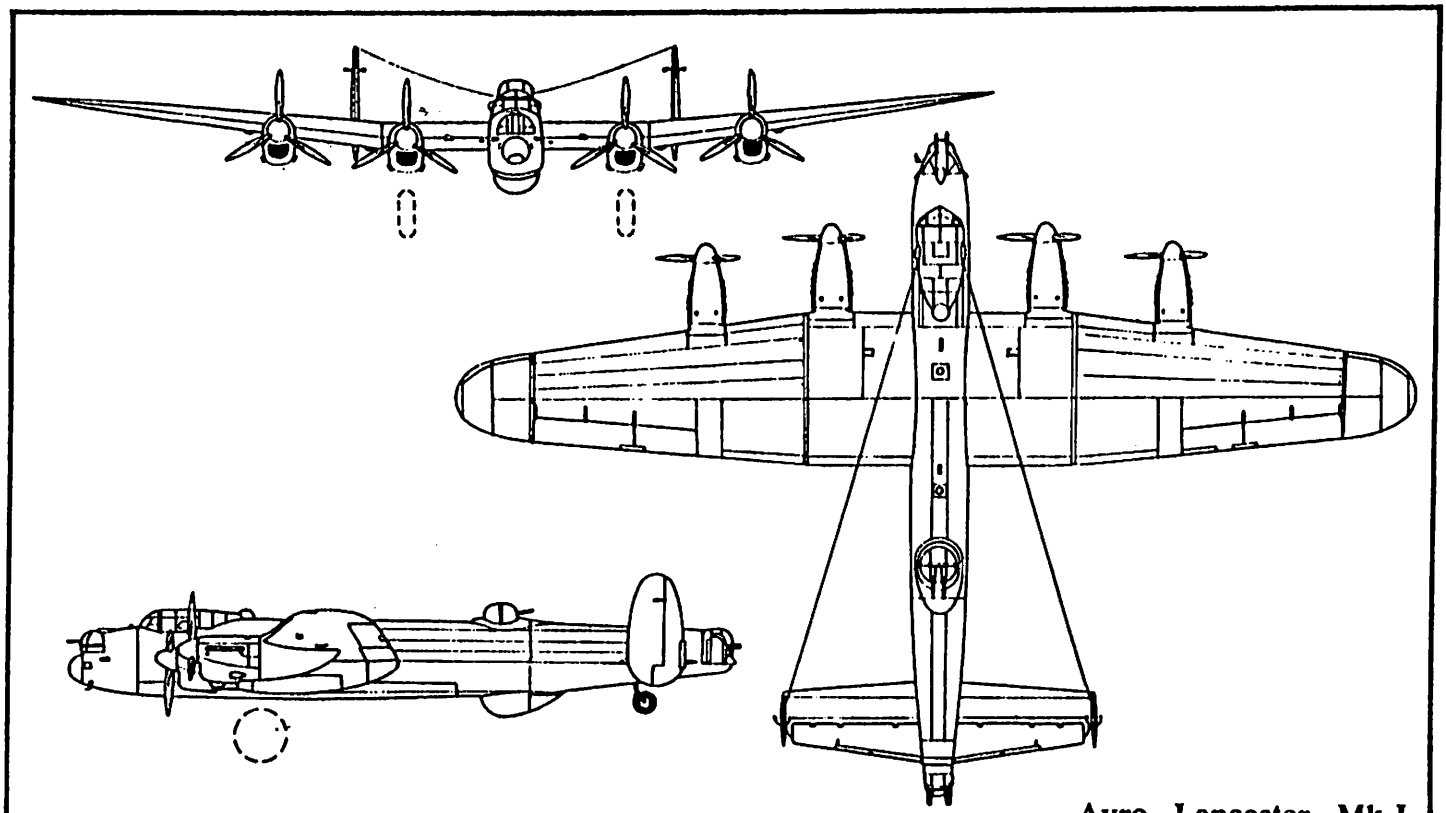
What does all this have to do with building model airplanes? Just this: there is a whole, mountain like, range of challenges, achievements, and satisfactions to be mastered even in the area of scale free-flight modeling. The creation of realistic replicas of jets, of helicopters, of flying wings and of multi-engine subjects are but a few of the "mountains" challenging the spirit and designing skill of the modeling community.

When we stop to think that not so many years ago most of us were intimidated by the thought of building a low wing subject, it is indeed exciting to realize progress that has been made. Multi-engine subjects are appearing in ever increasing numbers. In this issue we will share some of the dreams and achievements of four multi-engine free-flight designers: Tom Arnold of California, Dick Howard of Arizona, Charles Newman of England, and myself. Each of us has been inspired at the thought of creating good performing multi-engine rubber powered scale models. Unlike the mountain climbers, our inspirations existed not in external realities, but in internal dreams. Our efforts to bring those dreams into reality has been a spiritual exercise not unlike that of mountain climbing. All four of us have accepted the challenge and four of us have known the exhilarating joy of success. We also know that, like mountain climbing, designing and building of multi-engine rubber-powered scale subjects is not for everyone, but those of you who have witnessed our flights know the uniqueness of the joy and achievement that they represent. We welcome you to join us in our continuing efforts to design and successfully fly even more multi-engine subjects.

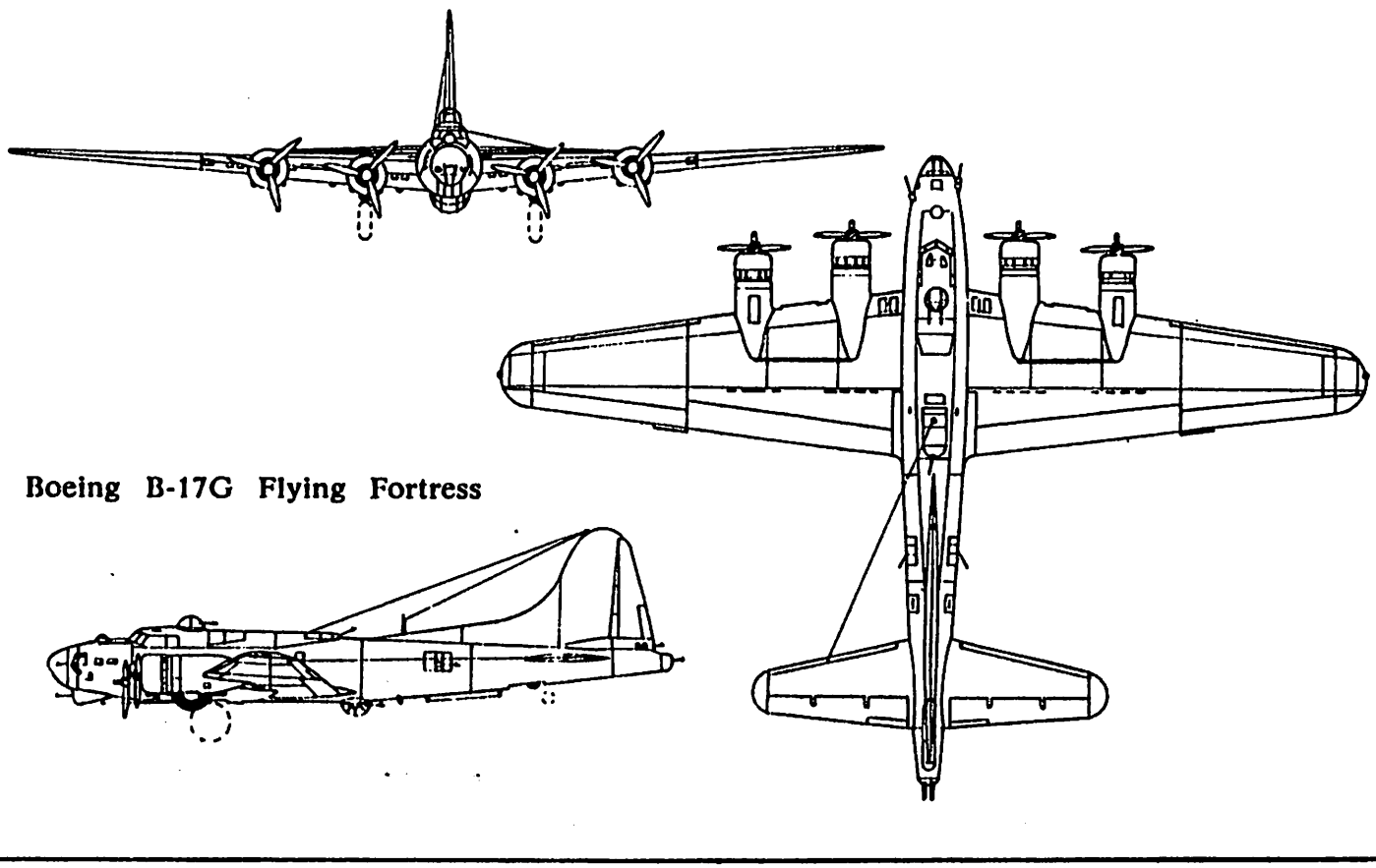
Why do people build multi-engine rubber-powered scale models? Not "because they <u>are</u> there," but because of the dream that they <u>can</u> <u>be</u> there with creative effort.



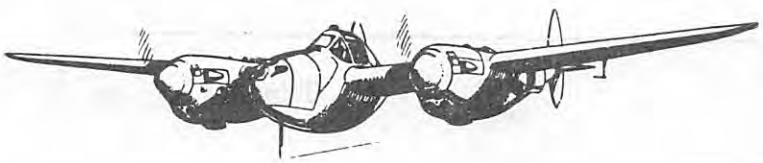




Avro Lancaster Mk.I



Boeing B-17G Flying Fortress





THE SHARING

Earlier this year, Charles A. Newman (whose mailing address is 37, Crown Road, Wheatley, Oxon, OX9 1 UJ, England) wrote me a letter which served as a stimulus for this issue of Crosswinds and for the exchange of letters upon which this article is based.

In his first letter to me, Newman said, in part,
"I have been corresponding with Tom Arnold and Dick Howard of the Scale Staffel, and they have been good enough to pass on your address. Like them, I have had a long interest in multi-engined scale models, having built a good many over the last few years. To date, all my output has been twins, but there are various subjects with four engines that I would like to tackle, and as the only person with a four-engined model that really performs well, I would like to pick your brains a little, if I may."

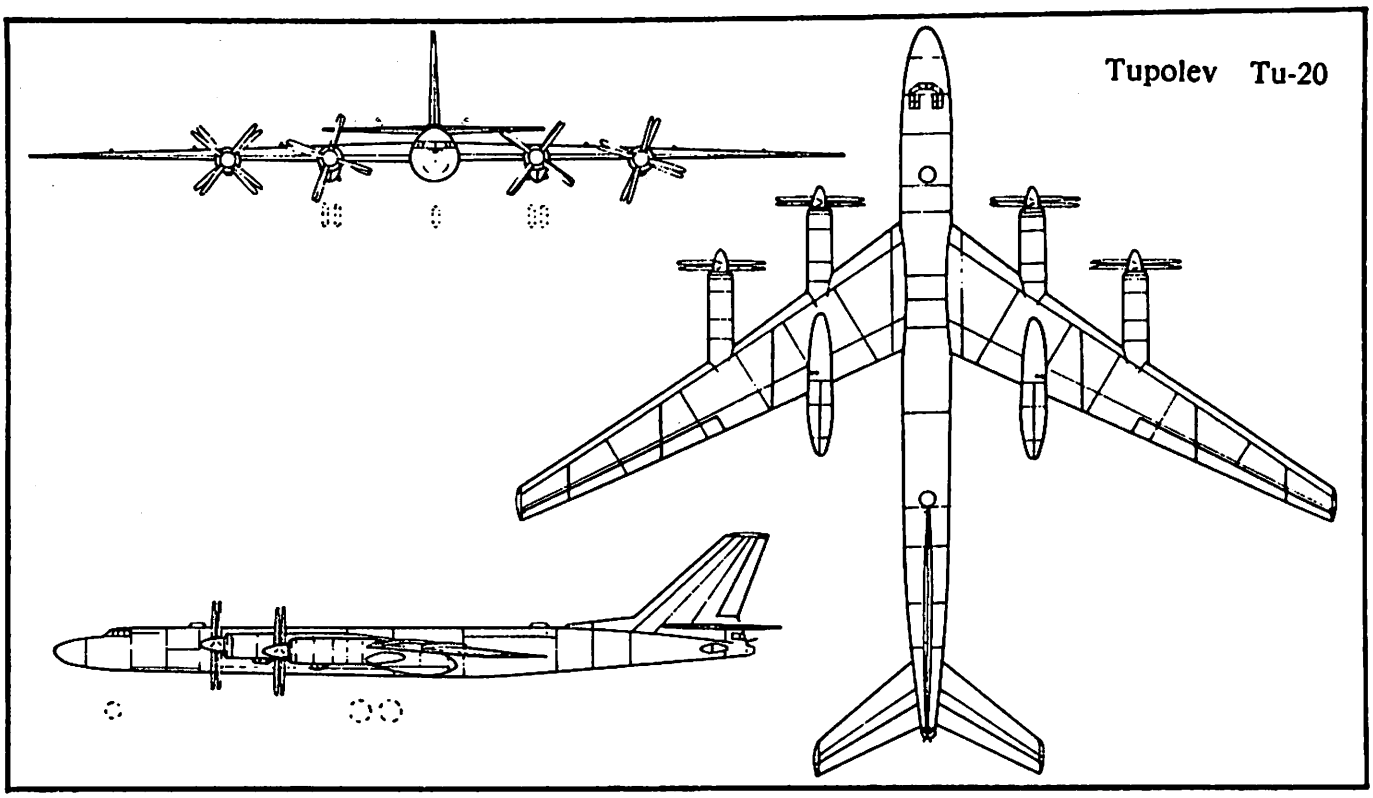
Newman went on to ask for details concerning the Lancaster and the B-17. Newman then went on to say:
"Tom also tells me that he thinks that you have a plan available for the Lancaster. If so, would it be possible to let me have a copy? If there is anything that I could send over from the UK in return, I would be more than pleased to reciprocate. Incidentally, I have a copy of your fine F7F plus an ancient copy of your Mosquito--you certainly have come a long way over the years, and that Lanc is a wonderful achievement!"

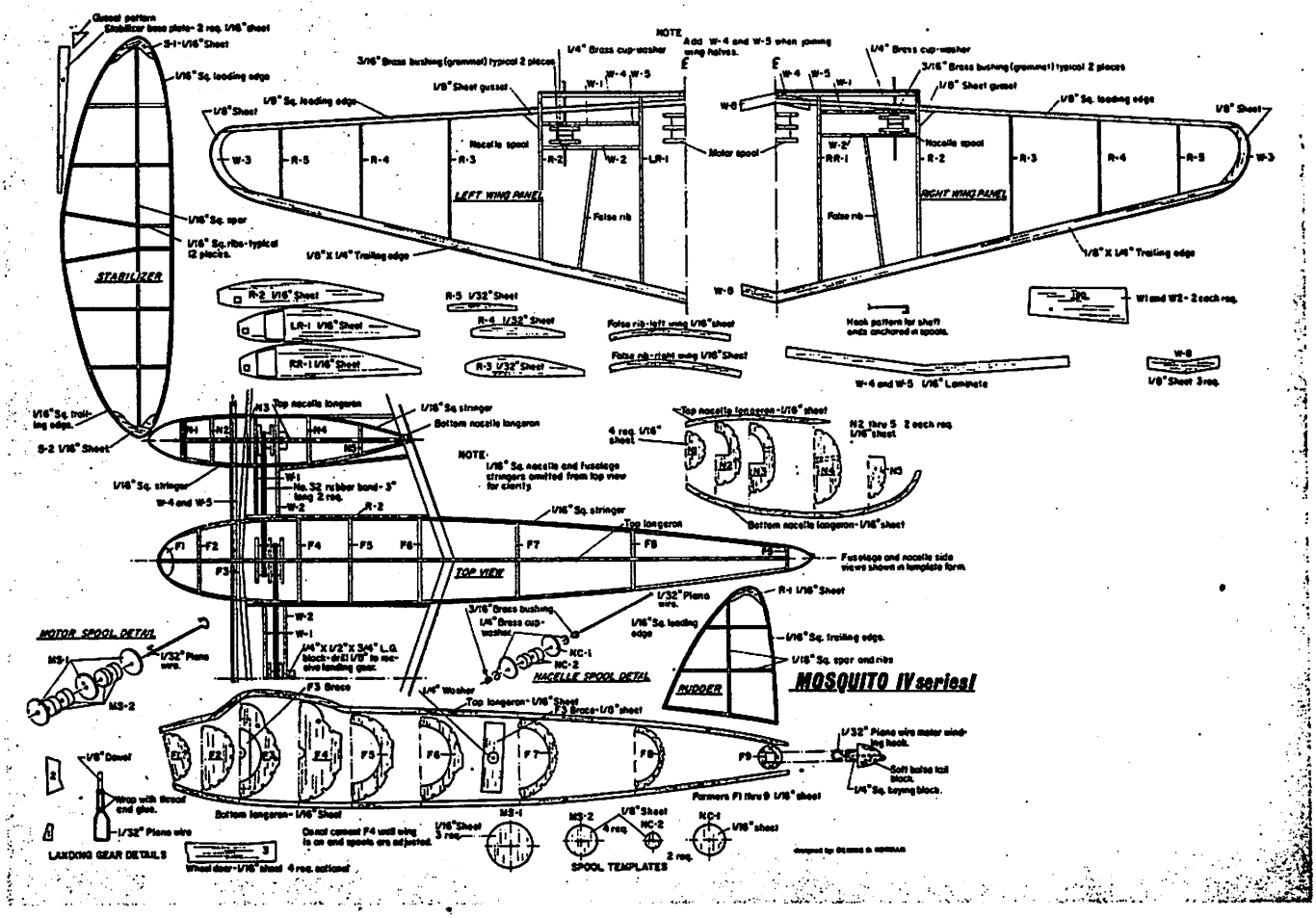
"Do get in touch, as I often feel as a 'twins' freak, that we all are so far from the next twin fan, we might as well be operating on Mars! I was really pleased when Tom wrote to me, and large packs of stuff have been criss-crossing the Atlantic ever since. It keeps the airlines in business if nothing else!! I enclose a shot of one of the recent models, the Breguet 693, taken at the Model Engineer Exhibition in January. Model is 42" span and has not flown yet due to the famed English weather. Subject to successful flight tests, I will be doing plans for this model and will send you a copy of you wish."

Newman's charming letter prompted a lengthy reply from me which I summarized my multi-engine rubber-powered scale efforts over the last 27 years. For whatever use it may have, I will quote my reply to Newman at length:

"Your letter of March 15, 1987 was a delightful surprise. I immediately recognized your name because of the excellent article that you wrote on "Rubber-Driven Scale Twins" for the October, 1985 Aeromodeller magazine. It is a classic and one of my treasures."

"My first venture into multi-engine, rubber-powered scale modeling was in 1960 when I built a Comet P-38 which I finished in British markings. The model did not fly particularly well due mostly to my lack of sophistication in trimming. Ultimately, my attempts to fly it ended disastrously with the model being in five pieces as the result of a brutal crash. It was an early lesson in the importance of having a strong spar between the relatively heavy motors of a multi-engine subject as the mass involved tends to stay in motion when the rest of the model is suddenly stopped (sounds like a basic physics lesson, doesn't it?)


Tupolev Tu-20


MOSQUITO IV series!
LEFT WING PANEL
RIGHT WING PANEL
STABILIZER
TOP VIEW
RUDDER
MOTOR SPOOL DETAIL
NACELLE SPOOL DETAIL
LANDING GEAR DETAILS
SPOOL TEMPLATES
NOTE
Add W-4 and W-5 when joining wing halves.
NOTE:
1/16" Sq. nacelle and fuselage stringers omitted from top view for clarity
Fuselage and nacelle side views shown in template form.
W-4 and W-5 1/16" Laminate
Hook pattern for shaft ends anchored in spools.
Bottom nacelle longeron-1/16" sheet
Bottom longeron-1/16" Sheet
Formers F1 thru 9 1/16" sheet
Soft balsa tail block.
1/4" Sq. baying block.
Wrap with thread and glue.
Wheel door-1/16" sheet 4 req. optional

and the results are disastrous for anything less than a strongly built main spar."

