AERIAL RUSSIA

LIEUT.-COLONEL ROUSTAM BEK


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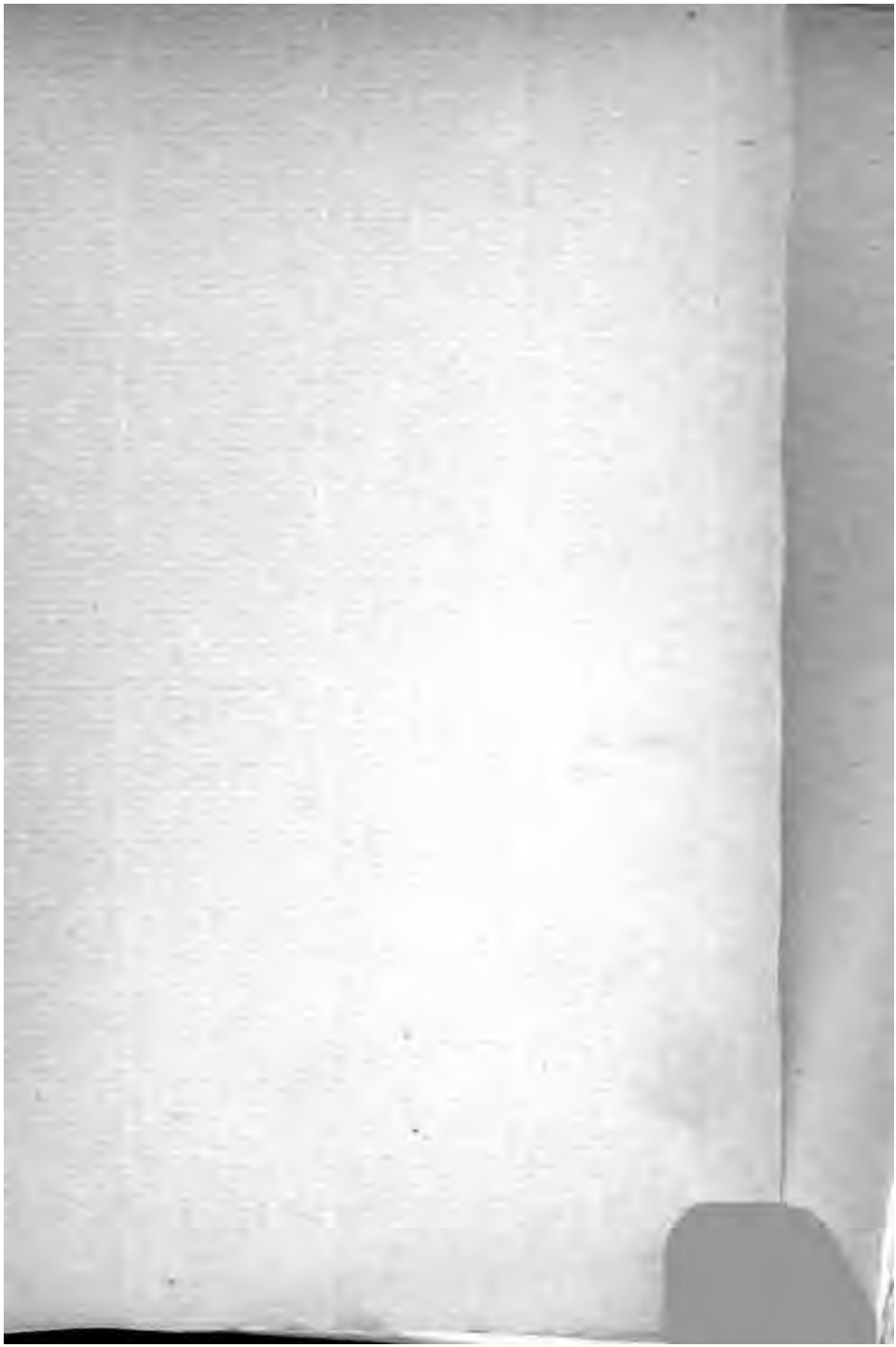

AERIAL RUSSIA

MR. KENNEDY WITH SOME OFFICERS OF THE STAFF OF THE KORPUSNOI MILITARY AERODROME AT PETROGRAD, 1912

AERIAL RUSSIA

THE ROMANCE OF THE GIANT AEROPLANE

BY LIEUT.-COL. B. ROUSTAM-BEK

WITH TWENTY ILLUSTRATIONS

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AUTHOR'S NOTE

I WROTE this book during the troublous nights when the Zeppelins were threatening London and the adjacent counties. While I was writing I was entirely undisturbed by the thought of danger. Outside my windows the great white beams of the searchlights were scouring the skies for the aerial invaders. Now and again I heard the familiar sound of an aeroplane passing through the night and the boom of anti-aircraft guns, and I knew that the heroic men of the British Air Services were guarding their country and its peaceful inhabitants. Many of these men have lost their lives in the fight against German militarism. In the sincerest admiration I dedicate these pages to their memory, and I propose to do myself the honour of devoting

all the profits from the sale of this edition to the fund that provides for the families of British aviators who have died in the cause that is Russia's as well as theirs.

