

MODEL AIRPLANE NEWS

APRIL

1936

20c



**New Hawker
Single-Seater Fighter**

Model AIRPLANE News

7th YEAR OF PUBLICATION

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Edited by Charles Hampson Grant

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In Our Next Issue

Russia Takes the Air, by Fletcher Pratt, gives you the latest information about the fast developing Soviet air service. We regret this could not be printed in our April issue as planned.

Plans for a simple but remarkable flying Gas Engine Model, by Allen Turner, will appear.

Building and Flying the Curtiss Osprey, by William Winter, provides you with instructions and plans to build one of the best flying scale models ever presented.

Plans for Cahill's Outdoor Fuselage Model, by Frank Zaic, will please the expert builder.

Phillip Zecchetella tells you some interesting things about one of the foremost model builders.

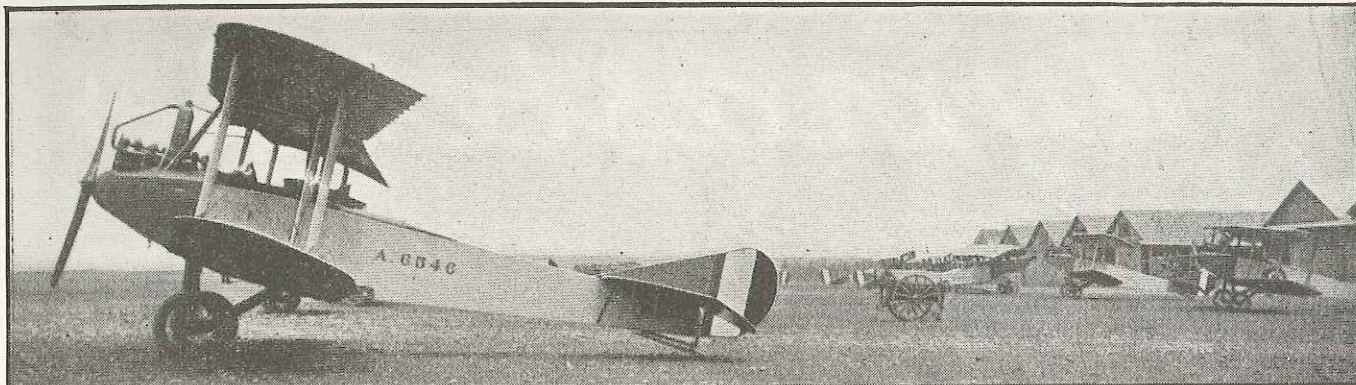
Other unusual contributions to the model art are: a Three View Detail Drawing of the New Northrop X-A13, by William Wylam; Build and Fly the China Clipper Glider, by Jesse Davidson; Frontiers of Aviation, Air Ways, Gas Lines, Aviation Advisory Board, Proportioning the Model for Stability, by Charles H. Grant; and the start of the Navi-Goid Contest. Don't miss this.

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German Aviatik training planes which fell into Allied hands and were painted Allied colors

The German Air Force in the World War

AS WITH all information concerning the German Air Service during war time, very little ever was let out either then or since that time. Their operations remain today a closed book, whether because they feel as a nation defeated in combat that it is nobody's business, or because the records were destroyed when Allied staff officers went to Berlin to check over their operations after the Armistice. Nevertheless, they had a strong air force in the field, a worthy foe and expert airmen to meet in combat. It is for this reason that so many are anxious to know the inside story of their training.

The training of pilots was done in the interior. It began in an aviation school, usually a civil school, or one of the many created by the airplane manufacturers. The finishing was done at a divisional depot squadron, called a Flieger-ersatz-abteilungen.

Up to the time of 1916, before air combat began in earnest, the pilots were required to pass three examinations before they were finished flyers or instructors and only two before they were eligible for a front line squadron. The first examination conferring the title of "Pilot" was obtained after making fifteen solo landings, landing in a circle fifty meters in diameter and making five figure eights

The second examination conferred the

Intimate Details of the Thorough Training System Which Produced the Great German Air Fighters—Part Number 2

By ALFRED CELLIER

title of "Feld-Pilote", or Field Pilot, and these graduates were ready for air combat. This required landing in a circle fifty meters in diameter from a height of five hundred meters, a flight of a half hour at an altitude of three thousand meters with a spiral landing, and a flight of an hour's duration at three thousand meters.