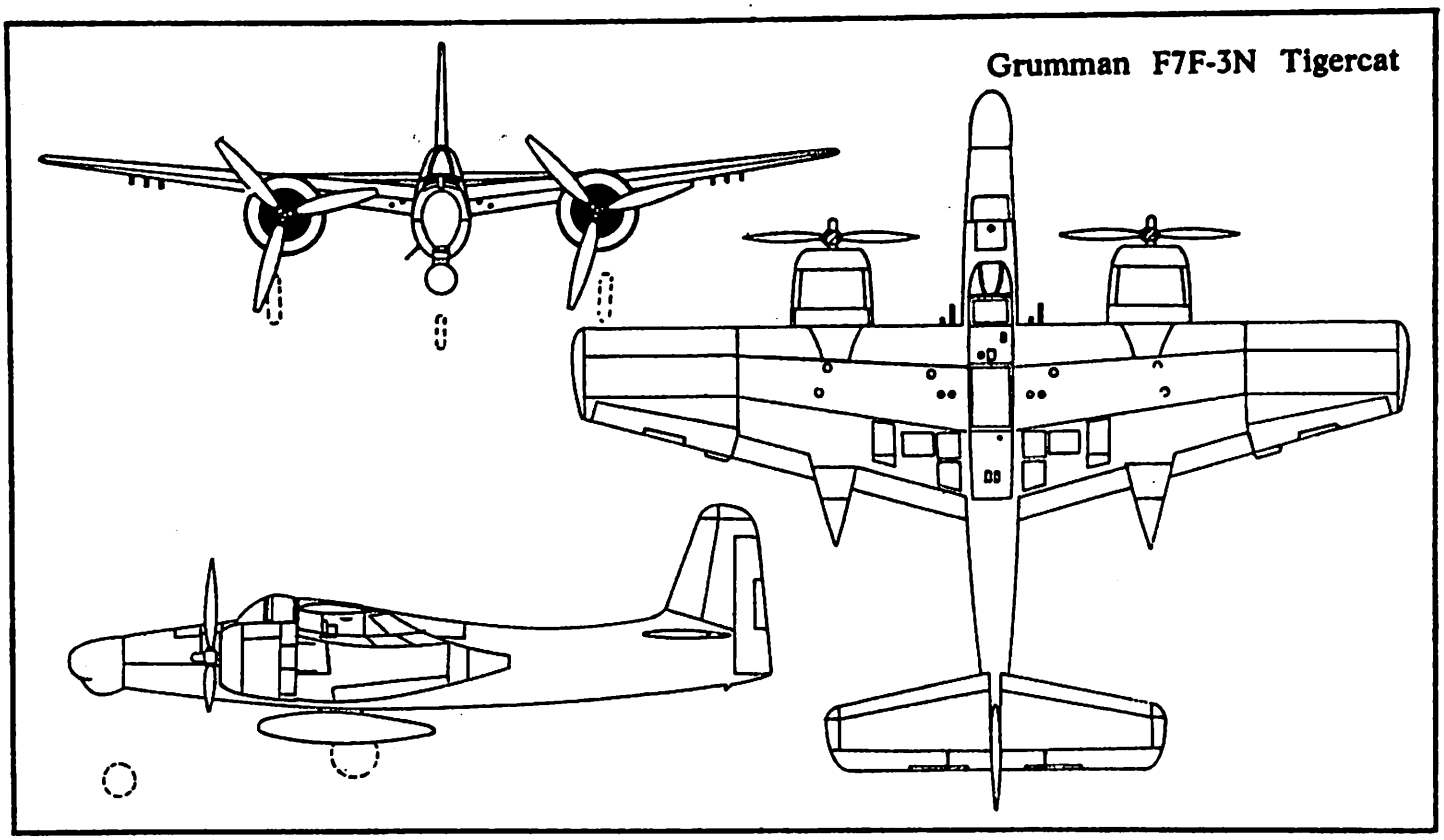
"In 1966, I began experimenting with rubber-powered, twin-engine subjects which contained the rubber motor in the fuselage and transmitted the power from it to the nacelles via balsa pulleys. My first effort was a Ju 188 which flew more like a weakly propelled glider than anything else and had a discouraging tendency to break up with the wing separating from the fuselage at the slightest provocation. The pulley concept appeared to have some merit, however, and I next incorporated it into a small Mosquito which was published in the December, 1966 issue of Model Airplane News. The Mosquito did fly better than the Ju 188, but the inefficiency of the propulsion system again produced little more than a powered glide."

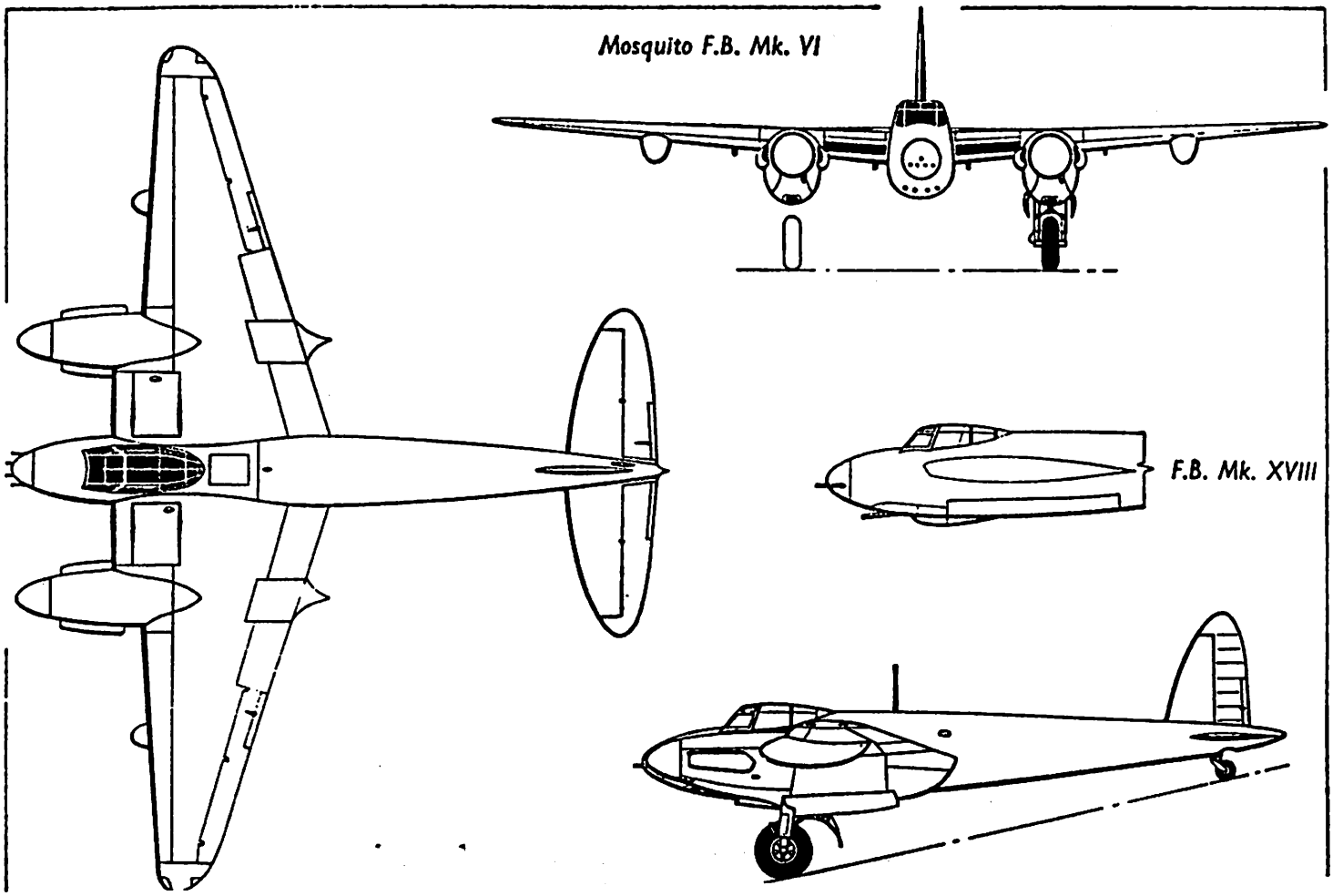
"In 1969, I drew up a plan for a one-half inch scale (1:24) Caproni Ca 5 which, of course, is a biplane with two tractor propellers in booms and one pusher propeller in a centrally placed crew nacelle. The Caproni remained a fanciful plan until 1974 when I built the model. It was an exciting subject to look at, but I was never able to get it to fly well, owing both to its configuration and my limited understanding of the fine art (science?) of trimming a free-flight subject. The old Caproni did cause quite a stir, however, and it now rests proudly at the Museum of the Academy of Model Aeronautics in Reston, Virginia. There are times when I wonder if I now know enough about trimming free-flight subjects to make a Caproni that would fly, but I have not found the time to build another."

"In 1978, I designed and built my first really successful rubber-powered, scale twin in the form of my F7F Tigercat. You are, of course, aware of that model. It routinely gave flights of a minute or more in duration and, on one occasion, flew for nearly five minutes before disappearing over deep woods. It lay in those woods for almost three months before I found it and, surprisingly enough, it suffered only minimal damage even though it was subjected to several torrential rainstorms."

"My first four-engine subject was a Tu 20 "Bear" which was built in 1980 and first flown at the Flying Aces Nationals held that year at Wright Patterson AFB near Dayton, Ohio. The "Bear" had a five-foot span and, at its best, rose to an altitude of only 10-12 feet and flew for only 10-12 seconds. Two years later, the "Bear" was badly damaged when its right wingtip struck the ground in a low altitude roll just after launching. The formidable leverage forces broke the wing at its center and also destroyed that part of the fuselage at



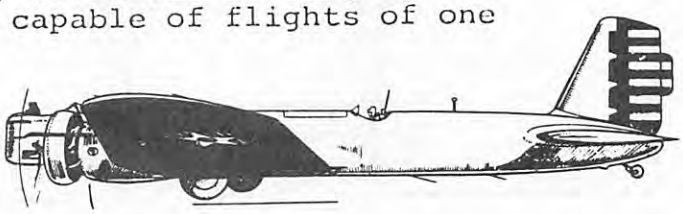

Grumman F7F-3N Tigercat

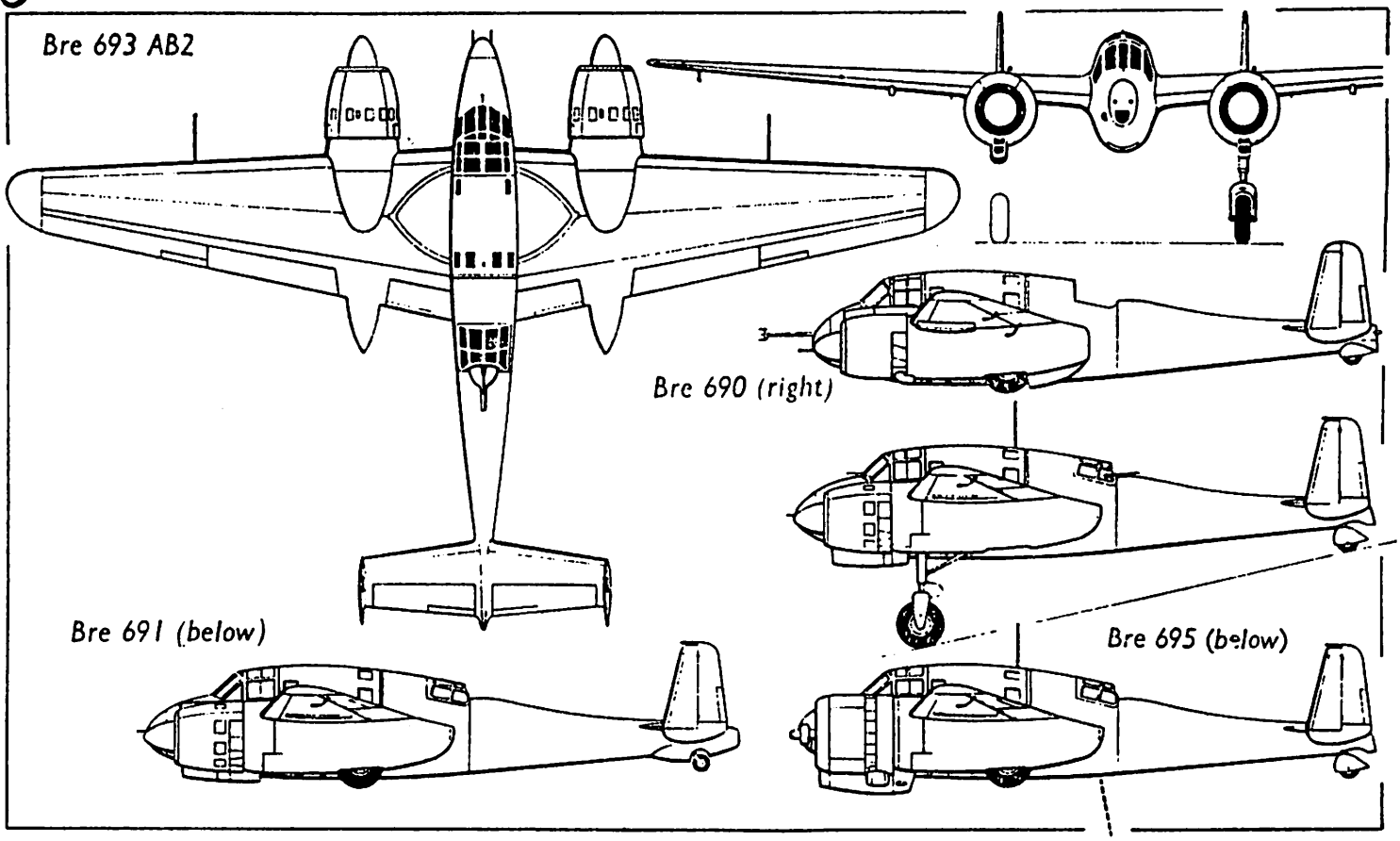

Mosquito F.B. Mk. VI
F.B. Mk. XVIII

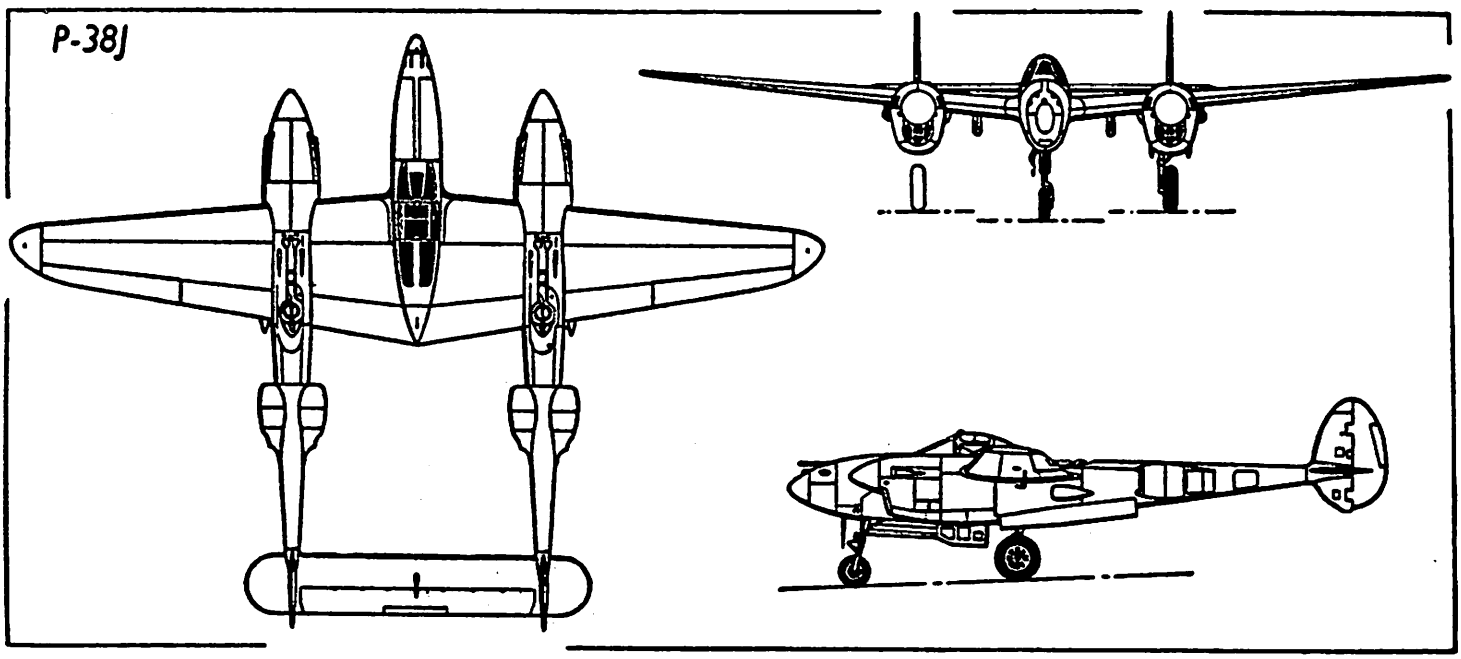
the wingroots and left me with a "Bear" in four pieces. I have kept those pieces, however, and hope to rebuild the "Bear" eventually."

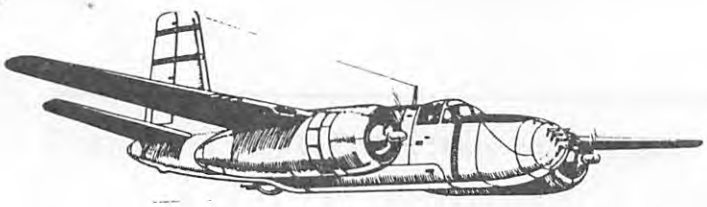
"In 1984, I took the lessons from the "Bear" and its predecessors and designed the Lancaster which makes use of a strong main spar of triangular section for the wing and which also makes use of a strong torsionbox which runs the length of the fuselage. There is the ancient maxim of "keep it light" which, of course, is the key to good performance in rubber-powered scale modeling. By 1984, I found myself competing indoors with superb craftsmen such as Jack McGillivray of Toronto, Canada and Vic Peres of Erie, Pennsylvania, both of whom obtain spectacular results from a minimum use of materials in the structure of their models. I developed a Zen-like craving for lightness which led me to several experiments in design, but the most fruitful of these was based upon an article which I read in a ship modeling magazine which explained a technique for constructing a model rowboat through the use of a waxed male mold carved to the dimensions of the inside of the rowboat with the boat's structure then being laminated over the mold and separated from it upon completion. I have read books and magazines on rubber-powered scale modeling going back to the beginning of the subject and, yet, I have never seen any designer make use of undersized, wax, male molds for the construction of the fuselages and nacelles for rubber-powered scale subjects. The successful use of this technique in the Lancaster is one of the keys to that model's success and, I believe, is one of the keys which will make it possible to construct numerous other high-performing, rubber-powered scale models whether they be of single or multi-engine configuration. Carl Wheeley, publisher of Model Aviation magazine, the official publication of the AMA has called the Lancaster a "landmark" model and Hurst Bowers, curator of the AMA Museum in Reston, Virginia, has asked to have the Lancaster prototype for the museum. It is heady stuff to receive such accolades, but even better than that it is personally gratifying to me to think that I have made a significant contribution to rubber-powered scale design and performance. The Lancaster should appear in the June, 1987 issue of Model Aviation, but I am sending you a copy of the construction article for your immediate reference. A reduced copy of the Lancaster plan is to be printed with the Model Aviation article and full-sized plans will be available from the AMA in the near future. At this point, I have only one blue-line copy of the master plan done for AMA. I have not sent it along with this letter, but am willing to mail it to you by separate post if you desire."

" The Lancaster has, thus far, flown for as long as 45 seconds and I believe that it is capable of flights of one




Bre 693 AB2
Bre 690 (right)
Bre 691 (below)
Bre 695 (below)


P-38J



minute or more. I have set 60 seconds as my target for the model and once I have obtained that time with witnesses, I will consider "retiring" the Lancaster to the AMA Museum. The B-17 "Flying Fortress" was designed along the lines of the Lancaster and was constructed by several members of our club (The Cleveland Free Flight Society) last year. Unfortunately, the B-17 has proved to be considerably heavier than the Lancaster and has, thus far, given us only flights in the 10-12 second range, again at low altitude. The B-17 appears stable, however, and we intend to continue flight testing in 1987. I have given it some thought, and I believe I can build a much lighter (and better performing) B-17, but the press of other matters has delayed my efforts."

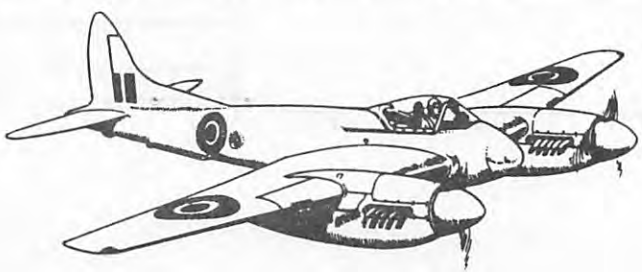
" Your Breguet 693 is a strikingly handsome model and should, I think, be a good performer. Have you considered detailing the cockpit? There is nothing like a fully-furnished "front office" complete with crew to add that spark of realism for static display!"