To become a "Flugmeister" or Flying Master, it was necessary to pass a third examination. This consisted of making ten landings in a space one hundred meters wide from a height of eight hundred meters; ten landings in the same space from a height of two thousand meters; ten landings from four thousand meters with power off, and a flight of one hundred and twenty kilometers and return, over a prescribed course.

Like the youth of other nations, most of them were satisfied with the first two examinations in their desire to get active service. Toward the middle of 1917, with

better equipment and the necessity for more finished pilot material, the examinations were tightened up. It was then necessary to take four examinations. The first two were in a civil school and the last two with a depot squadron. These remained in effect until the end of hostilities.

The first examination now required two flights making five figure eights and landing in a circle with a radius of twenty-five meters; the second, making five landings from five hundred meters, the signal to land being given by a pistol shot; ten landings from a height of eight hundred meters in a circle with a twenty-five meter radius; ten landings in the same circle from a height of one thousand meters with the engine stopped, and a flight of one hour at a height of more than twenty-five hundred meters. These examinations were given in an eighty to one hundred horsepower machine, and having passed them the student then went to a depot squadron.

The third examination called for five landings from a signal by pistol shot, and five from a height of eight hundred meters; five landings from a height of one thousand meters and five landings in unknown country; two flights of one hundred kilometers, with an observer; four successive trials in aerial combat at a height of two thousand meters or more including the taking of photographs, and a flight of two hundred



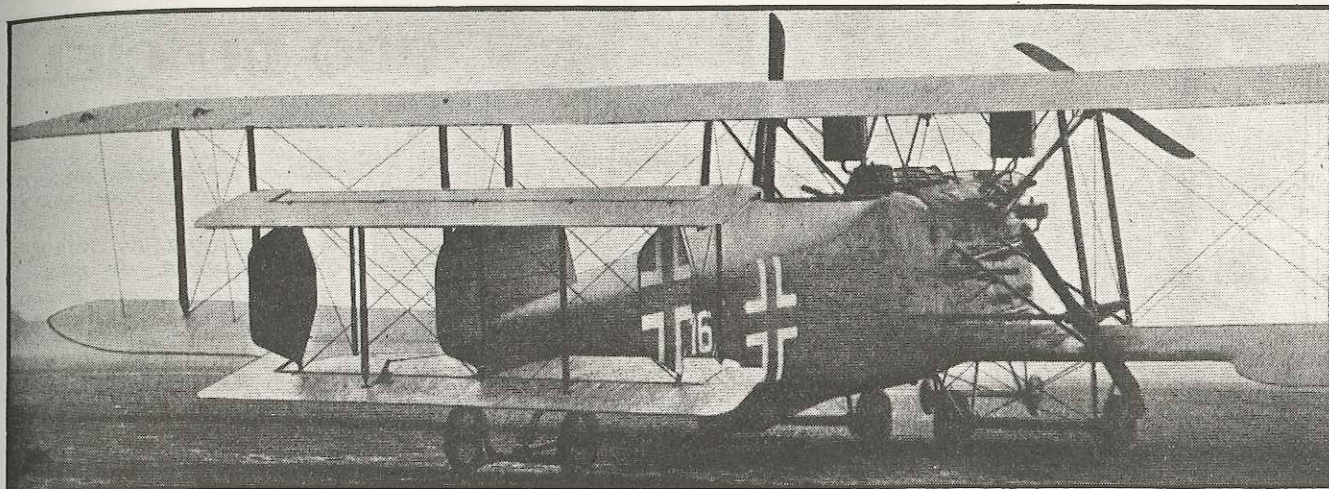
Capt. Immelman beside a British plane he brought down (Nieto)



Ernst Udet in his Fokker D-8. He was a close friend of Von Richthofen (Nieto)



Capt. Oswald Boelcke with his Fokker E-1 in the background



A 1918 Albatross R01 bomber with four propellers driven by engines in the fuselage (R.R. Martin Photo)

and fifty kilometers with an observer, landing during the trip. These examinations were given in machines of 120 to 160 horsepower.

The fourth examinations consisted of flights in different, new, high-powered, single and two-seater machines, with machine-gun firing during the flight. The training of the pilots lasted generally from five to six months. The pursuit pilots were usually selected from the pilots at the front. They were then returned for a special course of instruction in a pursuit school.

Observers also obtained their training at schools in the interior, or as more frequently the case, at Aviation Parks, in the North of France. Their instruction consisted of lectures on tactical and technical subjects and practical exercises.

Practical exercises consisted of flights with or without a tactical mission; machine-gun firing at ground targets and aerial combat lasting not less than fifteen minutes during which the observer took photographs of his opponent with a camera gun. The course finished with three examinations. These were the writing out of a report, reconnaissance work and ranging, and photographic reconnaissance and machine-gun fighting. The duration of the training took about two months.

Before the observer earned his brevet and was permitted to wear the insignia of an observer, he was required to have par-

ticipated in twenty-five flights over the enemy lines; the taking of twenty-five photographs, and have been engaged in at least one aerial fight; to also make two night flights and two bomb dropping flights, and receive by wireless telegraphy sixty letters in a minute and be able to send forty.

The obtaining of personnel for the schools was carried out by the Reserve Training Section, known as the "Flieger-Ersatz-Abteilungen." Approximately 150 to 180 recruits were drawn from civilian employment for each Flieger-Ersatz-Abteilung every three months, preference being given to experienced workmen such as locksmiths, mechanics, turners, etc. In addition, men with technical knowledge from other branches of the Army who were no longer fit for active service, were drafted into the Flieger-Ersatz-Abteilungen. These far outnumbered the civilians, and it is impossible to know the figures in the latter case.

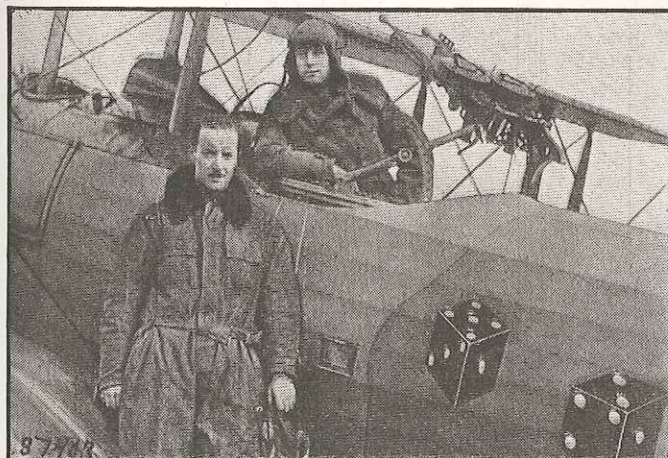
Flying personnel was drawn from the above mentioned sources as well as from officers and men who volunteered for the Air Service. Since volunteers were very numerous, it was possible to maintain a high physical standard. The medical examination was very strict, but apparatus for nerve testing was not used.

Pilots were trained in the Flieger-Ersatz-Abteilung and the Militar Flieger Schulen, or Military Flying School. The preliminary

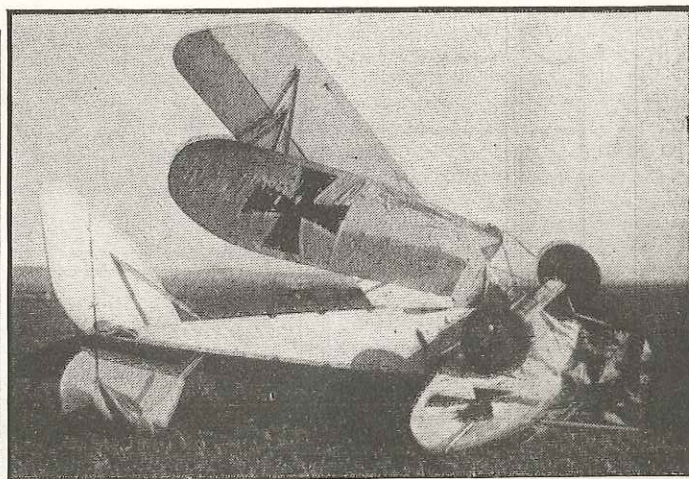
school was known as the "Vorratsschule." Pupils joining the Flieger-Ersatz-Abteilungen from other branches of the Army immediately entered the Vorratsschule, while civilians were first trained in the Rekrutenkompanie, or recruit company. The course comprised lectures on engine construction, meteorology, the compass and map-reading; elementary practical instruction in assembling and dismantling of airplanes was given by mechanics under the supervision of a Werkmeister or Equipment Officer. The lecturers were all officers and N.C.O.s. The pupils stayed at this school on an average of from four to twelve weeks, according to the number of vacancies at the flying school. Owing to the large number of flying pupils a Vorratsschule was attached to several Beobachterschulen, or observers school, and Flieger Funker Schule or Wireless School. After passing an easy examination on the termination of his course at the Vorratsschule, the pupil entered either the Fliegerkompanie or Flieger-Ersatz-Abteilung or was sent to the attached Militar Flieger Schule.