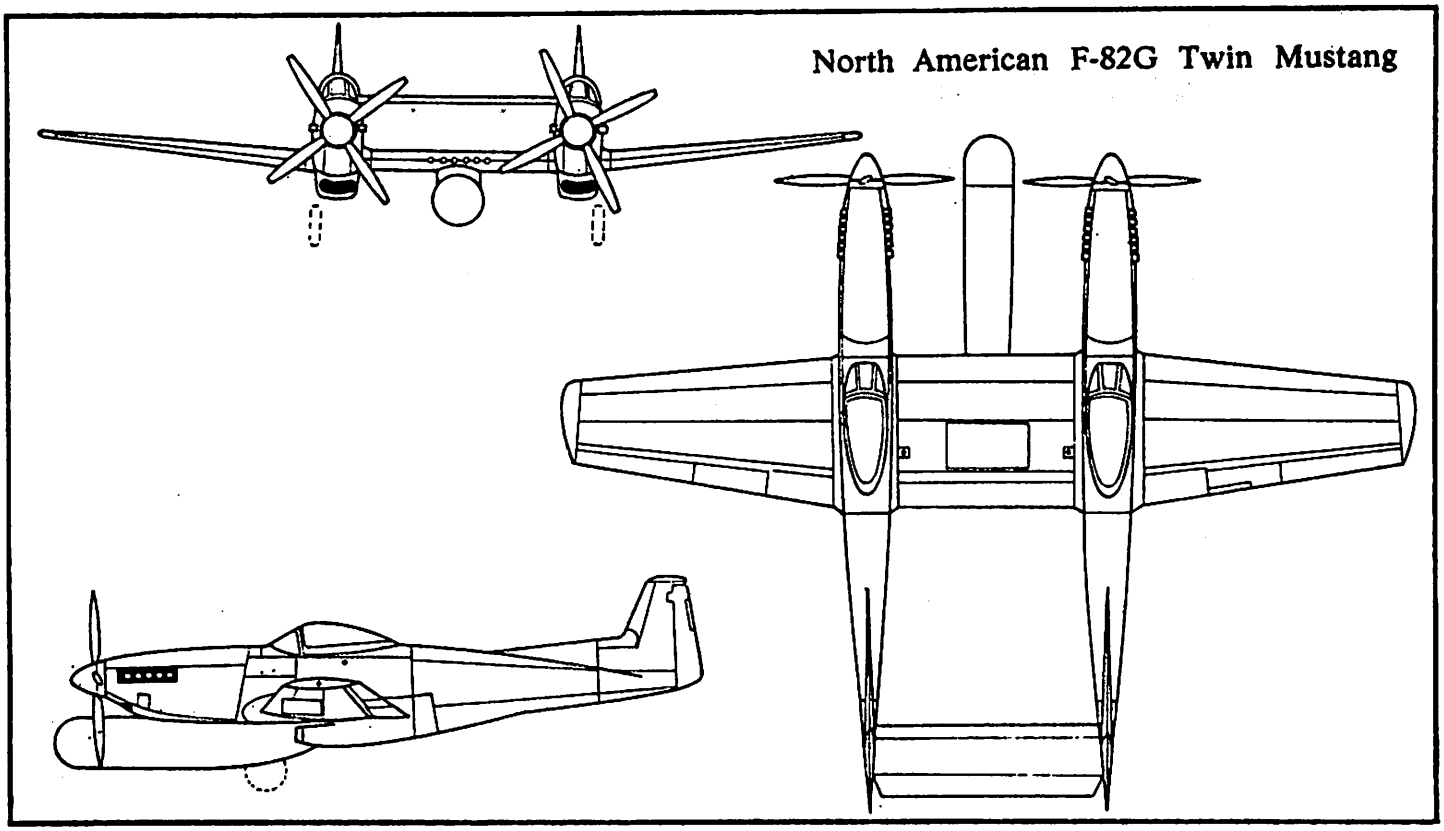
"P. S. I failed to mention it, but a third "key" to the success of the Lancaster design is the use of detachable wingtips which, if struck, separate from the model rather than transmitting the impact forces to the wingroot. That idea, of course, is not an original with me. I first read about it in Ron Moulton's book Flying Scale Models which I purchased shortly after it was first printed in 1956."

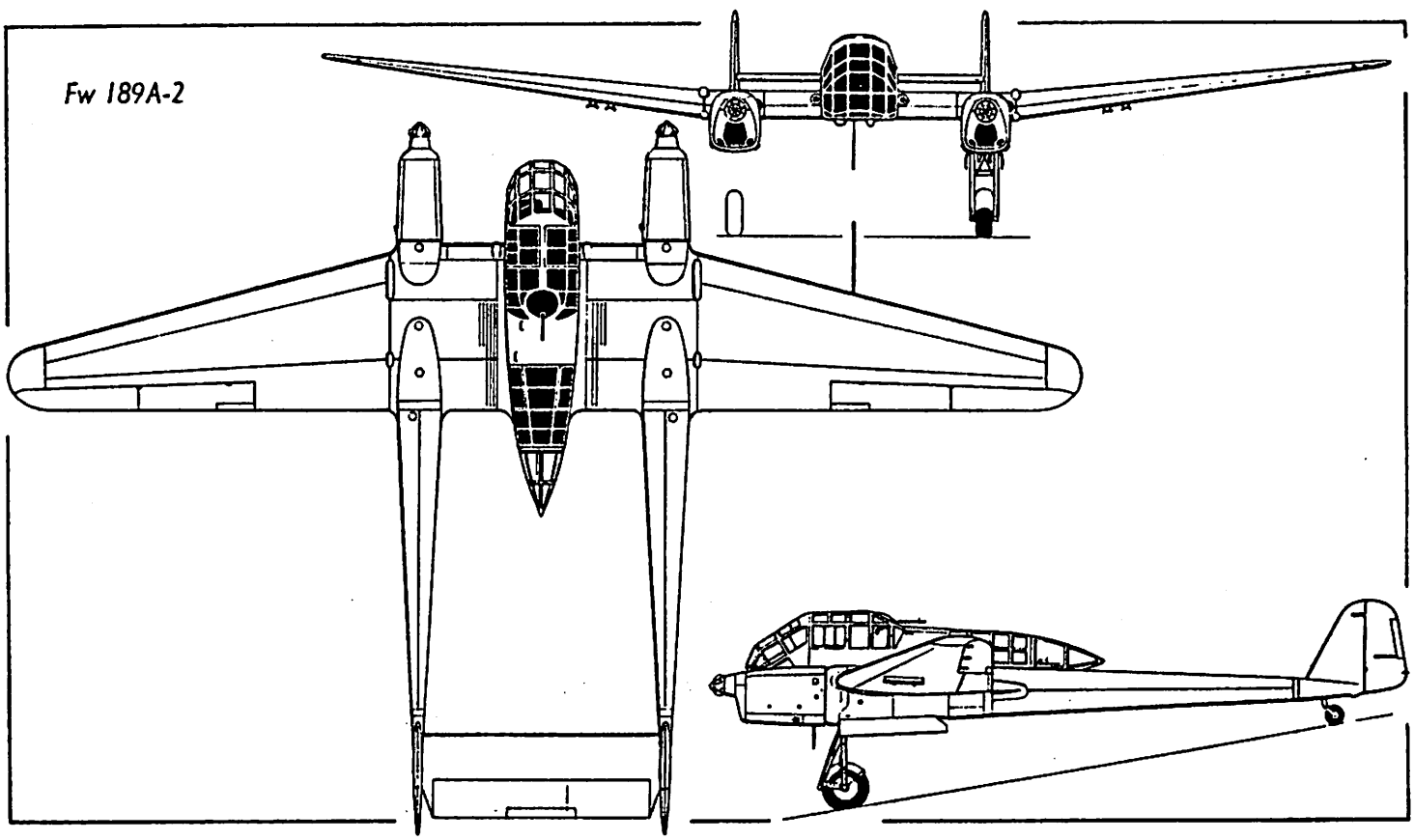
Shortly after receiving my letter, Newman replied at length saying:

"Thanks very much for the kind letter that I received the other day. Whilst I am indebted to you for your comments re my twins article, I feel that I should point out that there is nothing particularly earth-shattering in it, merely a number of home truths based on first-hand operational experience. As you yourself have found, the key to success is simplicity and light weight: your wonderful Lancaster is the best example I can think of to illustrate this. It comes as no surprise that the AMA wants the model for their collection though may I suggest that you get a good video record of the model in the air before you retire it, both for your own benefit and that of the AMA. However, enough of this mutual admiration society!!"

"The construction article is very fascinating. In fact, my colleague Richard Falconer has used the waxed wooden mould system for free flight models, his Saab J. 21 having twin booms made this way, though in thin laminated sheet. He too, is an advocate of tongue-in-box outer wing panels. Personally, I have only




North American F-82G Twin Mustang

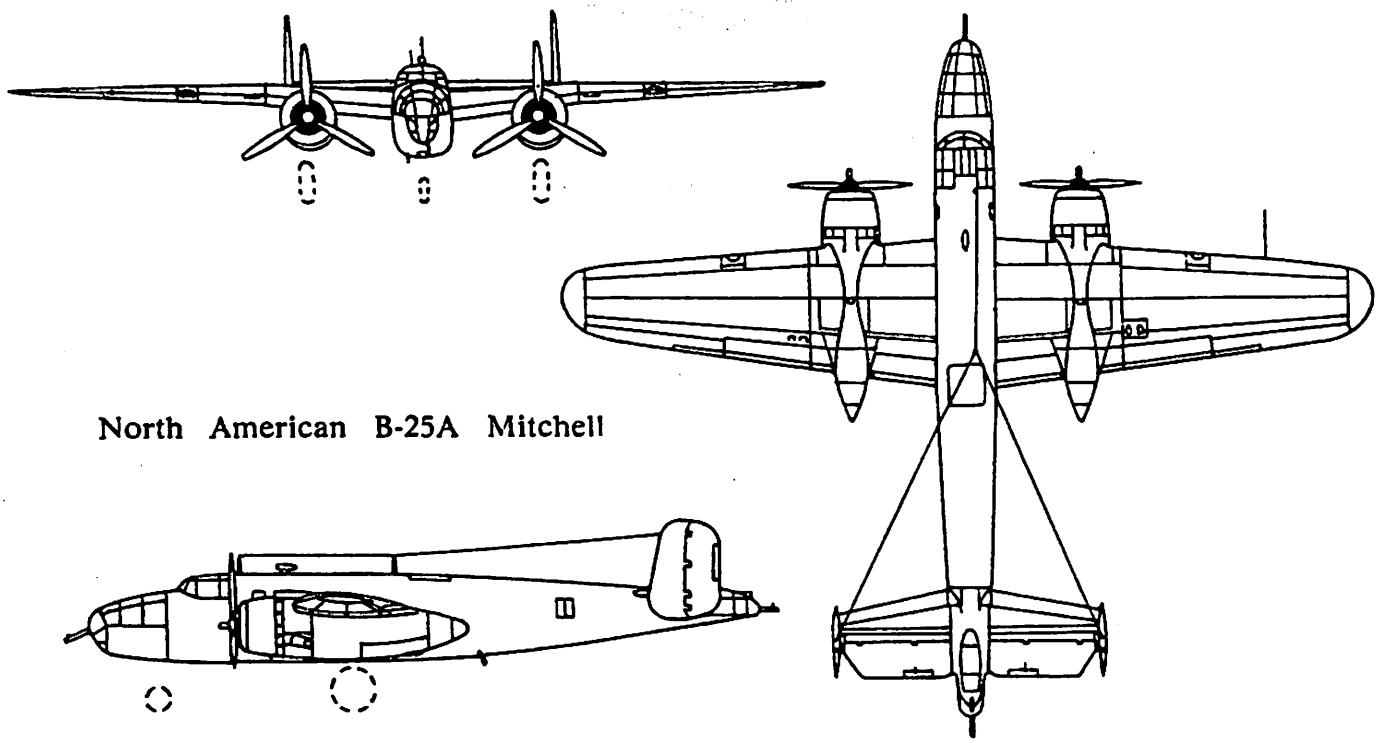

Fw 189A-2



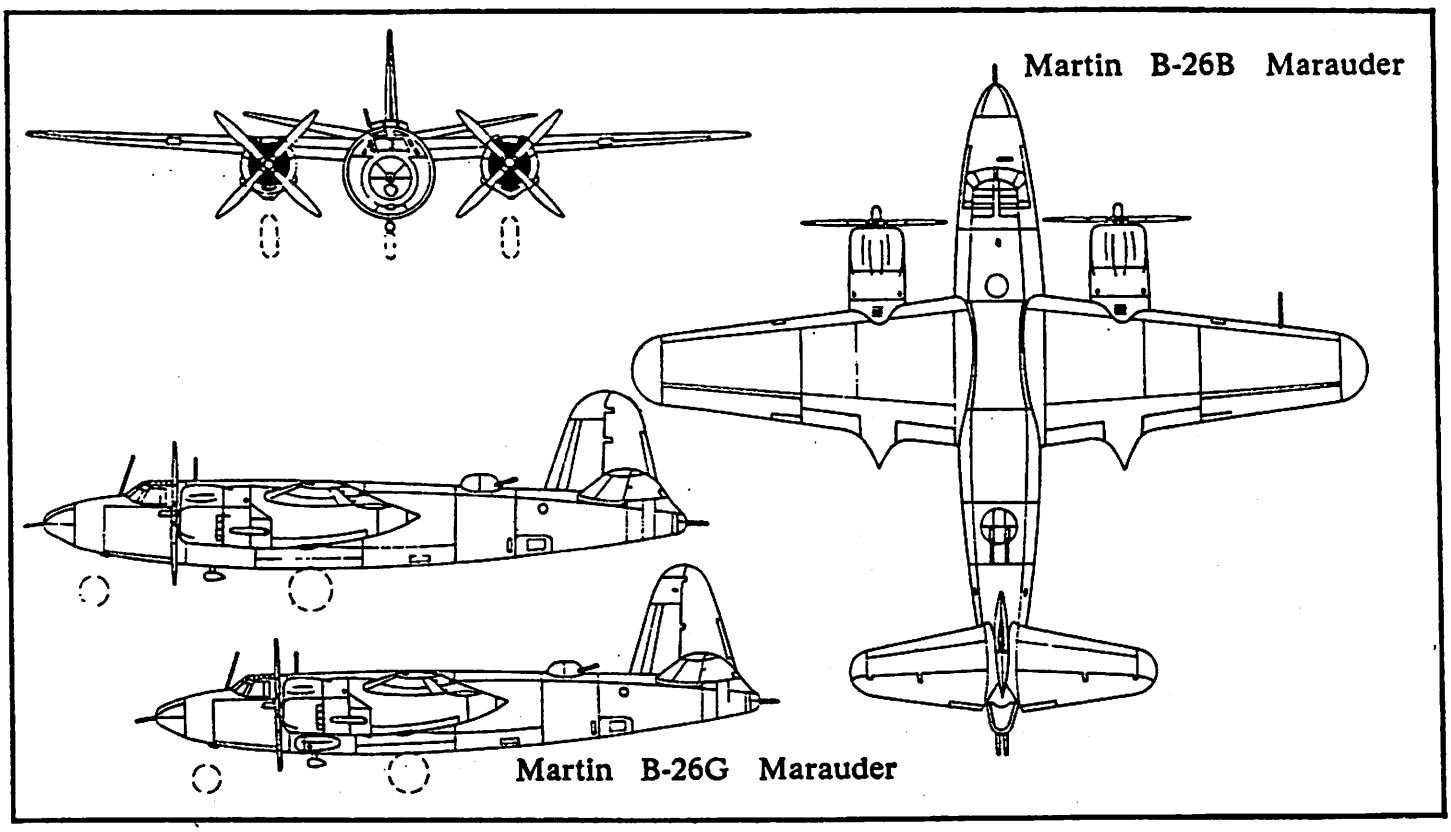
found them of real value in models of 36" span or greater. Below that size, the 'bouncibility' of a small, light model outweighs the weight penalty of the tongue-in-box method. Indeed, my recent P82 Twin Mustang had such a wonderful time hitting walls, tables, etc, at an indoor meeting the other day, that when it emerged unscathed after every collision without a scratch, other modellers were asking if it was made of glass fibre!! The secret is just light construction but with a little carbon fibre where it matters. Incidentally, this model is turning flights of 35 seconds ROG and it is nothing like trimmed yet. For your interest, I enclose a copy of the drawing--I will gladly send spinner, canopy and exhaust mouldings as well, if you wish."

"As you gave me a rundown on your modelling career, perhaps I should do the same for you. By the by, I notice that you are a lawyer--I too started out that way, but have since followed a career in business. My interests in aeromodelling have been centred on scale for a very long time though I do indulge in other types of models still. Apart from control-line, I have built and flown all types from indoor Easy B's to R/C scale and pattern ships. However, in the early seventies, I got hooked on rubber scale, and by 1975 I put down the transmitter for the last time and have had a whale of a time ever since. From then on, my interest has centred on indoor rubber and CO2 scale, plus outdoor power (gas), rubber and CO2 scale. Last year, I won the Superscale Trophy at the British Nats with a 1/10th scale Avro 504N, complete with fully detailed cockpits--you can read the maker's name on the instruments though there are no crew members as they would prevent all the internal detail being seen. My first twin was a P38 built from Richard Falconer's plans, long before they were published in Aeromodeller. I met him at a rally in '72 and saw his model. He was having big problems with longitudinal stability and I could see no good reason why, particularly as it was both true and light. He sent me the drawings the next day, and I promptly built one in four days! Mine flew well and we discovered that the reason behind Richard's problem was the simple fact that he was flying it unfinished, without the canopy. The resulting disruption of airflow over the tail was playing havoc with the flight performance. Ever since, yours truly has been hooked on twins of all types. I have never indulged in remote drives as you have , but I have been successful with conventional step-up gearboxes, especially with my FW189. Up to now, all my twins have had ordinary but light structures, and have been outdoor models. However, the new P82 is an attempt to shake up the Lacey brigade at indoor meets. Certainly, if its first outing last weekend is anything to go by, that is pretty much the way things are going to go!!"

"I too have gone down the lightness at all costs road though as I have explained in correspondence with Tom and Dick, the weather we get over here precludes very light construction as described in your article. That is not to say that it would not work here, merely that we might have to use a little more wood. My models are one hell of a lot lighter than they used to be, and following a description of my FW189, Tom Arnold wrote back to me saying that he would regard such a model as nearly bullet-proof! The trouble with the famed English weather, is that it is so very windy here, not to mention the rain which is coming down like stair-rods as I type this. The result is that the Breguet 693 uses 3/32 sq. stringers for a 42" span, and I would not be prepared to take them down a 1/16th square. The model would lend itself well to your Lanc's construction method, the plan giving you a large number of fuselage and nacelle sections. I have not completed the master yet, but will send you a copy in due course, plus documentation as it