The Military Flying School was called a "Militar Flieger Schule." These schools were conducted by private firms; the training program being prescribed by the Inspektion der Flieger-truppen or High Command of the Air Service. An officer in

(Continued on page 46)



A Salmson and its pilots of the 90th American Squadron, March 1918. Note the twin guns and insignia



A German A.E.G. after a crash at a German training school. Such incidents were a daily occurrence (R.R. Martin Photo)

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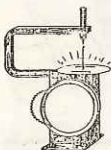
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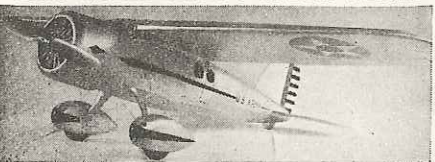
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sachusetts and Rhode Island who wish to enter this contest to get in touch with him at the above address immediately.

"The Soaring Cycle"

A publication which should be of interest to many model builders is "The Soaring Cycle." Anyone who wishes to receive, free, copies of the first two issues of this interesting treatise on soaring, may write to The Soaring Flight Company, Departmental Bank Building, Washington, D.C.

Junior National Aeronautic Association

On March 10, 1936, the Fresno unit of the Junior N.A.A. will celebrate its third anniversary at a meeting to be held at our local headquarters in the Hotel Fresno. In view of the fine work which the Fresno boys have done, their president will appreciate a few words from national headquarters which will offer encouragement and prove to these young men that Washington is still interested in their young American followers.

This chapter has been recognized as the first Junior chapter of the N.A.A. to be organized in the United States, and it was the local group who went on record as opposing the Bingham plan to do away with the Junior rating. Our members have done a fine bit of work, and have been taking an active part in civic affairs of Fresno.

APPLICATION FOR MEMBERSHIP IN THE AIRWAYS CLUB

Please enroll:

Name _____
Address _____
Number of Models Built _____
Type _____
Date _____

Aviation Advisory Board

(Continued from page 26)

Question: Is the stabilizer and rudder area determined in the same manner for a model sailplane as for a rubber-powered model?

Answer: No, the values of the areas of the tail surfaces of a model sailplane should be one-third to forty per cent less than in the case of a rubber-powered model, for equivalent wingspans. This is due to the fact that the propeller generates a torque that causes the tail to swing and prevent the recovery of the model from any disturbed position of flight. A greater area must be used for propeller models in order to overcome propeller reactions. However, formulae given for tail surfaces should be used in this case, for the wing span of several planes is usually excessive and the wing span affects the amount of wing area; the greater the wing span, the larger the fin must be. The fin of a sailplane should be approximately fifteen per cent of the wing area when the aspect ratio is in the neighborhood of ten or twelve. More area than this even may be necessary.

Question: Can the same model be entered in the stick model contest and also

in the fuselage contest when wheels are added?

Answer: No, the type of model is determined by the area of the greatest fuselage cross section compared to the length of the model, in which the length is the distance from the rear of the propeller hub to the extreme tip of the tail. The formula for the cross section area of the body for a fuselage model is $\frac{L^2}{100}$. This area must exceed the amount given by this formula. If it is less, then the model is classified as a stick model.

Question: In designing the KG-2 and 3, how was the airfoil designed?

Answer: The airfoil was developed by Mr. Grant and was designed so that it would give a high lift at a slow speed, and yet have a high lift to drag ratio. This airfoil section has proven on many occasions that it has fulfilled this intent well.

One young man writes us that the $\frac{D}{L}$ of his KG-3 gas model is eighteen. Those who have built this ship know that it flies quite slowly. This speed was desired for this ship because such a characteristic reduces the tendency for crack-ups. Also a slow ship is more likely to seek out and hold thermal currents of air upon which it can soar indefinitely.

Question: Would a model of the KG-2 scaled down to three-quarters be practical? Would any of its flying ability be reduced?

Answer: Yes, scaling this model down is exceedingly practical. Its flying ability would not be materially reduced. By doing this a faster climb would result. The gliding angle of the ship should be about the same.

The German Air Force in the World War

(Continued from page 5)

charge of the school representing the interest of the I. D. Flieg.-T. was responsible for the running of the school strictly on the lines laid down by the High Command. Flying instruction was under the control of the Chief Pilot employed by the firm. The efforts of each firm to obtain first-class instructors and lecturers promoted competition between the firms, which had a considerable influence on the efficiency of the schools. For a fee of eight thousand marks, the firms undertook to provide machines, instructors and free board and lodging for the pupils up to the second examination. It was obvious, therefore, that the company had a financial interest in preparing the pilots for the second examination in as short a time as possible. In the case of pupils who failed to pass the second examination the State paid fifty marks for each flight up to a maximum of thirty-five hundred marks. While a majority of pupils were officers, a large number of other ranks were also trained at the Militar Flieger Schulen.

Each instructor had six to ten pupils, whom he trained on two dual control machines and at least four machines for solo flights. In the spring of 1918, the member of flights on dual control machines had been cut down to thirty. Civilian flying instructors received a minimum pay of three hundred marks per month, plus a premium of two hundred and fifty to three

hundred and fifty marks for every pupil who passed the second examination, a large part of which premium was paid after the pupil had passed the first examination. In 1918, it was no longer customary to make deductions from the instructor's premium each time a pupil crashed. Flying pay of one hundred and fifty marks per month was given pupils dating from their first flight.

Those Vorratsschuler who were not sent to a Militar Flieger Schule received their practical and theoretical training at the Fliegerkompagnie der Flieger-Ersatz-Abteilung, where the whole of the course was in the hands of the military instructors. Flying instructors were always N.C.O.s. Owing to the non-existence of the premium and to the fact that private influence played an important part in the selection of candidates for those posts, the instructing staff of a Fliegerkompagnie was usually greatly inferior to that of a Militar Flieger Schule.

Air Parks were known as Flug Parks. As a rule pilots were sent to the Parks only after having passed the third examination; but in order to relieve the pressure at the Flieger-Ersatz-Abteilungen, pilots were sometimes allowed to pass some of the tests of the third examination at the Park. The first four tests, however, invariably were passed at the Flieger-Ersatz-Abteilung. Pilots who had furnished their training remained one to three months at the Park, where they practiced flying on the latest type machines.

Suitable pilots were selected for special training on single-seaters and twin-engined machines after completion of their course on two-seaters. The former were trained as scout pilots at the Flieger-Ersatz-Abteilung; pilots who flew at the front and wished to become scout pilots were sent to a Jagdstaffelschule or Pursuit Flight School.

Pilots of G-type machines were trained at the Geschwaderschule or Squadron School where formation flying was practiced to a very great extent. Pilots of R-type machines were sent to the Riesen-Ersatz-Abteilung or Giant Airplane Training Section. As a rule only pilots who had flown at the front were sent there.

After a stay of four weeks at the Beobachter Zug or Observation Course, of a Flieger-Ersatz-Abteilung; the observer pupil was sent to a Beobachter Schule, observers school, or an Artillerie Flieger Schule, artillery observation school. The length of the course was approximately eight weeks.

Apart from the Flieger Schutzen Zuge or Machine Gunners Course, at some Flieger-Ersatz-Abteilungen and Observers' Schools, no schools for machine-gunners existed. The training was similar to that carried out at observers' schools, as many machine gunners who had passed the one year course in service were afterwards given commissions as observers. In addition to the ordinary observers' course a very thorough training was given in machine-gunnery and aerial fighting.