North American B-25A Mitchell



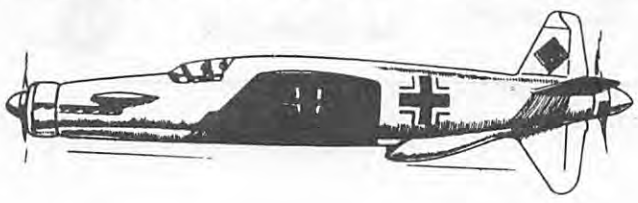
Martin B-26B Marauder

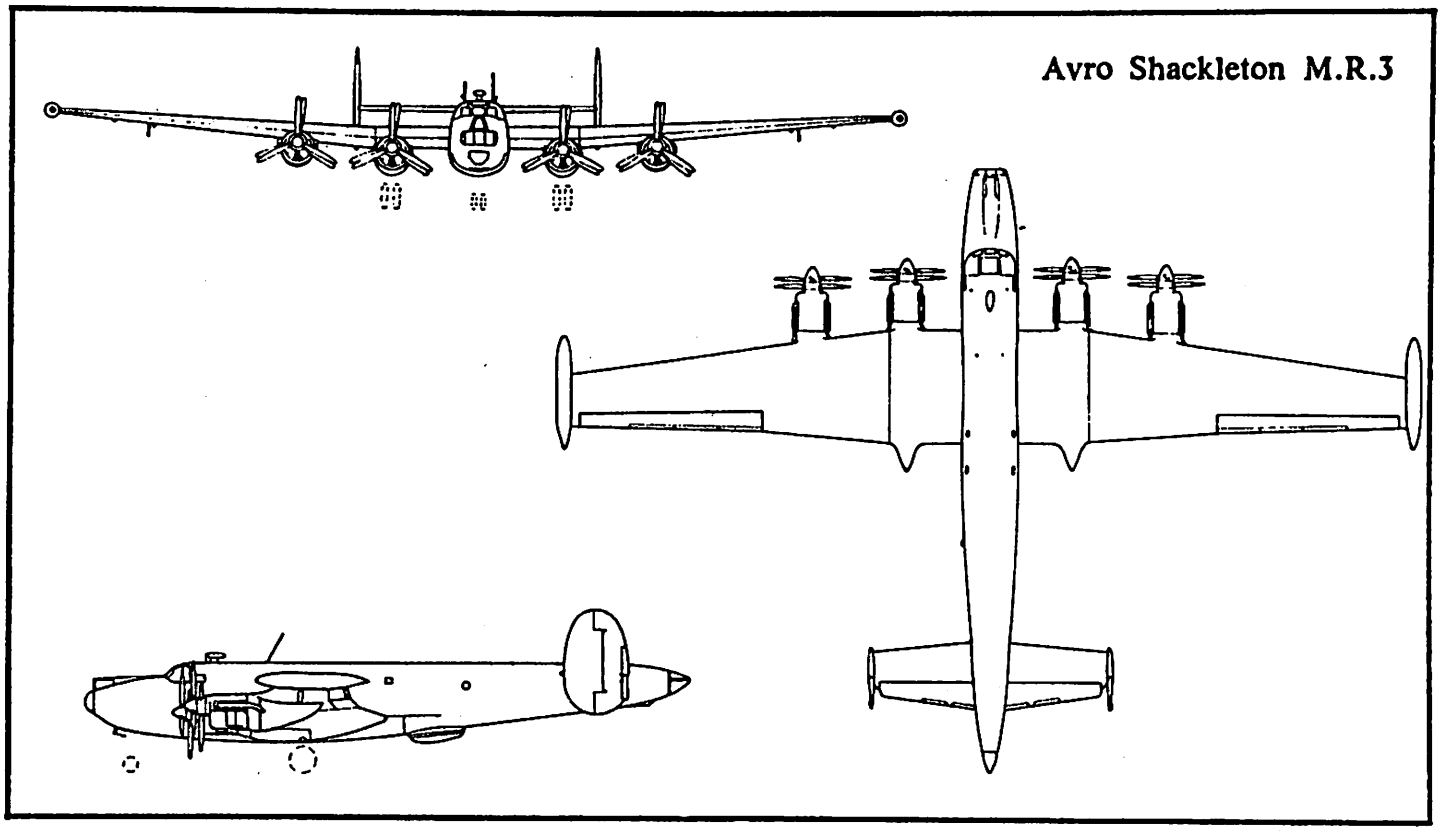
Martin B-26G Marauder

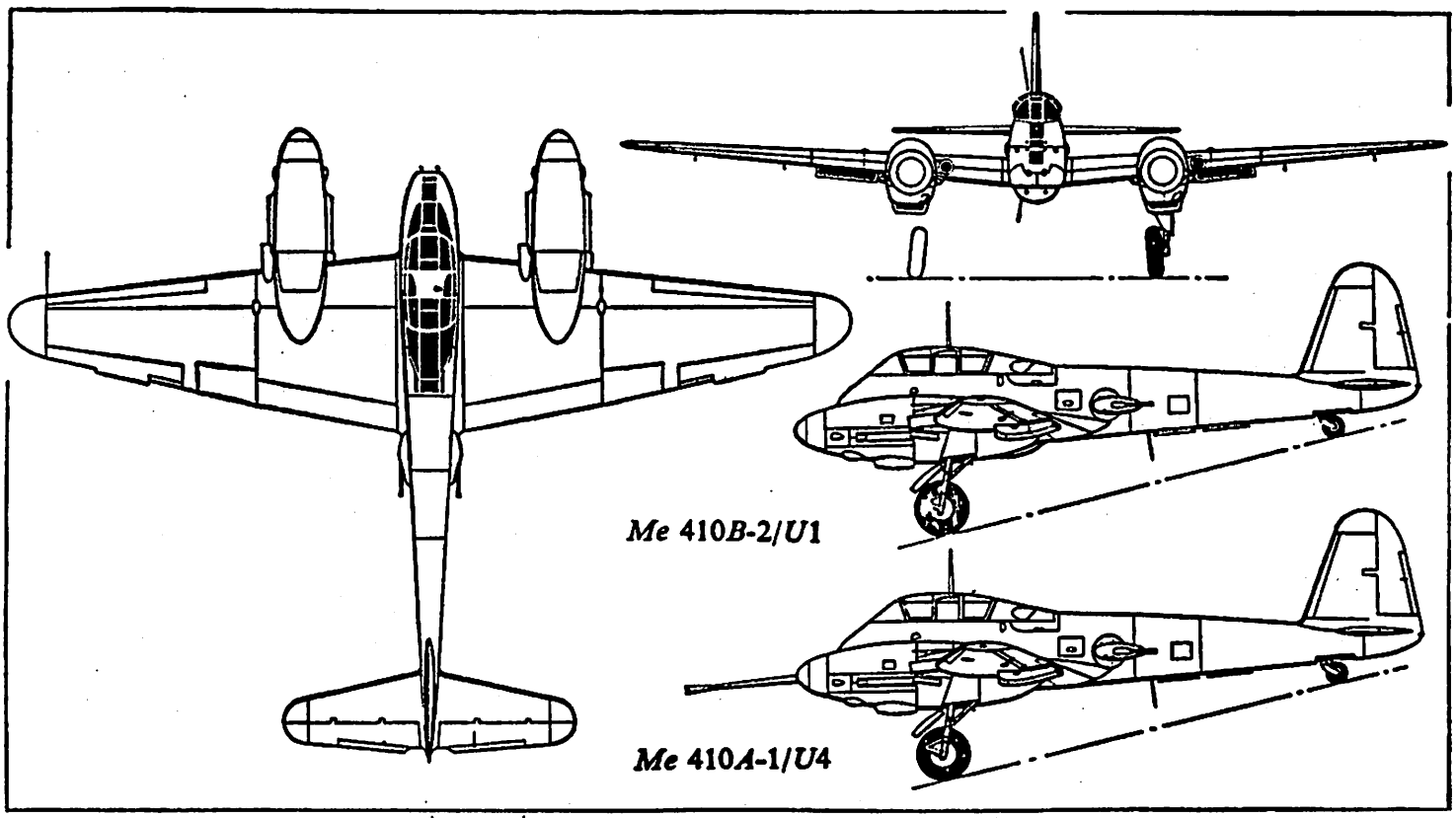
is a little obscure. To return to the strength issue, I have a Pres Brunning B25 which flies like a bird, but frankly is very marginal structurally in British conditions. His B26 would probably be a little better in this respect, but I have not had a chance to knock one of these out yet. Your F7F built straight off the plan would probably be only safe to fly on half a dozen days in the average year here, and with my luck, they would be days when I wasn't free!"

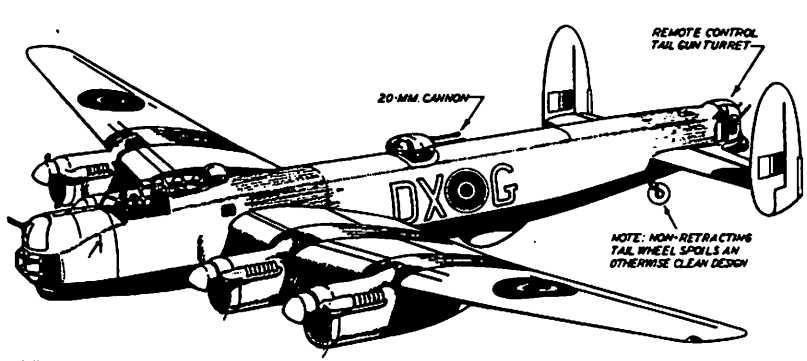
"My twins article was an attempt to promote interest in this type of model, which I regard as essentially simple to fly even if they involve a little more building. Sadly, the response over here has been minimal but the reaction from abroad has been very encouraging, especially from the States--the airlines have been burning a lot more fuel humping heavy packets of mail across the Atlantic in the last couple of years! When Tom wrote to me for the first time, I was beginning to think that as a 'twin fancier', other modellers regarded me as a creature with two heads and eight arms--it was great to receive a letter from a kindred spirit! About eighteen month's ago, I designed and built a non-scale twin to experiment with, all banded together so that it could be altered easily in the field. This model, the Pipistrelle, turned out to be a red-hot performer (vertical climbs like an F1C power model) and various friends showed interest, suggesting a one-model competition for it. Well, I was persuaded to go ahead with this, and a good many models were built, though not many showed up for the competition. However, I regard this venture as something of a success in my campaign to increase activity with twins. Many modellers actually built and flew Pipistrelles, one young lad losing his model out of sight upwards on his first time out with it. The result is that there are now many times more people who have actually achieved good flights with a twin and not only are now inspired to do other twins, but also argue against the many bar-room pundits who pooh pooh twins but have never had any first-hand experience themselves. Frankly, even though I was a seasoned twin operator when I designed and made the Pipistrelle, I have learned a great deal more about multis with the consequence that firstly, my existing models are now giving a better performance, and secondly, I am considering certain twin subjects as viable that several years ago would have been written off as no-hopers. Shortly, I will be doing a slightly larger version with four motors, prior to embarking on the ultimate goal: an Avro Shackleton MR2 to ½ inch to the foot, hence my note to you."

"Since I received your letter, it has been seen by the editor of Aeromodeller, who agrees with me that what we all need is lots more twins. He, in fact, has turned out a number of successful diesel-powered twins that were flown free-flight. However, he has asked me to do a short precis of your article for the Scale Column in the June issue, essentially drawing attention to the fact that your plans and article are to be published in the same month's issue of Model Aviation. Assuming that you have no objection to this, would it be possible to let me have a shot of either the uncovered airframe or the jigs, preferably black and white? If you are anything like me, you probably did not get active with the camera until immediately before the first flight, but if you are able to oblige, Geoff Clarke would be grateful. For the record, the upcoming issue of Aeromodeller has twins photo feature. Once Geoff gets his delivery, I will put in the post to you. Incidentally, if you can help with a photo, he will need it about four weeks from now. On the subject of books and journals etc, should you need any British or European stuff, including the Eastern Bloc, just let me know and I will do my best to supply it. I have easy access to many good full-size warbird subjects, including

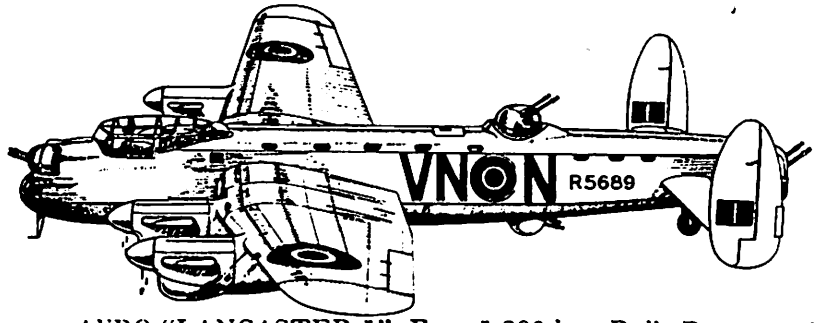



Avro Shackleton M.R.3

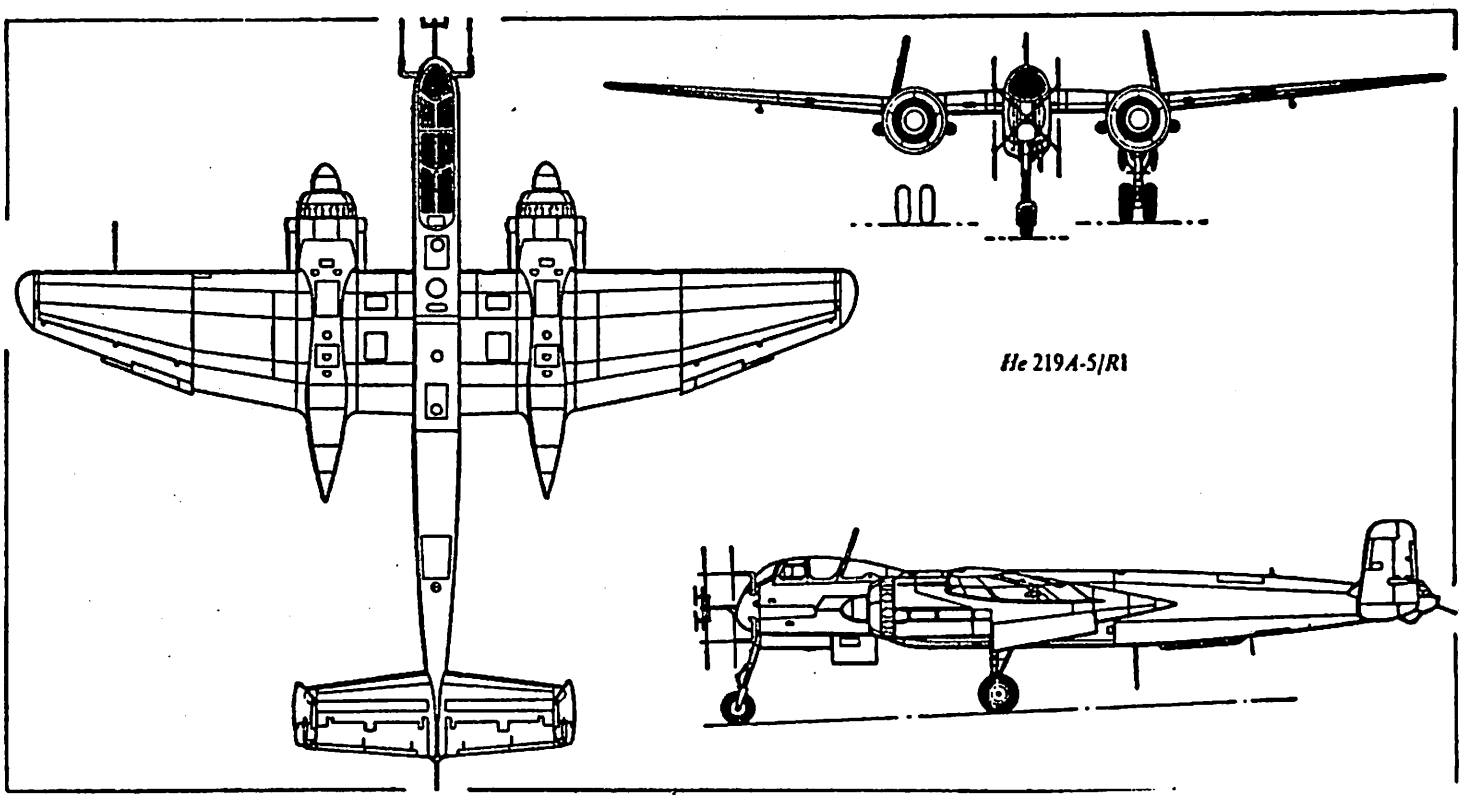

Me 410B-2/U1
Me 410A-1/U4



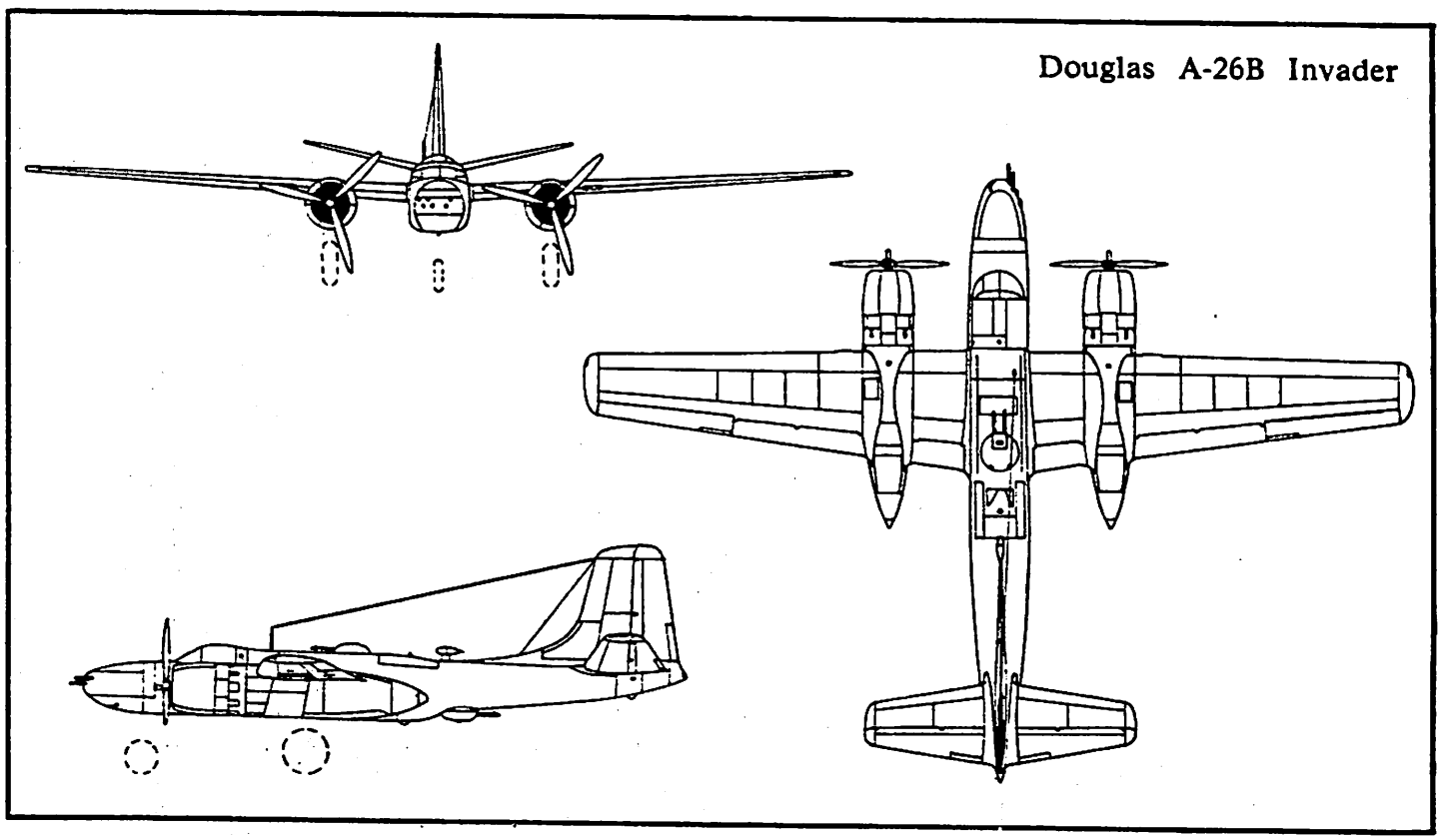
AVRO "LINCOLN" Four 1,760-h.p. Rolls-Royce Merlins. Intended to replace the Lancaster bomber, it carried up to 11 tons of bombs. In production during closing days of World War II.



AVRO "LANCASTER I" Four 1,280-h.p. Rolls-Royce engines. Largest R.A.F. bomber of World War II. Could carry large bomb load, including famed 10-tonner "blockbuster." With crew of 7 and full load, it hit 300 m.p.h.



He 219A-5/R1



Douglas A-26B Invader



the RAF's remaining airworthy Lanc, so I can supply photos too, if required. The same offer was made to Dick and Tom and the packages crossing the pond seem to get fatter and fatter, both east and west bound!"

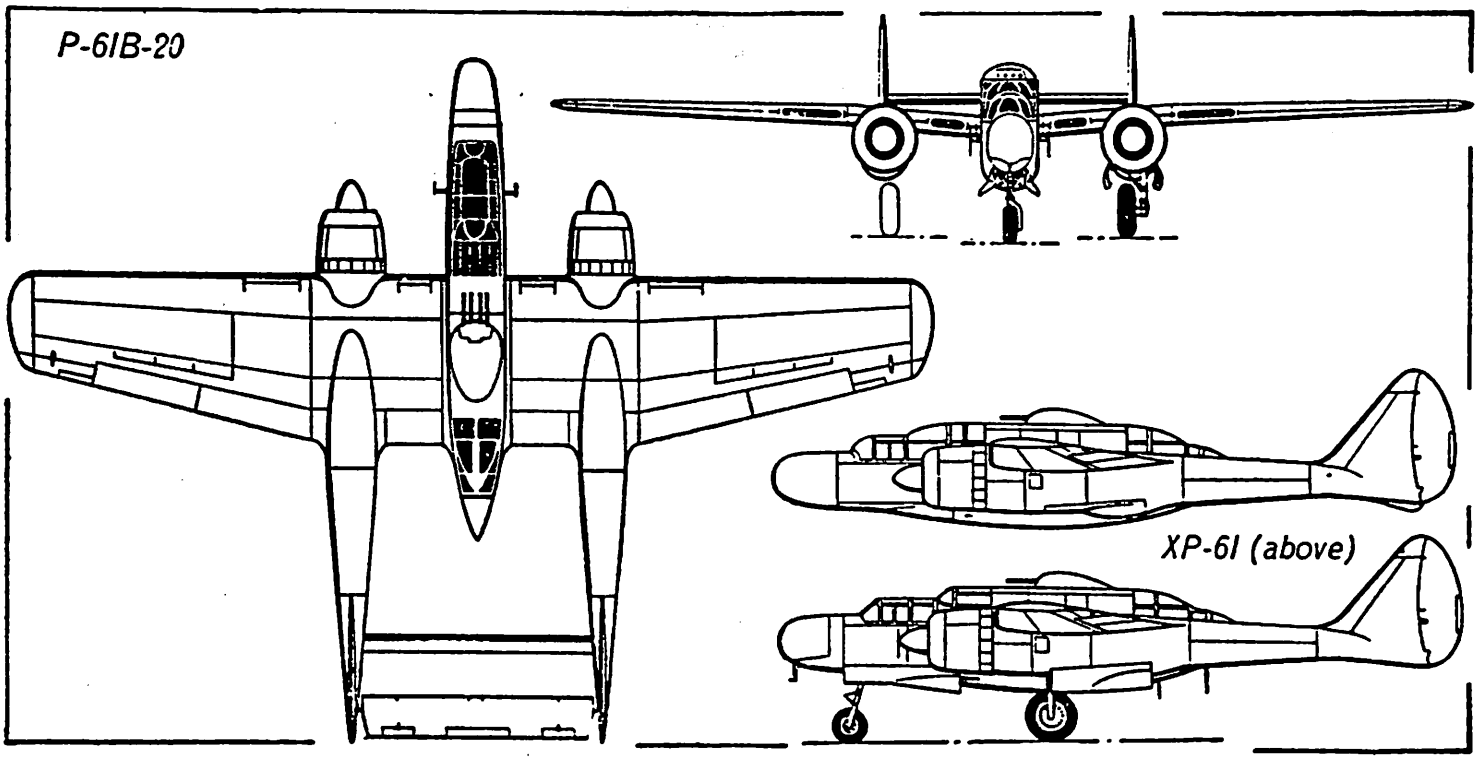
As Newman had mentioned Tom Arnold and as I had Tom's address (325 F Avenue, Coronado, California 92118) I then sent Tom copies of the correspondence from Newman and this, prompted Tom to send me a lengthy reply from which I quote:

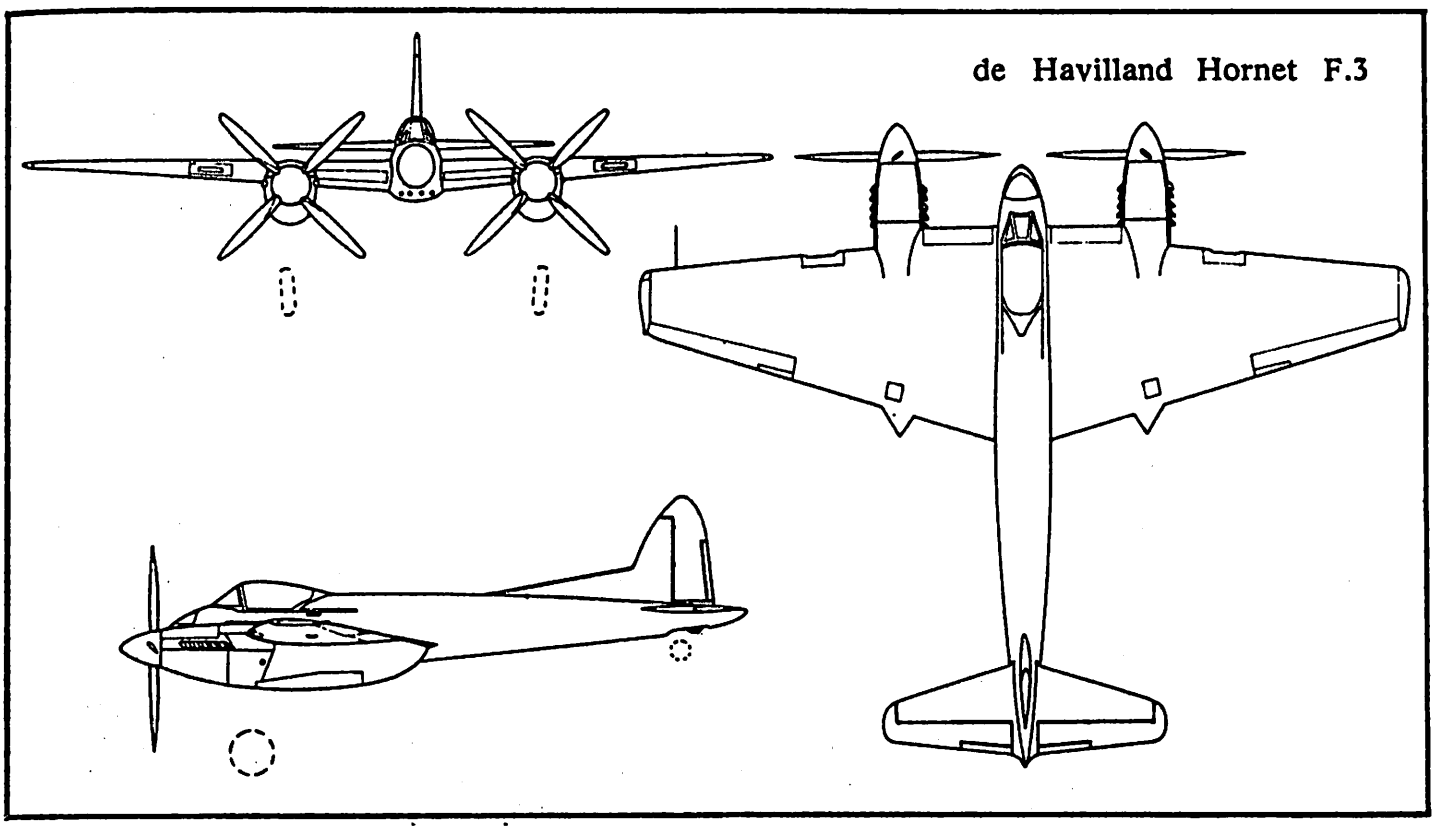
"I sent a copy of your letter on to Dick Howard as I know he'd be delighted with it too. Speaking of Dick, do me a favor and mark on your calendar to send him a post-card next May and harrass him about attending the FAC NATS. He would be a highly worthy competitor there. His airplanes are really a nice combination of 'flying' and 'scale'. We constantly accuse him of putting small helium bags in his models as they fly like McGillivrays'. He's going to get a kick out of your efforts with the P-38 years ago. One of his best flying models has been a Comet P-38 done in PRV blue and marked like the one flew in WWII. In fact he built it straight from the kit with a few modifications (props, larger former holes, canopy, etc.) much to the amazement of the sidewalk spectators. I've seen it consistantly hit 1½ minutes. He seems to have got that 'feel' for lightness & prop/motor combo. Just off the top of my head I've seen the following multi's in back of his van: P-38, Me-410, XP-67, Turbo prop Meteor, OV-10, A-J Savage, Mig?, He-219, F7F Tigercat (yours), A-26 and some others. His Tigercat is a fearsome competitor wherever he brings it out. The Tigercat is built using the "diamond box' method for the fuse-lage but other than that is pretty stock from your MA article."

"Detachable wing tips are a good solution to the wing tip--hits--the ground maneuver. I once tried the method of detachable wings by having them detached at the roots, but with a twin it proved to be a lost cause. Normal wear and tear began to give me varying degrees of incidence (sometimes in flight!) And I had some truly exciting flying sessions. One memorable flight of my He 219 consisted of large barrel rolls, each one pulled out at a height of about 3". The 219 was a real learning experience for me in a lot of ways--I guess we all get a plane like that at some time. It was such a dog at the '84 FAC NATS and when I got home I found that a prop and motor change was all that I needed. It was like a new plane from that point on."

"Your efforts in quest of lightness after being around Jack McGillivray really struck a responsive chord in me. However, I have found it to be truly one of the most maddening aspects of the hobby. My efforts at using the famous "light but firm wood" have had mixed results. I'm beginning to feel like my ability to select wood is in need of a lot of development. Attempting to mix wood weight and grain pattern to get what you want is a real art. After reading Dave Platt's wood selection method in the FM article on his Guardian, I felt a bit more of hope. I had been going strictly by what was printed on the end of a sheet of SIG and I've come to find that it's not too accurate."

"Along that line I was interested to hear of your success with laminated formers. I have made formers of various types (all of the same shape, of course) and found that the laminated versions do offer more room for rubber thrashing around, but that they do not offer much advantage in lightness due to the weight of the glue in making them. That could, of course, be due to my building techniques. Certainly, enough modelers use lamination and proclaim its virtues, though, to make me continue to experiment. Thus far I have had the best results with standard formers cut from flat sheet and then braced horizontally top and bottom with a 1/16th square. A friend of mine is a math teacher at a local junior college and I've proposed that he set a problem for his students revolving around which of a number of fuselage construction tech-


P-61B-20
XP-61 (above)


de Havilland Hornet F.3



niques is the lightest. I hope to run the results in upcoming issues of the Scale Staffel newsletter."

"My effort in twins (beside the He 219) thus far has been with a F-82 Mosquito, B-26, Hughes XF-11, Do. 335, P-61 with a couple of these subjects being built twice. All have been learning experiences with the XF-11 being the latest and the best flyer. All were in the 28" to 36" span range. The worst performer was the P-61. It gave me fits in trimming until I discovered that the spiraling prop-wash going back along the booms created a strong nose-down pitching moment when the props turned 'out at the top.' The blanket of air evidently struck the underside of the stab and gave it a shot of lift under power that disappeared in the glide. The result was an aircraft dedicated to an outside loop with every launch but which would glide fine. My thrust adjustments got progressively more frantic as I tried to find the cure before the abused fuselage shattered. Unfortunately, the weight of repairs was the price I paid to discover this phenomena.

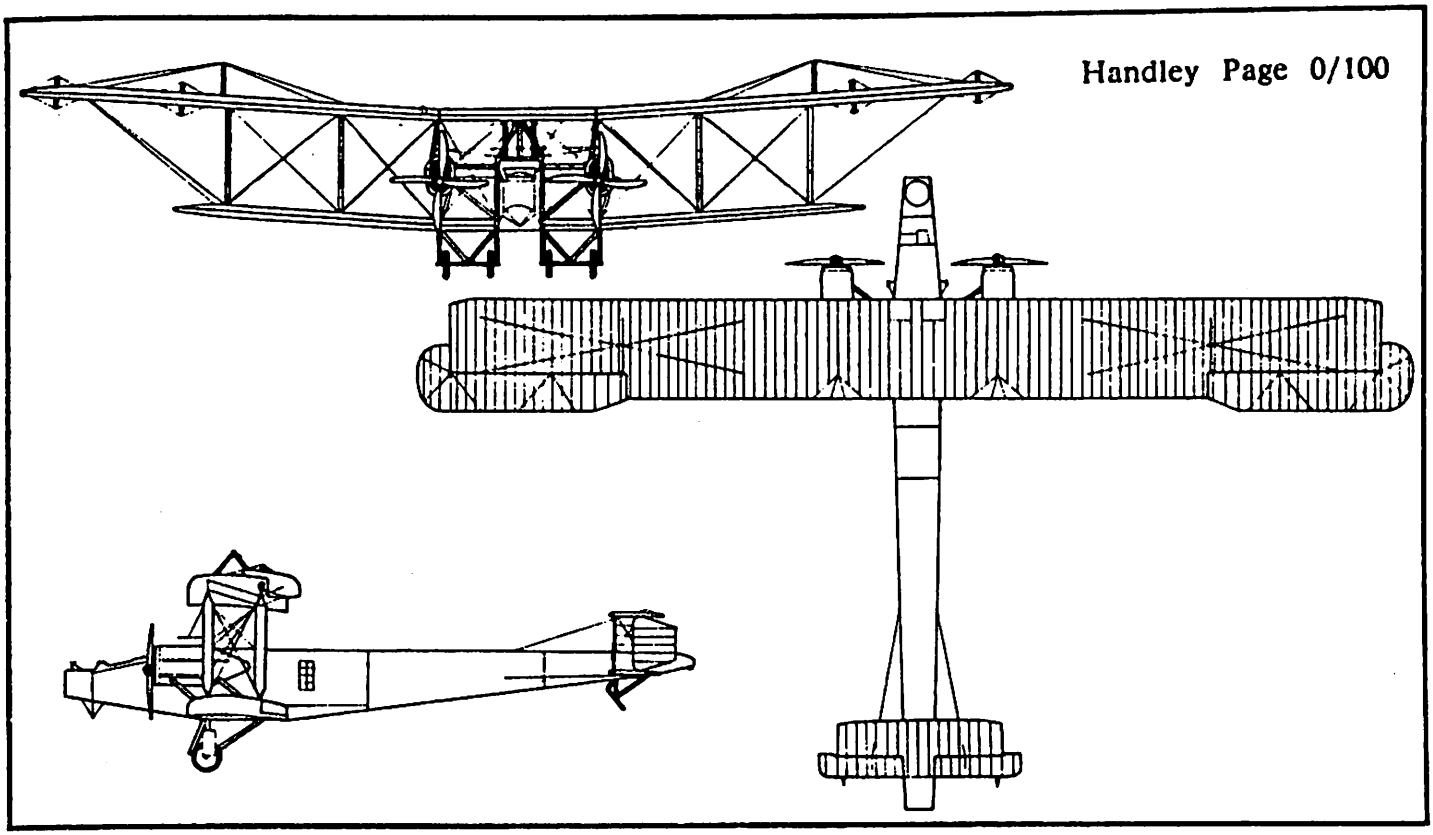
"The best flight I ever got from the Mosquito was about 45 seconds once (and only once) due to weight again. The lack of leverage on that short nose really required nose weight for the sins of generous construction on that long tail. Seeing McGillivray's Sea Hornet fly really made me appreciate what he had done. One big plus the Sea Hornet had was that the nose was so short that oversized props could be used. A wise selection on McGillivray's part."

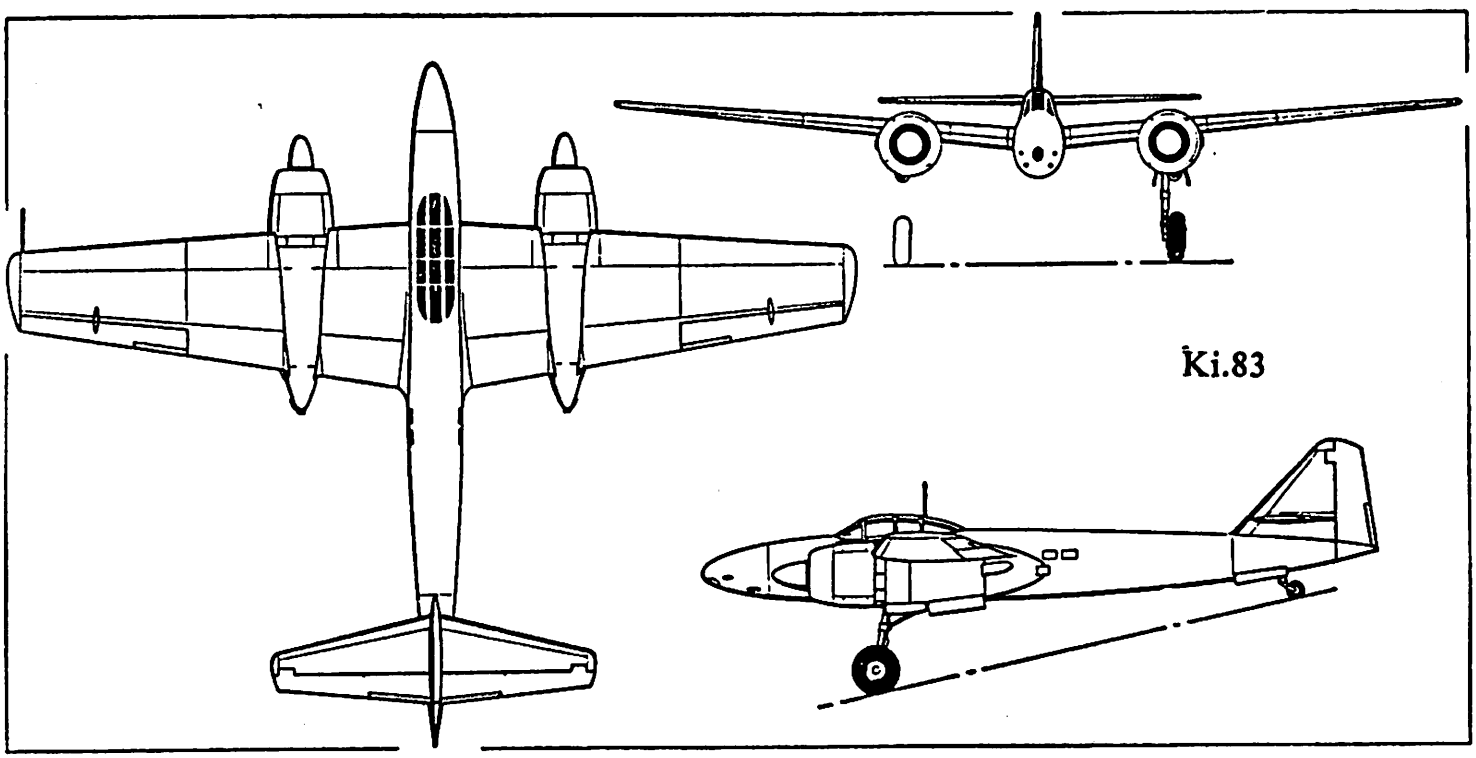
"The F-82 was fun. I built it as my first twin and learned about how not to do it. A few cutesy construction shortcuts resulted in too much weight for contest flying, but I'm really enamored with the design and I'm planning to build a new one as a 'world-beater' F-82 for the next FAC NATS. The B-26 was from Pres Brunning's article and I found it a good, stable, flyer. It's quite sensitive to props though. Some work well and some do not."

"The DO 335, as I discovered at the FAC NATS, works best with no rear prop. It does seem a shame to waste that long, tall, fuselage and not make use of it for a twin, but unless that rear prop is just feather light, it simply takes too much nose weight to balance the model. I think even that would not help considering the rubber you got back there too. I never found any real problem trimming the push-pull version though."

"The XF-11 has been a pleasant surprise. Evidently, the efficiencies of a high aspect ratio wing began to show themselves with wings spans of 30" and over. Outside of a bodacious amount of downthrust, it's a stable climber and flyer. Being so clean also helps and the model does seem to be a bit faster than other twins I've seen. I think with a bit of prop experimentation and maybe a move of the rubber peg forward I can squeeze the XF-11 over a minute. Right now it's hitting around 50 to 55 seconds."

"My most spectacular flop to date has been an XB-35 flying wing for rubber power. My plans were to bring it to the last FAC NATS but the workshop gremlins did me in about five days before. My design was to carry the rubber in a large box mainspar made of 1/32" sheet and transfer the power via small railroad gear trains. The wing tips were detachable to get to the winding hooks and all was locked by a large wind pin at the root rib. The span was 40 to 42 inches and I got the whole affair framed up and the gear train in. A test run using a Dremel moto-tool in place of the rubber motor showed everthing to work as smoothly and freely as possible. On the last test run one of the 1/32" wire shafts popped loose from a connecting sleeve. I thought there would be no problem in repairing this with a drop of CYA glue. You can probably


Handley Page 0/100


Ki.83

guess the ending at this point. My glue bottle was old and clogged and it was about midnight and I wasn't thinking too clearly as I squeezed the bottle. Suddenly a stream of CYA flue shot right into the heart of the gear train and locked it solid for the ages! It had taken a month to get the gears and with only five days left to go, it was obviously going to be impossible to get new gears in time. Not only had I destroyed the gear box, but in my surprise at what happened I jumped back, caught the wing on my work bench and broke the rear half right off the spar. All that was left was a tangle of balsa and wires that seemed fit only for pitching out. Fortunately I did not do this, but in examining the wreckage several days later I discovered that I had made an error in construction in having only butt-glued the ribs to the main box spar with the result of the smallest bump would jar them loose."

"It's been almost a year so I think I can start working on it again but to be honest these new little electric motors might work quite well too. Previously I had built a glider of the XB-35 just for CG and washout tests and it was a lot of fun to throw around. You should see it float in ground effect."

Then followed the letter to me from Dick Howard (his mailing address is 3110 Mescalero Drive, Lake Havasu City, Arizona 86403). After thanking me for sharing the correspondence with Newman, Dick said:

"Tom and I have been trying to promote multi-engine (rubber) over here for several years while Charlie has been trying to stir up interest in England. Kinda looks like Charlie's getting much better results."

"My interest in twins goes way back to the old B-9 bomber by Construct-A-Plane Co. I never did build it, but, like your Mosquito plan, I've had it filed away. I never did like motor sticks, and I didn't think I could handle the pulley arrangement in the Mosquito, so I just looked at them once in a while."

"My first attempt was Henry Strucks' H. P. 0400, with the motors hanging outside and attached to the stab. It wasn't much better than motor sticks and pulleys. I did, however, get a few respectable flights of 20 to 25 seconds. Then I saw Dave Smith (of Pheonix) fly his Comet kit P-38 at a Flightmasters Contest (1981) and I was hooked. I now have 23 scale twins, all in flying condition, though four, including the Mitsubishi Ki-83 (photo enclosed) have never been flown. In fact I just finished the Ki-83 two days ago."

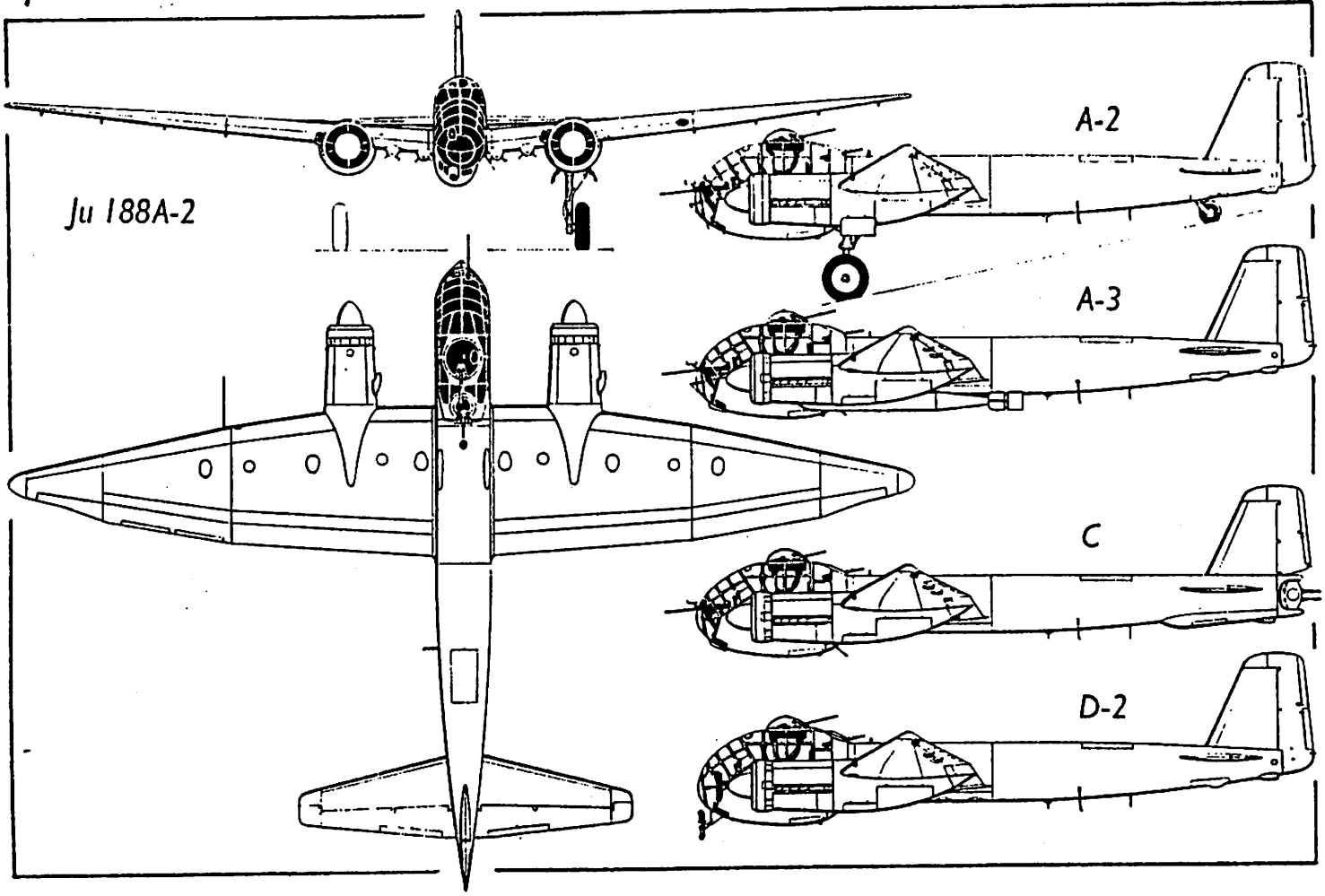
"My best performing models to date are the Comet P-38 with a best time of 1:45 and the F7F Tigercat from your plans, with many flights over a minute and a best time of 1:43."