Beginning April 1st, 1918, only officer-observers for artillery and long distance bombing flights, as well as wireless telegraphy operators, known as Bordfunker, for giant machines, were trained. The officers and wireless telegraphy operators went through an advanced course lasting four weeks in all branches of aviation wireless telegraphy work. It should be noted that before joining this school, the officers had already gone through a course of eight weeks at an Observer's or Artillerie Flieger Schule, and the wireless telegraphy operators had been trained from three to six months at a Nea Signals School. Only wireless telegraphy operators who could send and receive at a minimum speed of one hundred letters per minute were sent to a Flieger Funker Schule or Wireless Telegraphy School.

In addition to the pupils mentioned, wireless telegraphy mechanics, called F. T. Warte, were also trained at the Flieger Funker Schule. Their duties were to fit wireless telegraphy apparatus on the machines; to keep it tested and in order. The wireless telegraphy pupil mechanic took part in a number of flights until he was capable of tuning an apparatus correctly and of getting into communication in the usual way with the wireless telegraphy ground station, or Flughafenstation. The advanced pupil was also trained in communicating with his own station in spite of several interrupter stations working at the same time.

Two Officers Lehr Abteilungen, called "Ofas", or Officers' Training Sections, trained on an average seventy officers per month. About two-thirds of these were observer pupils, the rest being trained observers sent back from the front.

The training of air mechanics was had by three ways. They could be attached to the first class mechanics; by a course at the Werfeschule of a Flieger-Ersatz-Abteilung, or by a course at the works of various motor firms.

At the Werfeschulen only a general training was given and there were separate courses lasting as a rule four weeks for special classes of mechanics such as riggers, splicers and welders. Men who were attached to engine firms received special training in the type manufactured at the works. In spite of the fact that great care was taken to make the courses as complete as possible, the system did not appear to be satisfactory and there was a much felt

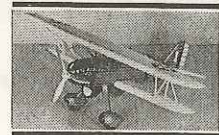
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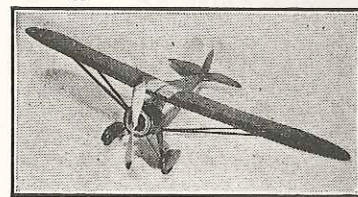
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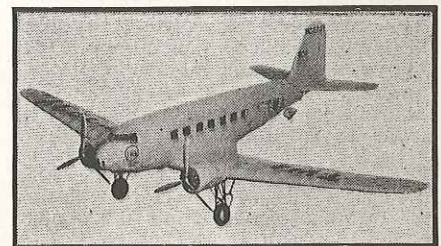
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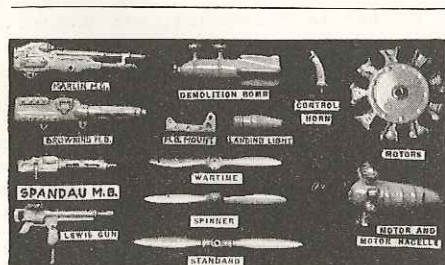
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1/16x1/8 18 for .05	1 1/2" per pr. .20	Large or Small 2 for .05	
1/16x3/16 14 for .05	1 1/2" per pr. .25	Prop Hangers	
1/8x1/8 10 for .05	1 1/2" per pr. .08	Large or Small 2 for .05	
1/8x1/4 8 for .05	1 1/2" per pr. .12	Rear Hooks	
3/16x3/16 6 for .05	1 1/2" per pr. .16	Large or Small 2 for .05	
1/4x1/4 3 for .05	1 1/2" per pr. .10	Steel Beads	
1/2x1/2 2 for .05	1 1/2" per pr. .20	Per doz. .03	
1/2x1 1 for .05	1 1/2" per pr. .25	Washers	
18" Sheets		1/4" dia. per doz. .03	
1/64x2 2 for .10	1 1/2" per pr. .30	3/8" dia. per doz. .05	
1/32x2 3 for .10	1 1/2" per pr. .45	1/2" dia. per doz. .05	
1/16x2 4 for .10	1 1/2" per pr. .45	Jap Tissue	
1/8x2 3 for .10	1 1/2" per pr. .45	Wheels per pr. .45	
3/16x2 2 for .10	1 1/2" per pr. .45	Colored each .05	
1/4x2 2 for .10	1 1/2" per pr. .45	Black, Orange, Red, Yellow, Green, Brown, (new) Silver	
18" Planks		Rubber Motors	
1x1 1 for .05	1 1/2" per pr. .10	1/16 q. 25 for .10	
1x2 1 for .10	1 1/2" per pr. .10	1/32x1/16 20 for .10	
2x2 1 for .20	1 1/2" per pr. .10	1/32x3/32 25 for .10	
2x3 1 for .30	1 1/2" per pr. .10	1/32x1/8 25 for .10	
2x6 1 for .45	1 1/2" per pr. .10	1/32x3/8 25 for .10	
18" Birch Dowels		Aluminum Motor	
1/8; 3/16; 1/4 dia. 1c	1 1/2" per pr. .10	Nose Plates	
1/16x1/4 12 for .10	1 1/2" per pr. .10	3/8" for 1 1/2" Motor .08	
.01 ea. 12 for .10	1 1/2" per pr. .10	1 1/2" for 2" Motor .10	
Machine Cut Propellers		1 1/2" for 3" Motor .15	
5" 3 for .10	1 1/2" per pr. .10	Cast Guts	
6" 1 for .05	1 1/2" per pr. .10	each .05	
8" 1 for .07	1 1/2" per pr. .10	each .10	
10" 1 for .10	1 1/2" per pr. .10	Cast Guts with Ring Mount	
Hand Carved Propellers		each .20	
5" .10 8" .25	1 1/2" per pr. .10	each .25	
6" .12 10" .30	1 1/2" per pr. .10	Bombs	
7" .20 12" .35	1 1/2" per pr. .10	each .05	
Aluminum Props		each .10	
1 1/2" long 4 for .05	1 1/2" per pr. .10	Wing & Tail Lights	
1 1/4" long 3 for .05	1 1/2" per pr. .10	Small 3 for .10	
1 1/2" dia. each .15	1 1/2" per pr. .10	3 for .20	
2" dia. each .20	1 1/2" per pr. .10	Large 3 for .25	
3" dia. each .35	1 1/2" per pr. .10		
Balsa Wheels			
Small per pr. .04	1 1/2" per pr. .10		
Medium per pr. .05	1 1/2" per pr. .10		
Large per pr. .05	1 1/2" per pr. .10		

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1 1/2" Browning with pin 5c	1 1/2" long 10c	
1 1/2" Spandau, per pair 15c	1 1/2" long 15c	
2" long Browning..... 15c		
2" long Marlin..... 15c		
1 1/2" Marlin with pin..... 10c		
LEWIS GUNS		
1 3/4" long 15c		
2" long 20c		
MACH. GUN MOUNT		
For 2" guns..... 5c		
3/4" Landing Light..... 5c		
PROPELLERS		
2 BLAD.		
2 1/2" ST..... 10c	2 1/4" SP..... 15c	1 1/2" ST..... 10c
2" ST..... 15c	3" ST..... 25c	2" ST..... 15c
3" ST..... 20c	4" SP..... 35c	3" ST..... 20c
4" ST..... 25c	5" SP..... 50c	4" ST..... 25c
5" ST..... 30c	6" W..... 15c	5" ST..... 30c
6" ST..... 35c	2 1/2" W..... 20c	6" ST..... 40c
7" ST..... 50c	3" W..... 30c	7" ST..... 40c
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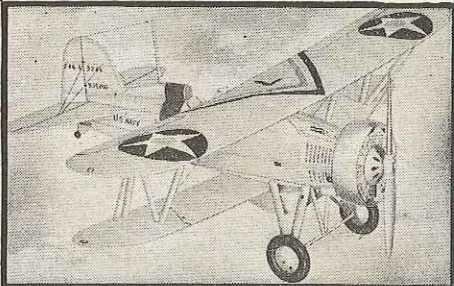
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lack of good mechanics.