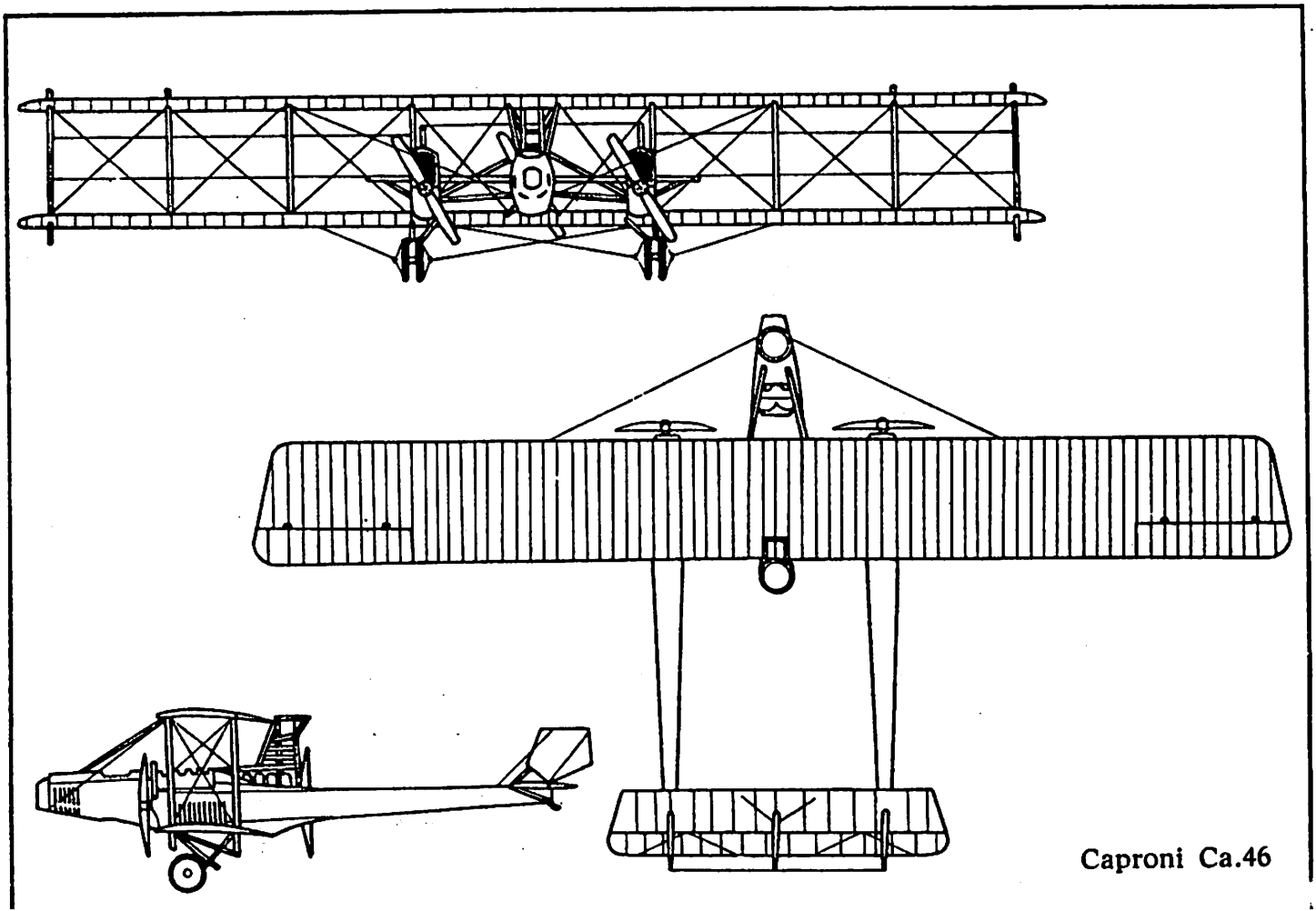
After receiving Dick's letter, I wrote thanking him for it and told him that I believe that he must be the world's most prolific builder of twin engined rubber-powered scale subjects. Photos of his Mitsubishi Ki-83, Focke-wulf TA 154, and his Miles Monitor II are being presented in this issue.

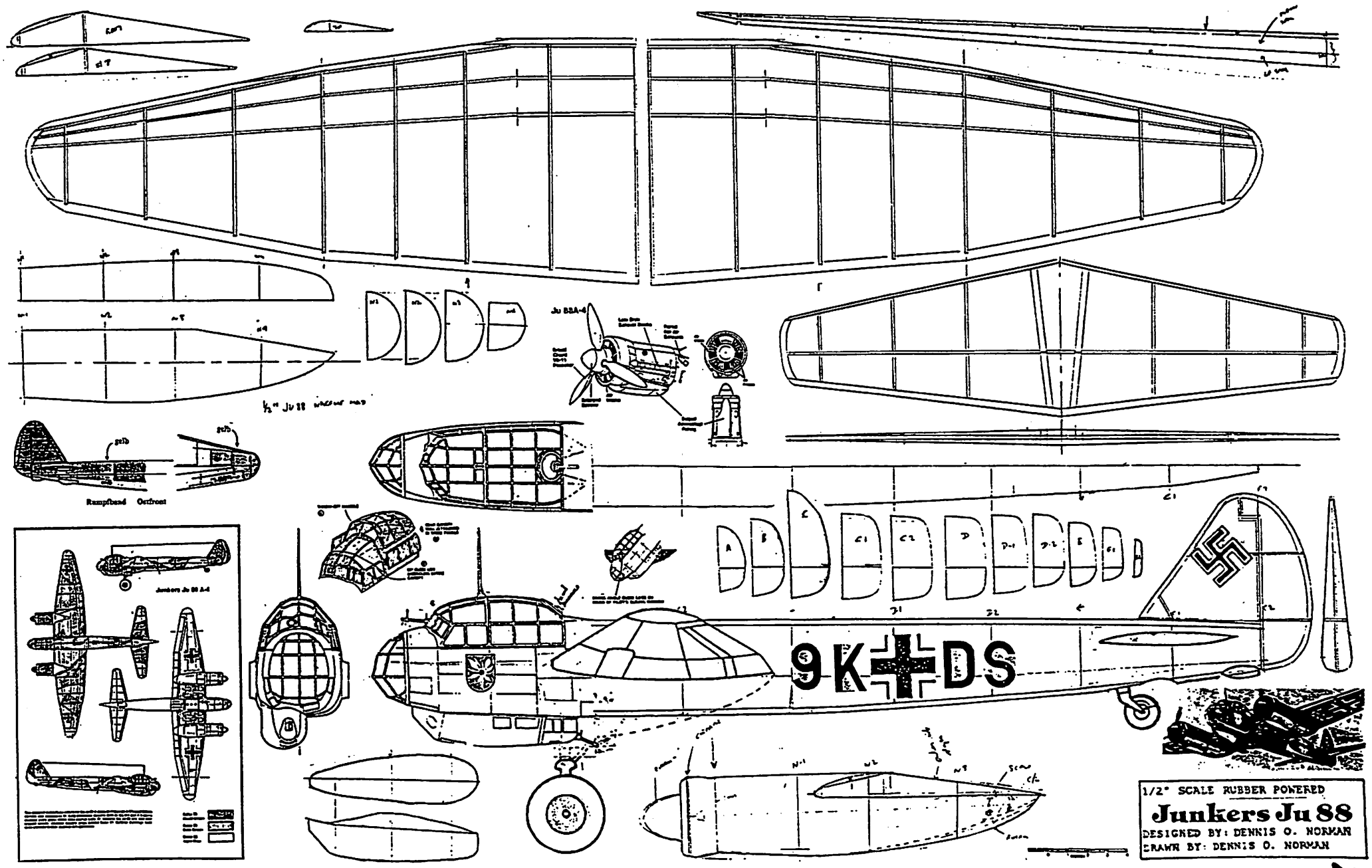
For those of you who have not read it, A copy of Charlie Newman's article from the October 1985 issue of Aeromodeller is also reprinted for reference.

So there you have it, an insight into the experiences of four builders of multi-engine rubber-powered scale subjects. Many have been attempted and many more remain as a challenge. Success with these types requires the creation of sturdy, but lightweight, designs. The challenge is there and that is part of what keeps this hobby so fascinating.




Ju 188A-2
A-2
A-3
C
D-2


Caproni Ca.46



1/2" SCALE RUBBER POWERED

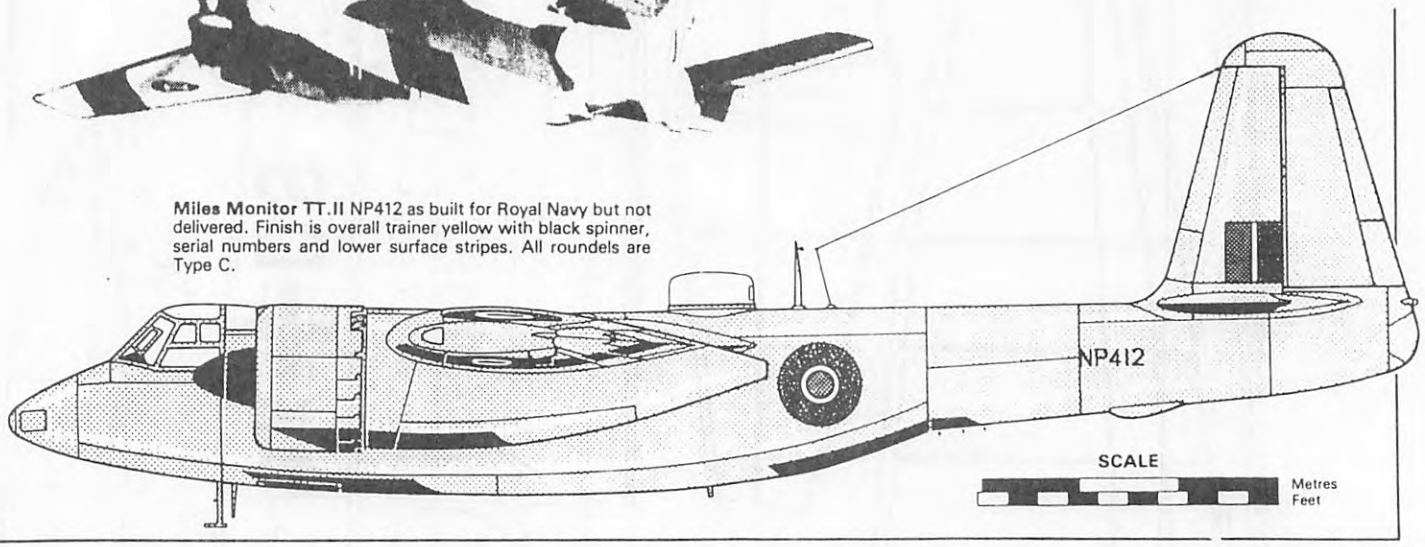
Junkers Ju 88

DESIGNED BY: DENNIS O. NORMAN

DRAWN BY: DENNIS O. NORMAN

Left: One of the few Miles Monitors that were completed in 1945. (Author)

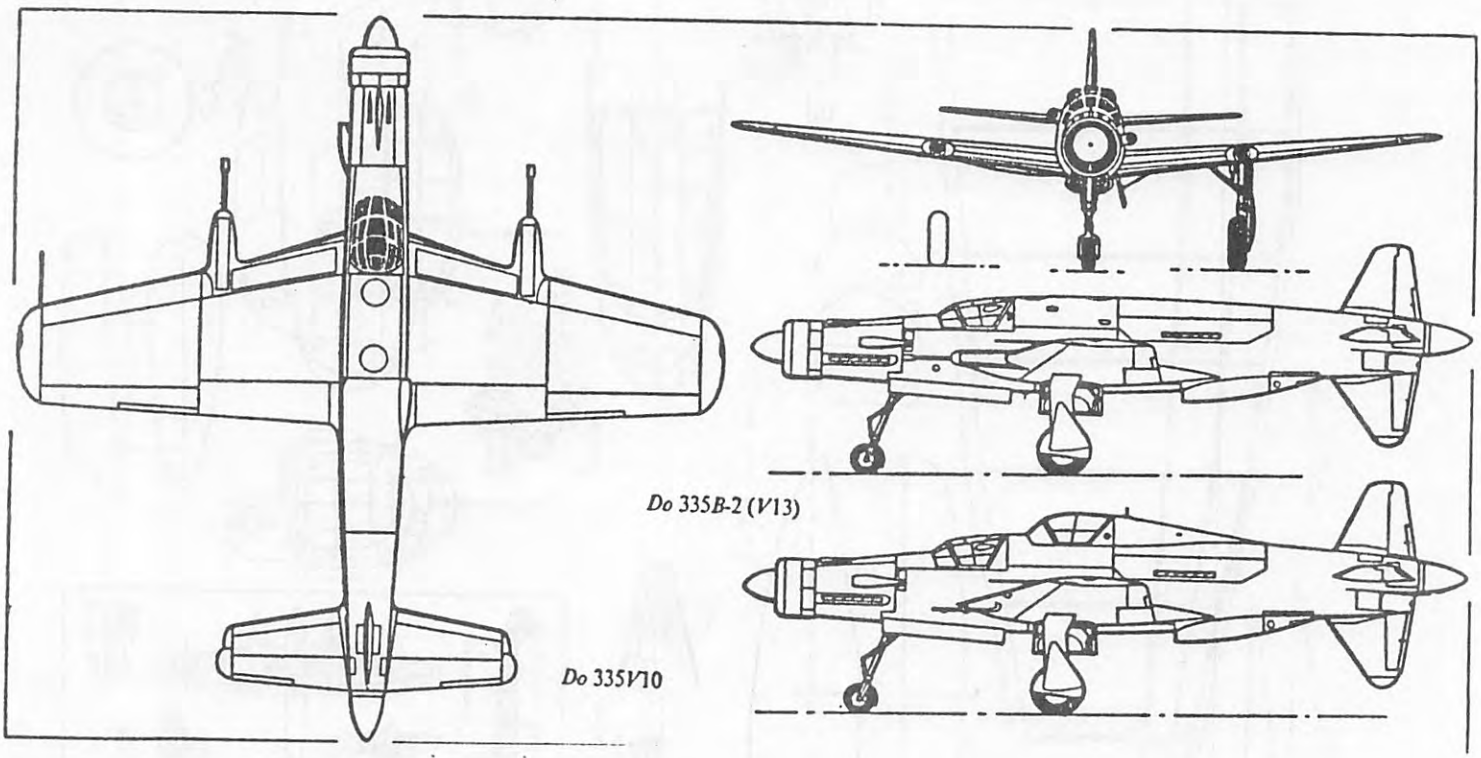




Miles Monitor TT.II NP412 as built for Royal Navy but not delivered. Finish is overall trainer yellow with black spinner, serial numbers and lower surface stripes. All roundels are Type C.

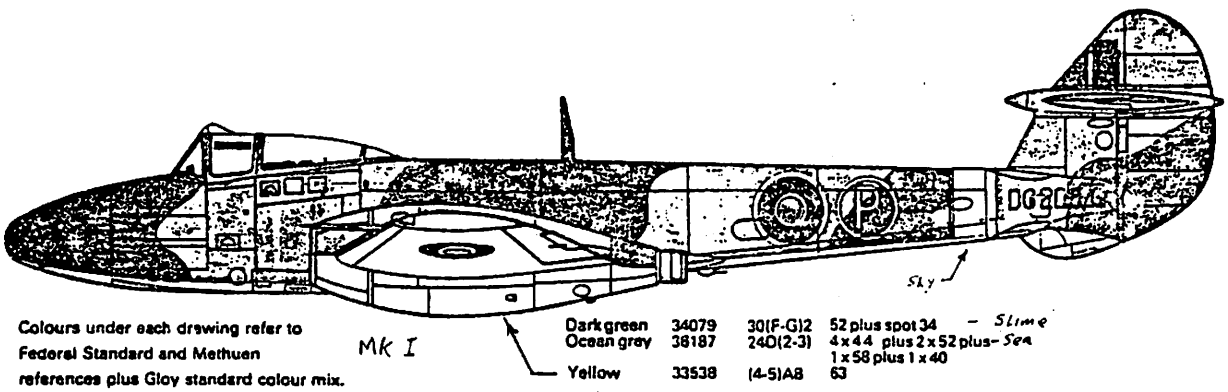
533

Courtesy Scale Aircraft Modelling Sept. 1988
Target Tugs by M. W. Payne. Dwg's by Mike Keep.



Do 335B-2 (V13)

Do 335V10



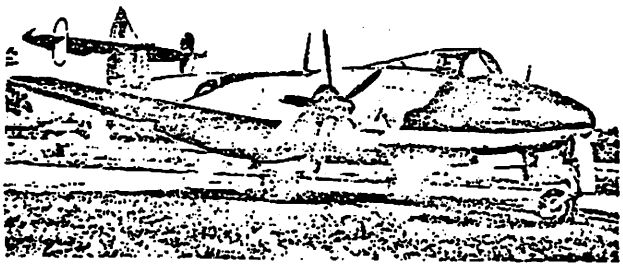
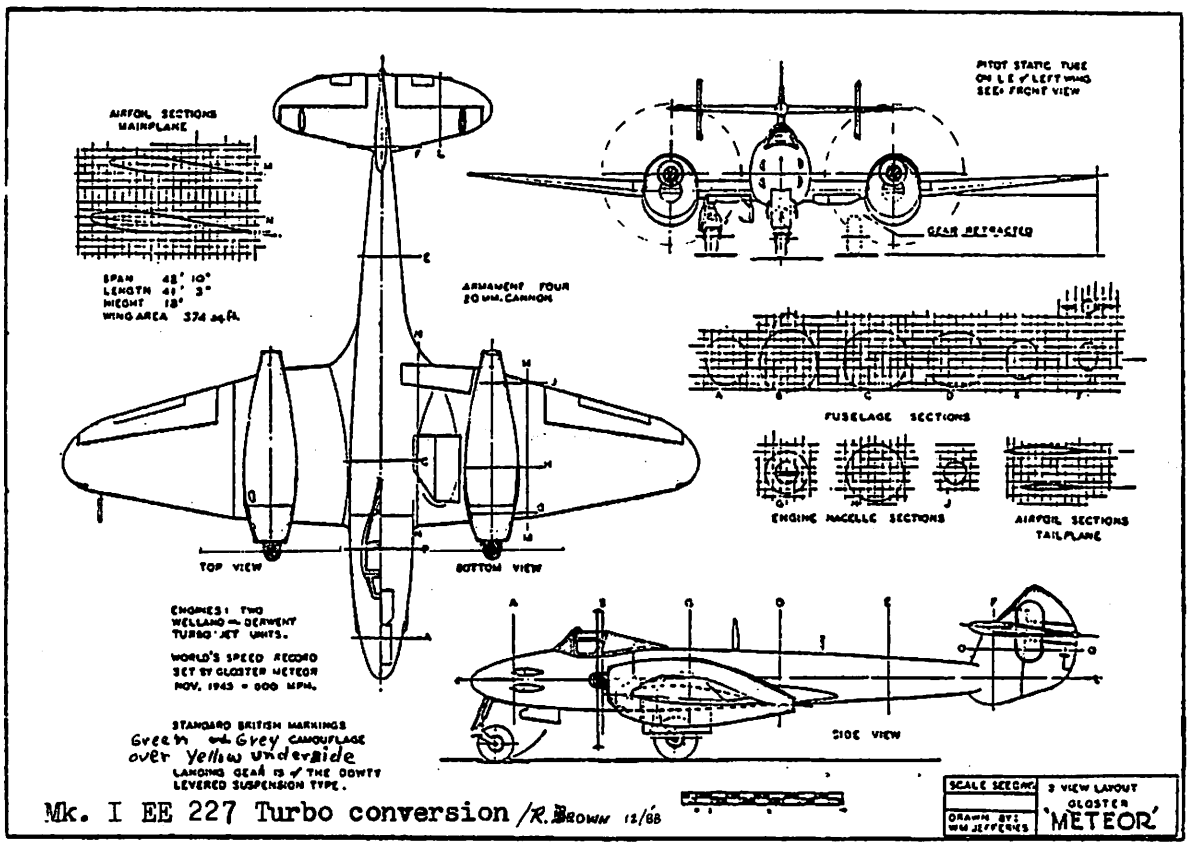
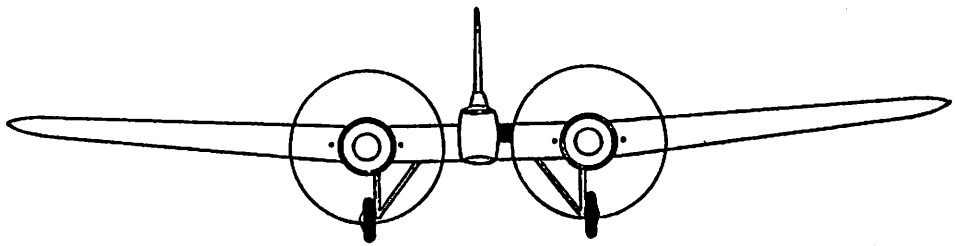


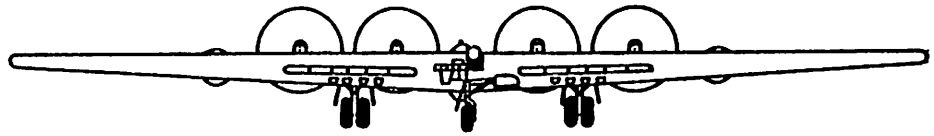
FIG. 49. Gloster Meteor aircraft with Rolls-Royce "Trent" airscrew gas turbine engines.

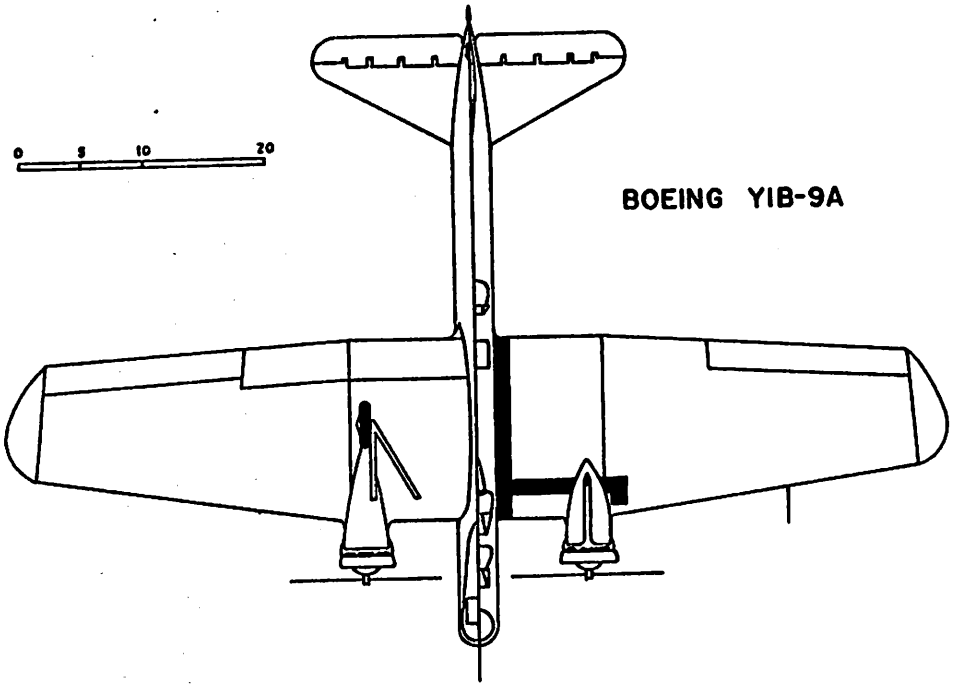
Meteor Mk. I EE227 as converted to sea and slime over yellow prototype markings. P in ring and camouflage pattern show in WINGS feature sent in by peanut plan designer DAVID DIELS. Trent engine nacels were extended and raised for turbo prop use. The sound of fretting gears and shock waves from ten prop tips was the first recorded example of hard rock.
from CROSSWINDS No. 59



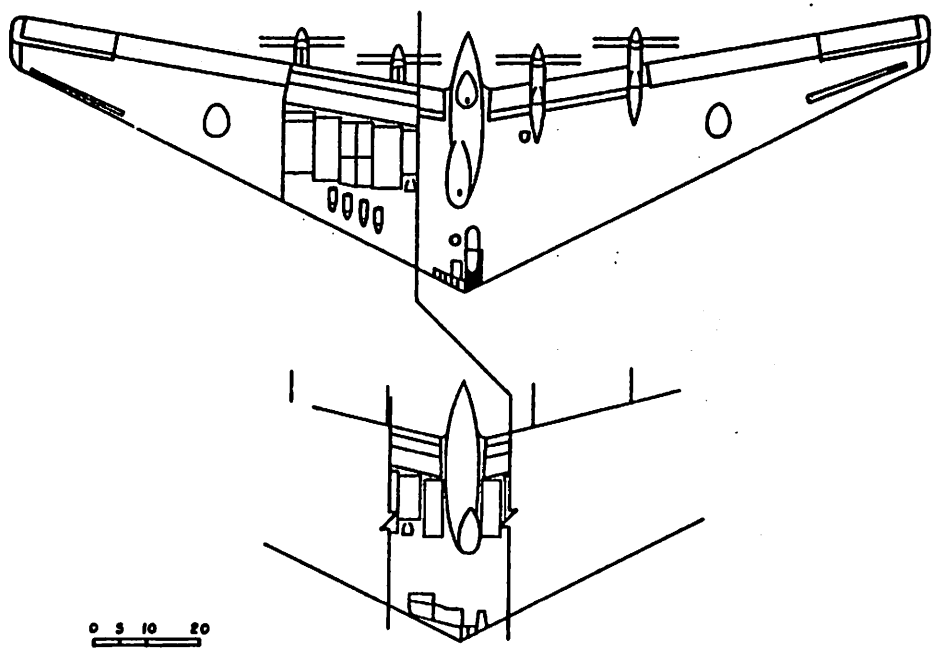
Mk. I EE 227 Turbo conversion /R. Brown 12/68



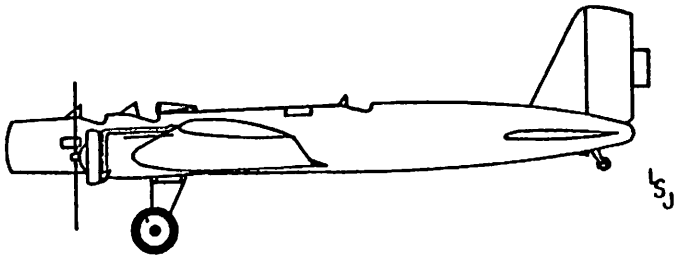


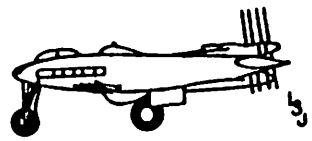


BOEING YIB-9A



NORTHROP XB-35





JAN. 15 CFFS MEETING 7:30 P.M. at Dennis Normans' 11216 Lake Ave. Cleveland, OH 44102 Phone 216/ 631-7887.

FEB. 24-26 Cleveland National Model Plane Show at Randall Mall, Northfield, OH. FF Static contest trophies for: FF Power Scale, Rubber Scale, Peanut Scale, Mass Launch Scale, Power Gas, Unlimited & O.T. Rubber, O.T. Gas, Towline Gl., and Under 30 inch wingspan General. Registration at tables Fri P.M. & Saturday.

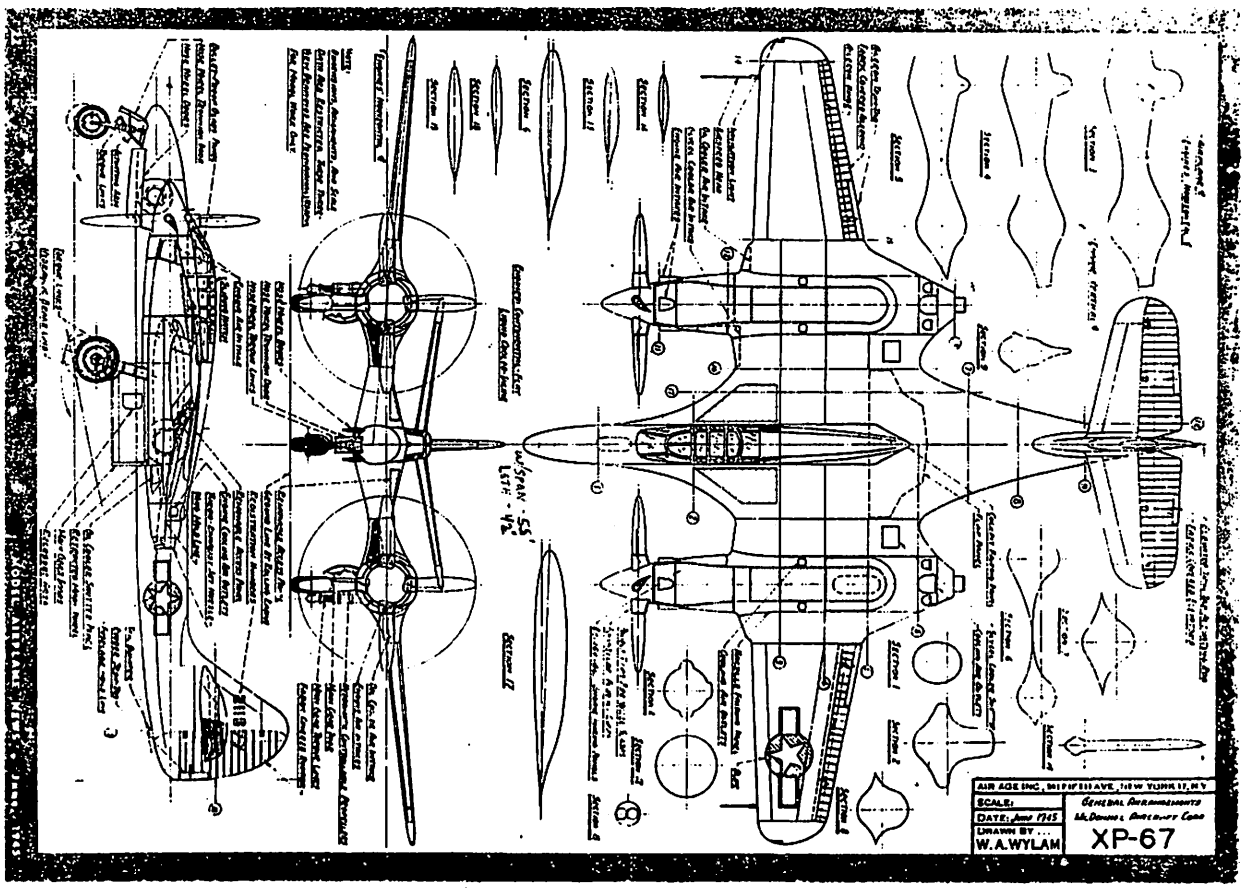
MAR. 12 CLEVELAND INDOOR CONTEST 9-5 P.M. at Normandy High School, Parma, Ohio. Exit I-77 West on Pleasant Valley, West of Broadview Rt. 176. Enter 8 A.M. Events: Easy B, Jetco R.O.G. Stick, FAC No. Cal. Profile Scale, No. Cal. WW II Single Mass Launch, FAC Peanut Scale, High Wing Peanut Scale, WW I Multiplane Mass Launch, and a special class certificate for No. Cal Profile Cleveland Air Race Plane commerating 60 years of Thompson Trophy Race. Mike Zand C.D.

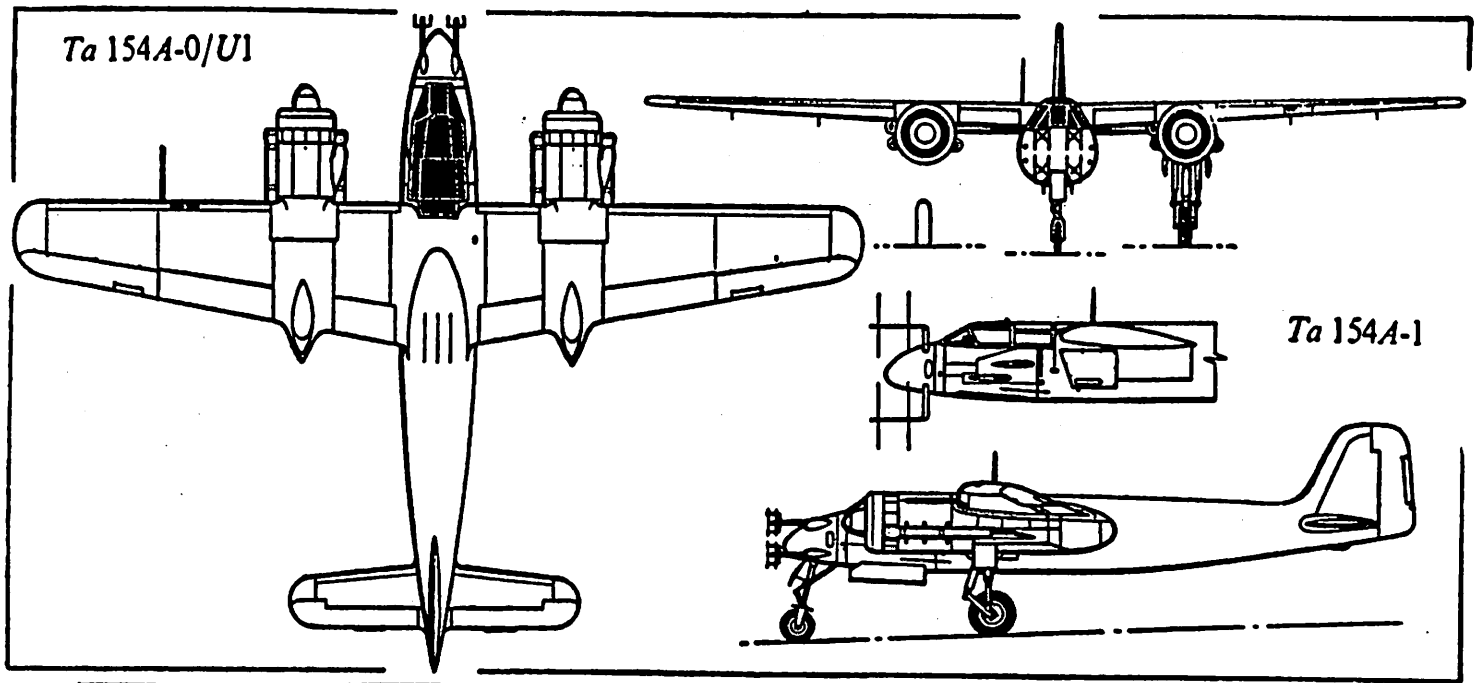
8-9 AM EZB Test Flying.
9-12 EZB (J)(SO)
12- 2 Jetco R.O.G. (J)(SO)
2- 5 Peanut, Hi Wing Peanut, & No. Cal. Profile (JSO)
2:30 WW I Biplane Mass Launch Dogfight Eliminations (JSO)
4:00 WW II No. Cal Profile Single Mass Launch (JSO)
5:00 Prize Awards & Pack up.

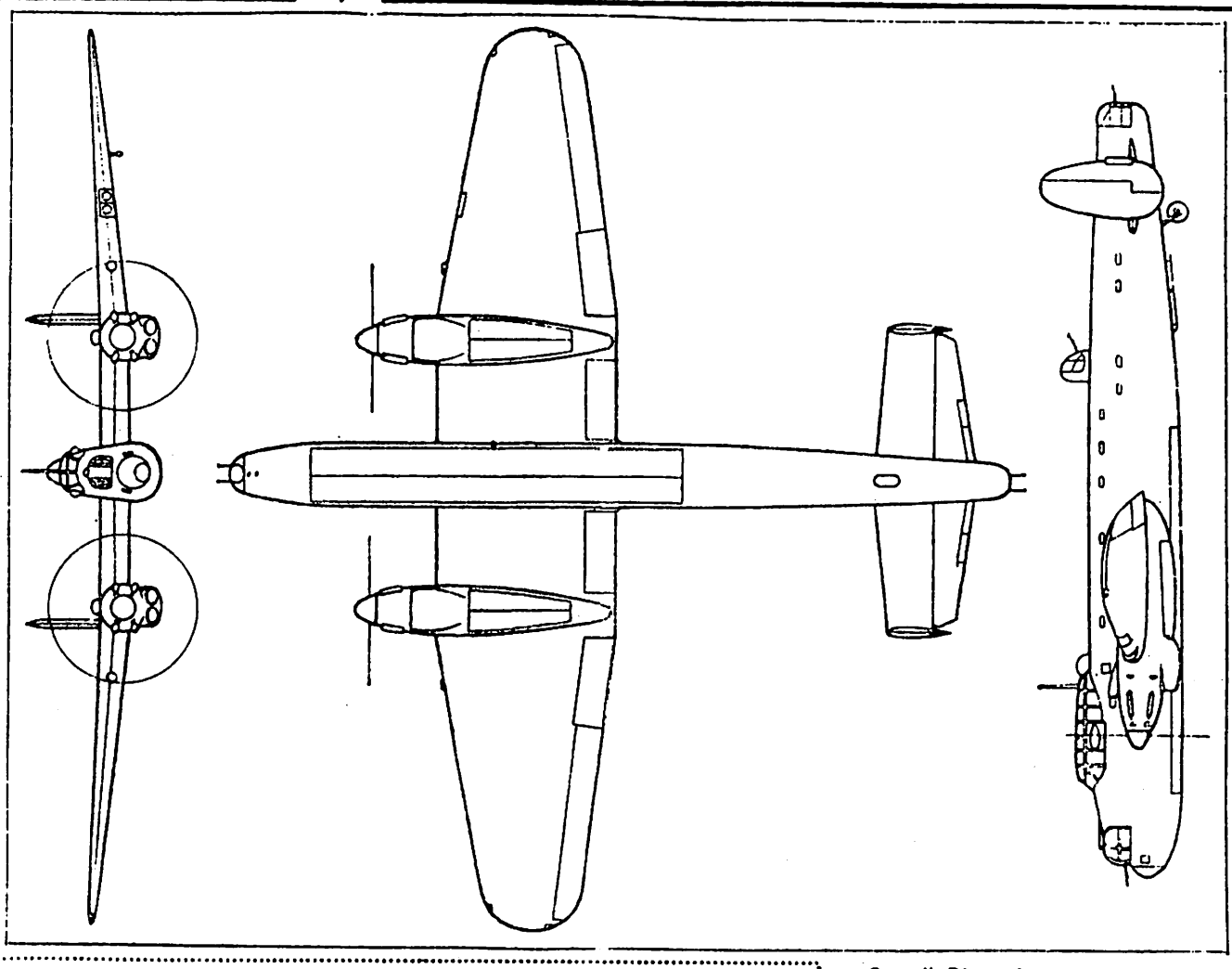
APR. 30 ERIE MAA Indoor FAC Contest.

JUN. 1-4 Indoor at Johnson City, TN. with MIAMA Pistachio Grand Prix.

JUL. 15-23 1989 AMA NATS at Richland, WA in N.W.USA. FF/ no burning D/T fuses allowed.







AVRO "MANCHESTER" HEAVY BOMBER

Type : Mid-wing twin-engined all-metal cantilever monoplane with retractable undercarriage.

Engines : Two Rolls-Royce Vulture liquid-cooled engines. The maximum power rating :
1,845 B.H.P. at 3,000 r.p.m. at 5,000ft. in the low supercharger gear.
1,710 B.H.P. at 3,000 r.p.m. at 15,000ft. in the high supercharger gear.

Airscrews : 3-bladed, 16ft. diameter—fully feathering.

Overall Dimensions :
Span 90ft. 1in.
Length, 68ft. 10in.
Height, 20ft.
Gross wing area, 1,131 sq. ft.
Fuselage 8ft 2in deep × 5ft 9in wide

CROSSWINDS 31

78

CROSSWINDS

4909 N. Sedgewick

Lyndhurst, Ohio 44124

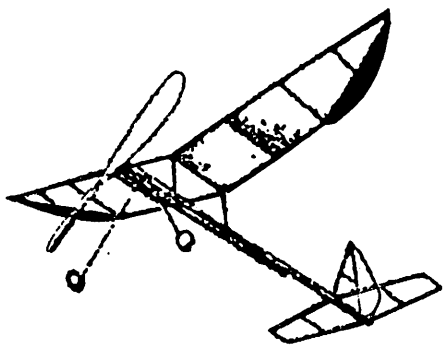
Russ Brown Bus./Sub. Edt.

Please check your address lable for issue expiration No. Numbers belcw 78 are a reminder for $10 contributions. Thanks!

FLAT HATIN' ON WINDMILLS

At ease, and take ten, this is not a mirage! The great Norman Crusade for more windmills is at last flipping through your finger tips. More power to you when the long simmering soup spoons (props) dip air. Four is certainly fantastic, as the Lancaster made lots of believers. Or for a more temperate tempest, ease on the power and clip that Lanc. in half and work up a twin Manchester? Go ahead, take a peek at that Manchester three view, and project the vision for twice the fun! You can be the first kid on the block with this twin. This may be a good place to admit that Dennis Norman did not get inspired to fly multi-engine models when his P 51 H Mustang broke off a wing tip crashing intc a mirror (F 82). The Caproni broke (on) ice, and the 13 years bad luck was over when the Lancaster flew. We cheerfully do admit it was Air Marshall Gordon Roberts who broke the Peck Polymer P 51 Peanut, and got double vision when the resulting F 82 pilot had a split personality.