The airplanes chiefly in use at the Flieger-Ersatz-Abteilung were of many types, some of which have not appeared on the many lists of wartime machines. They consisted of the Albatros Type B and C I. to XII, Aviatik B and C; A.E.G. B and C, old Fokker two-seater biplanes; German Type B; Gotha B and C; Halberstadt Type B and C to 180 hp. Mercedes engines B.V.G. type B and CL to the 200 hp. Benz engines. Merkur type B and C; Rolands and Rumplers.

Pilots who passed the third examination had the following single-seaters at their disposal: Albatros type D.I to D.III; Fokker monoplane and old biplanes D.I to D.V; Halberstadt type D, with the 120 hp. Argus engine; old Pfalz and Roland Haifischs.

The Reserve Training Section or Flieger-Ersatz-Abteilungen, had schools located and numbered consecutively from one to fifteen at Altenburg, Schneidemuhl, Gotha, Posen, Hannover, Grossenhain, Braunschweig, which was transferred from Cologne in 1917, Crauden, Darmstadt, Boblingen, Brieg, Kottbus, Bromberg, Halle and Konigsberg.

The Bavarian Military Flier Schools, which were the same as the Reserve Training Section in the rest of Germany, had four schools numbered consecutively at Schleissheim, Heustadt, Furth and Germerseheim.

The following Flieger-Ersatz-Abteilungen were being built at the time of the Armistice, Furstenwalde, Weimar, Wurzen, Luckenwalde and Chemitz in West Saxony. Also at Murnau in Waren, a training field was under development which had the war lasted, would have been the greatest flying center in Germany.

The Military Flieger Schulen conducted by private firms were as follows: A.E.G. at Niederneudorf, attached to Flieger-Ersatz-Abteilung 1; Albatros at Schneidemuhl, attached to Flieger-Ersatz-Abteilung 2; Aviatik at Bork, attached to Flieger-Ersatz-Abteilung 3. D.F.W. had three schools of which the one at Leipzig-Mockau was attached to Flieger-Ersatz-Abteilung 6, the one at Leipzig-Lindenthal also to school 6 as was the one at Travemunde. The Gotha firm located at Gotha had a school attached to Flieger-Ersatz-Abteilung 3. Halberstadt located at Halberstadt was attached to Flieger-Ersatz-Abteilung 5. Hansa at Hamburg was attached to Flieger-Ersatz-Abteilung 1. Konder at Grossenhain was attached to Flieger-Ersatz-Abteilung 6. Their two other works at Nordhausen and Krefeld were attached to school 7. L. V. G. at Koselin was attached to school 8. N. F. W. at Leipzig and Rumpler at Muencheberg were both attached to Flieger-Ersatz-Abteilung 9.

The Flieger Beobachter Schulen or Observers' Schools were located at Fuerth, Gotha, Grossenhain, Hannover, Konigsberg, Lager Lechfeld, Schwerin, Schleissheim, Stolp, Thorn and Warschau.

The Artillerie Flieger Schulen or Artillery Observers Schools were at Jueterbog, Libau and Grafenwoehr. The Wireless Telegraphy Schools or Flieger Funker Schulen, were located at Neu Ruppin, Schleissheim, Stolp, Warschau and Johannisstr., while the Bombing School or

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AIR VIEWS, three for twenty-five cents postpaid, all different. Skyview Camera Company, Municipal Airport, Cleveland, Ohio.

Bomben Lehr Abteilung, was located at Frankfurt.

There were also two Bomben Verzuhe Abteilung, or bombing experimental schools, which were located at Frankfurt and Doeberitz. Experimental and testing stations known as the Prufanstalt Und Werft, or called mostly P. U. W., were at Aldershof, which was by far the most important, and at Doberitz.

Aircraft depots and testing stations, known as Flugzeugmeistereien, were located at Aldershof, Charlottenburg and Bork. The motor schools or Motoren Schulen, were located at the following factories of engine manufacturers; Benz at Mannheim; Mercedes at Stuttgart; Maybach at Friedrichshafen; Oberursel at Reinickendorf; Argus at Cannstatt, and the Bosch magneto school at Berlin.

This then, was the organization laid out for the training of Germany's pilots, observers and mechanics. While the flying tests do not appear stiff in view of present day military or commercial requirements, this training contributed to their control of the air on several occasions.