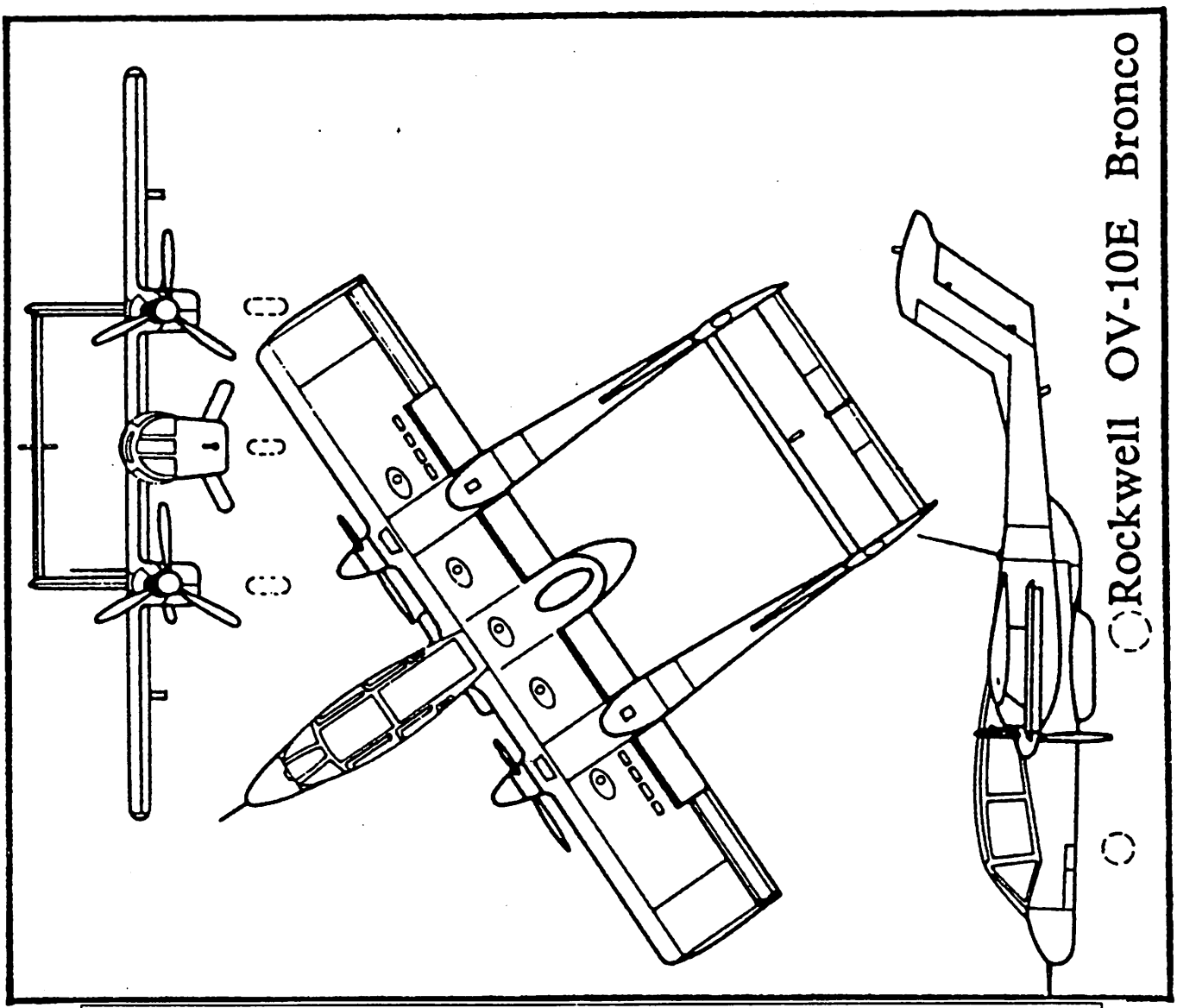
But enough Quixotic jousting with multiple windmills and the Lancaster. The dam (silent e or n) is busted--no, make that the wheel is spoken, and the CROSSWINDS annual jam during flying season is breaking out. Gordon Roberts claims Editorship for Issue No. 79, due out February 1989. That gives CROSSWINDS a definite maybe for two issues out before the CFFS big site Indoor Contest March 12, 1989.

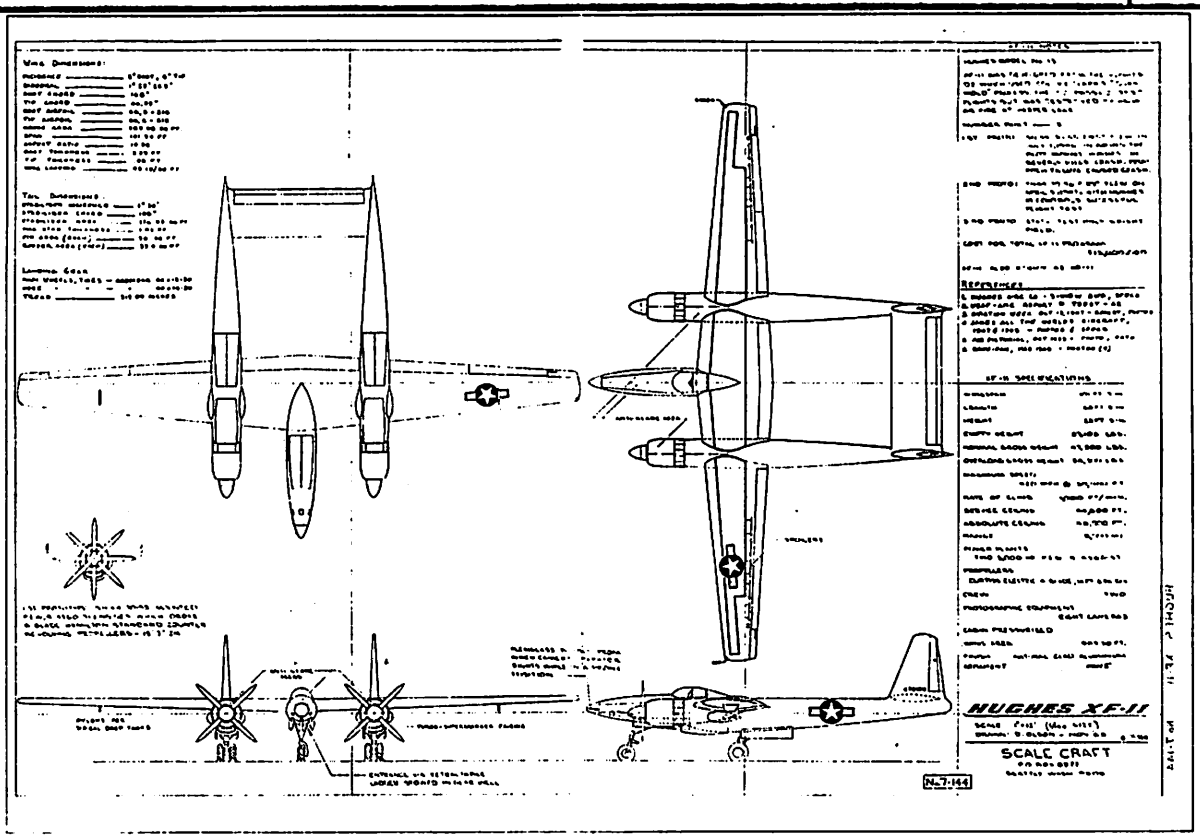


R.O.G.

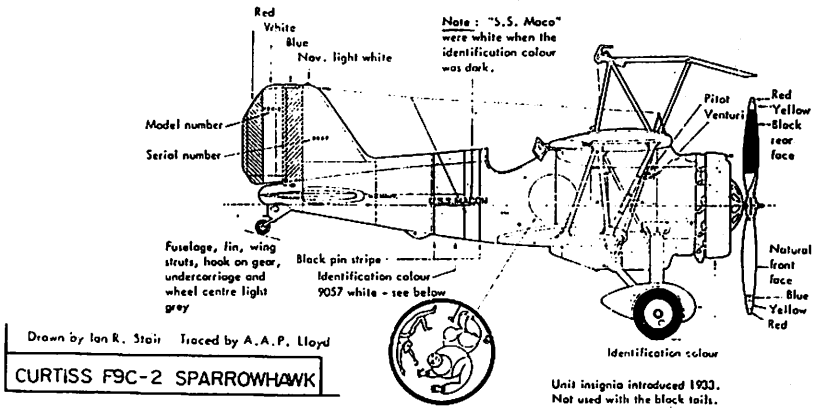
Indoor Contest? BIG SITE INDOOR? Is it possible that we will return to the big hangar indoor era in Cleveland? *1 Twenty and two years have melted away since those memorable gatherings Chuck Tracy directed to the Public Hall and then to St. Edwards gym. Display of indoor models at the annual Randall Mall Contest never fails to inspire comments about the good old days when we could fly indoor in Cleveland. Big site cost is the large gravity factor at indoor sites. Mike Zand has a fresh altitude for a big barn contest: Go get a great site, and then worry about debtors prison. The big dome at Normandy High School is available for eight hours flying time thanks to Mikes' connection. It remains for a few angels to assist with hour share time sponsorships. Donors are most welcome starting now! Contact Mike Zand at 7055 Seven Hills Blvd., Seven Hills Ohio 44131 for a piece of the action. Just $86 may save Mike from jail or spending the remainder of time in the Cleveland joke called school. Good CROSSWINDS editors be saved! Events at Normandy H. S. in Parma, Oh. on March 12, 1989 are the ever popular local favorite Jetco R. O. G., Easy B, FAC Peanut Scale, High Wing Peanut Scale, FAC No. Cal. Profile Scale, WW I Multiplane Dogfight mass launch, and a single mass launch of WW II Combat Profiles. In commeration of the 60 years anniversary of National Air Racing Thompson Tropky Races, a class within the No. Cal Profile models will offer a certificate to the high time race plane. The hobby shop is out of 39 cent Jetco R.O.G.'s! Write Mike Zand or Russ Brown for a plan. Erie MAA follows with indoor action April 30, 1989. Mass launch events are to include a WW I Monoplane Peanut event, possibly as early as 4/30. Dennis Norman is dusting off his plan of the Morane S. Bullet mid wing for entry. But with only one engine, we can't fit it in here! CFFSers at the annual banquet were awarded M. S. Bullet plans. We'll look for flying examples in Erie.

*1 The last indoor air meet at Public Hall was the 19 th annual Great Lakes on Jan. 4, 1970.


Rockwell OV-10E Bronco


HUGHES XF-11
SCALE CRAFT

FLAT HATIN' ON NAVY SPARROWHAWKS



Great shirt art adds to the Flying Aces fliers heraldry coloring of a FAC Nationals meet. Cactus Squadron, Arizona offered fliers a brilliant rendition of the Curtiss F9C-2 sky hooked Sparrowhawk in pre WW II Navy colors. Yellow wing tops, red bands on a hot orange disk warm the over all pale grey Navy color T-shirts. The skyhook biplane is real pizazz *1 at $9.00 per T-shirt. Too hot a deal to pass for even grey top kids at Geneseo. See photo in FLYING ACES CLUB NEWS photo page and think of Jane and Dave in color. Hot stuff 'nes paw? But a shirt with a pocket is real handy for timers and cards or notes. More good news: The same Sparrowhawk art is now available backing pale grey made in U.S.A. HANES pocket polo shirts. Any color you want, so long as it's U.S. Navy Grey! Haw-aw-aw-w-w-w-w. Order T-shirts at $9 or polo shirts at $11 in S, M, or L size from Dave Smith at FAC Cactus Squadron H. Q., 1041 E. Rawhide, Gilbert, AZ 85234.

Ed Bergman , now building in Chicago sector, will need a Sparrowhawk shirt when he builds his F9C-2 model. Ed checked in the Fox Hole for Mailwing and Sparrowhawk plans. The detail drawings by Pete Westberg were published in MODEL BUILDER. But the copy machine ate the edge with the year and month on the first month, and we don't have any following issue copies filed for reference either. The Mark Fineman index to MODEL BUILDER would be a big help! AERO MODELLER April 1967 features Ian Stair drawings by Pat Lloyd. And for still more F9C detail.I wish I had purchased the late Paul R. Matts' Historical Aviation Album Vol. 18. Bill Hannan to the rescue! Historical Aviation Album Vol. 18 is back, for $14.95 plus $2 postage and pack from HANNAN'S RUNWAY P. O. Box A,Escondido, CA 92025 U.S.A. Bill's latest catalog is a treasure of art, books, and craft. Soft graphitti for WW I fans includes Peanut plans of the Morane Saulnier L Parasol for WW I action at $ 2.50 plus $1.50 postage. WW I biplane plans include the S.E.5a at $3, the I-TY Ansaldo S.V.A.-5 at $3, and the Aviatic C-1 two seater for $2.50. Postage and handling breaks are $1.00 up to $7 in plans, $2.00 for $7.01 thru $15, and $ 2.50 for $15.01 thru $25. $3.00 for over $25. Bills' PEANUTS AND PISTACHIOS VOL. 1 is all sold out (BOO). Volume 2 at $4.95 and the new Vol. 3 at $5.00 are still available (YEA).

Between the Greve and Thompson Races at Geneseo, Tom Nallen who designed the Dayton FAC NAT'S winning Keith Rider R-1 Suzy race plane model, approached this timer. A call to Tom last Spring in Springfield led to a look at the Gee Bee R-1 rebuild project in the shed at Bradley Field, Hartford, Ct. This was a good time to kid Tom about building subjects other than the local favorite Gee Bees, and to check on the Gee Bee A biplane at Bradley Museum discussed in CROSSWINDS # 76 and #77. Psss-ss-s-s-st sez Tom; don't tell anyone except FAC fliers, but if you want to see some racy sketches from the Springfield Museum of Science, for four bucks, I'll send you an eyefull in a plain brown wrapper.

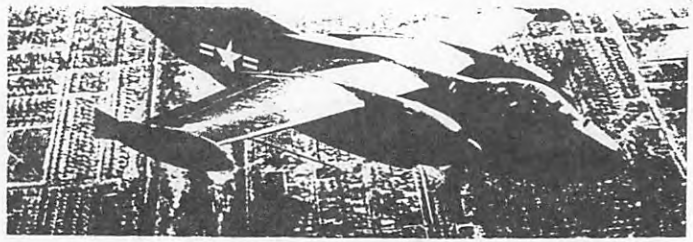
Fast as the pony express goes West, the Postman crams a plain brown 4 X 6 fat pack in the Fox Hole mail drop. Tom doubled up and sent two six packs of sketches on stationary notes. Assortment 1 has the Biplane Gee Bee A and Sportster Models E, D, Z, Y, and X. Assortment 2 adds the famous Gee Bee R-1, plus R-2, Hall Bulldog, Miller Zeta, Ascender, and Q.E.D. And how did Tom get in on this deal? HE EARNED THEM BY DRAWING THE ART! Great talent continues to emerge from Connecticut'Nes Paw? But now the word is out, and Tom just may get a chance at some cover art! Meanwhile, CROSSWINDERS send $ 4.50 to Tom Nallen Co. at 17 Peter Street, Chicopee, Ma 01020 USA (Phone 413/ 592-3615), and he will let you peek in the "plane" brown wrapper too.

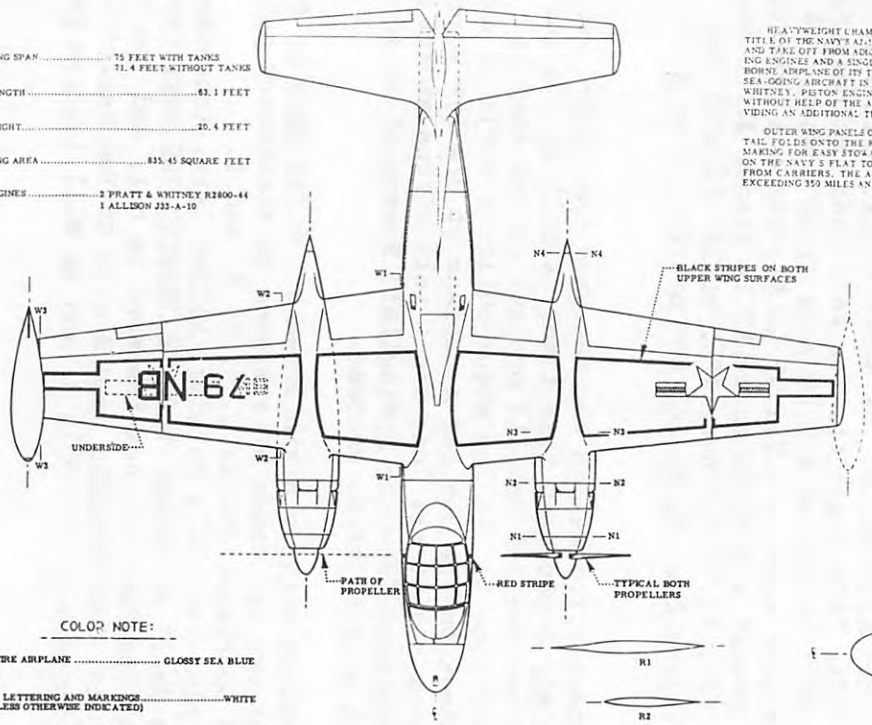
*1 Who spilled Pizza on Count Pizannas' shirt? B.

WING SPAN	75 FEET WITH TANKS 71.4 FEET WITHOUT TANKS
LENGTH	63.1 FEET
HEIGHT	20.4 FEET
WING AREA	835.45 SQUARE FEET
ENGINES	2 PRATT & WHITNEY R2800-44 1 ALLISON J33-A-10

HEAVYWEIGHT CHAMPION OF CARRIER-BASED AIRPLANES MIGHT BE THE TITLE OF THE NAVY'S AJ-1, ITS TWIN ATTACK BOMBER. HEAVIEST PLANE TO LAND AND TAKE OFF FROM AIRCRAFT CARRIERS, PROPELLED BY TWO RECIPROCATING ENGINES AND A SINGLE TURBO-JET, THE AJ-1 IS THE FASTEST CARRIER-BORNE AIRPLANE OF ITS TYPE AND DELIVERS A GREATER BOMB LOAD THAN ANY SEA-GOING AIRCRAFT IN ITS CLASS. THE TWO, 2,300 HORSEPOWER PRATT & WHITNEY, PISTON ENGINES CAN POWER THE GIANT AIRPLANE IN TAKEOFF WITHOUT HELP OF THE ALLISON J-33 TURBO-JET ENGINE, CAPABLE OF PROVIDING AN ADDITIONAL THRUST OF OVER 4,500 POUNDS.

OUTER WING PANELS OF THE AIRPLANE FOLD INBOARD, AND THE VERTICAL TAIL FOLDS ONTO THE RIGHT SURFACE OF THE HORIZONTAL STABILIZER, MAKING FOR EASY STOWAGE ON CARRIER DECKS AND IN THE HANGAR DECKS ON THE NAVY'S FLAT TOPS. DESIGNED FOR HIGH SPEED ATTACK MISSIONS FROM CARRIERS, THE AJ-1, WITH ITS CREW OF THREE, HAS A TOP SPEED EXCEEDING 350 MILES AN HOUR.





COLOR NOTE:

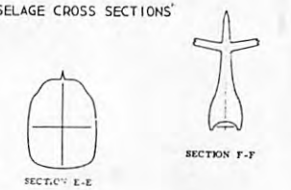
ENTIRE AIRPLANE	GLOSSY SEA BLUE
ALL LETTERING AND MARKINGS (UNLESS OTHERWISE INDICATED)	WHITE
NATIONAL INSIGNIA	RED AND WHITE (THE BLUE OF THE AIRPLANE SERVES AS BACKGROUND. DO NOT USE OUTLINE OF BORDER)
PROPELLERS	DULL BLACK WITH ORANGE-YELLOW TIPS

RUDDER AND VERTICAL FIN SECTIONS

BOTTOM VIEW

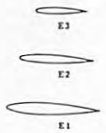


FUSELAGE CROSS SECTIONS

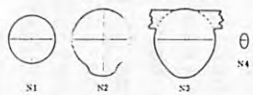


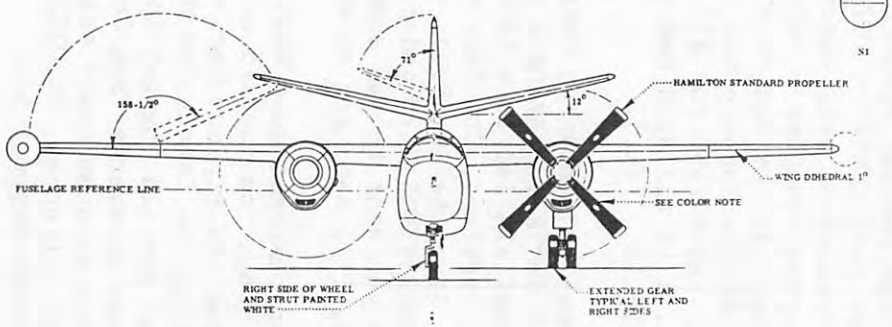
WING SECTIONS

HORIZONTAL STABILIZER AND ELEVATOR SECTIONS

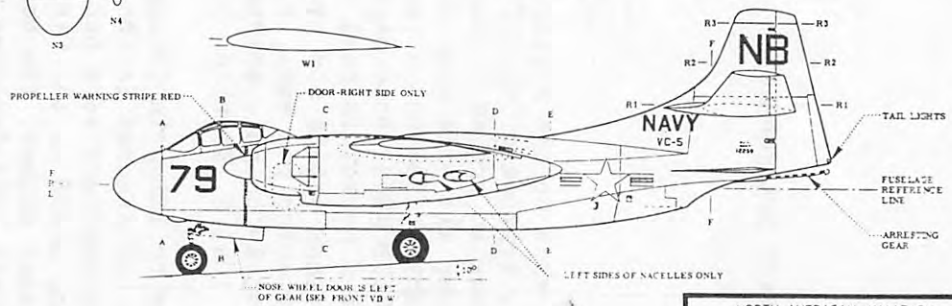


NACELLE SECTIONS





FRONT VIEW



SIDE VIEW

SCALE IN FEET

NORTH AMERICAN AVIATION
U.S. NAVY
AJ-1 Savage
ATTACK BOMBER

SCALE: NOTED	DATE MARCH 1952