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INTRODUCTION

I AM persuaded that a close rapprochement between Great Britain and Russia, both now and after the war is won, is not only necessary for the well-being of both nations but is also essential to the continued equilibrium and progress of the whole of Europe. The British unfortunately have in the past known little and cared little about Russia. The Russian Empire has remained a mystery, and even now, when the two nations are bound by a most cordial friendship and are fighting a great war in loyal alliance, the large British public remains absolutely ignorant concerning the realities of the vast Empire of the Czar.

In order to understand my country it is absolutely necessary to live there, to learn the

Russian language, and to enter the intimate eddies of Russian life. Nevertheless the Russians are really an easy people to understand. They are free from any kind of hypocrisy. They are characteristically straightforward and frank, and they are extraordinarily eager to welcome the stranger and to reveal to him, with an almost childish confidence, their feelings, their dreams, and their thoughts. Yet Russia remains a " terra incognita." Even the Germans, who practically covered Russia with an industrial net and who for many years had a predominating influence on Russia's economic development, had a very limited understanding of the Russian character. Germany certainly had learned all there was to learn concerning the rapid progress of the Russian army, and before the war the army was unquestionably held in high respect in German military circles. Great Britain, however, knew nothing of the new spirit that has inspired the Russian army since the Japanese War. There was indeed

considerable surprise in Great Britain at the successful advance of the Russians during the first period of the present war. Our success was enthusiastically acclaimed by our friends, and one heard in London loud eulogies of the strength of the Russian army and of the skill of its leaders. Soon, alas! there came a reaction. The British began to reconsider their first high opinion of their new Allies, and their hesitation was the direct result of their lamentable ignorance of Russia—now we can see how wrong they were.

For centuries the Russian people have had a warm admiration for Great Britain. Despite all political friction, British visitors to Russia have always found a most cordial welcome, and I am sure that all British residents in Russia would agree that, if the rapprochement between the two greatest Empires in the world has been unduly postponed, it was certainly not the fault of the Russians. The instinctive Russian sympathy with the British is well illustrated by the career of my friend

Mr. Chessborough J. H. Mackenzie-Kennedy
Mr. Mackenzie-Kennedy has spent the te
best years of his life in Russia and has playe
a large part in the development of the scienc
of aviation in my country. His achievement
make an important portion of the story I hav
to tell, and the fact that a Scotsman is s
largely concerned with aerial Russia appear
to me a happy augury for a permanent *entent*
between the two peoples.

AERIAL RUSSIA

AERIAL RUSSIA

THE ROMANCE OF THE GIANT AEROPLANE

CHAPTER I

A SCOTSMAN IN RUSSIA

MR. CHESSBOROUGH MACKENZIE-KENNEDY is a typical Scotsman. On the subject of aviation he speaks with such complete knowledge and authority that it is difficult to believe that he is only twenty-eight years old. His residence in Russia has caused him to identify himself with the Russian people so completely that he even speaks English now with a slight Russian accent. His Russian, of course, is perfect and he has a most enthusiastic admiration and respect for the genius of the Russian people and the achievements of Russian science. Mr. Kennedy has returned to England on an im-

portant mission connected with aviation. In my long conversations with him he has given me very full details of the progress of the conquest of the air in my own country. As a Russian soldier I am of course familiar with the technical developments of the Czar's army and, adding Mr. Kennedy's information to my own knowledge, I am now able to write a story which I am convinced the British public will find both interesting and surprising.

Mr. Kennedy received his early technical training in the United States and he went to Russia when he was eighteen.

"I reached Petrograd," he said, "with exactly three pounds in my pocket. That was my entire fortune. I did not know one word of Russian, and had not a single friend in Russia."

The revolution which was troubling the whole Empire and the irritation against Great Britain for the part she had taken during the Russo-Japanese War immensely complicated Mr. Kennedy's position. Englishmen in those days were not popular in Russia, and the authorities regarded both the English and the

Americans with suspicion as the friends of Japan. I fancy that only a Scotsman could have overcome such unfavourable conditions. It is difficult in Russia, as everywhere else, for a stranger to get into touch with the heads of great business undertakings. Even, however, at the time of their greatest unpopularity the British were always sure of a certain courtesy in Russia, mainly owing perhaps to the fact that they were regarded as odd persons unlike anyone else in the world. There have always been many anecdotes in Russia about the obstinacy of the Scotch, and this tradition stood Mr. Kennedy in good stead. He approached the directors of the most important State factories, who in Russia are usually generals with high technical qualifications. It says something for Mr. Kennedy's scientific equipment that he, young as he was, attracted the attention of these officials. Almost at once he was entrusted with important experimental work, and he was brought in successive connection with the Putiloff Gun Factory, the Baltic and Admiralty Wharfs, the Mechanical Factories of Ijora, Obuchof, and the Admiralty.

In a short time Generals Ilüne, Voskresensky, Veshkutzoff, Baron Kaulbars, Mr. Tennisson, and many other high officials bore tribute to Mr. Kennedy's unusual capacity. From the first he realised that technical science in Russia is on a high level and that the opinion common in Europe and America in regard to this is absolutely wrong. Mr. Kennedy indeed felt that Russia afforded him the best possible opportunity for improving his own technical equipment. He became a member of the Imperial Russian Technical Society, to which the most accomplished Russian professors lectured. The famous Imperial Institute of Ways and Communications hospitably opened its doors to the young Scotch student. The " anglitchanin " became very popular in Petrograd, and he was materially assisted in his studies by many of the best-known professors. It is remarkable that a citizen of the country that was Japan's ally and consequently Russia's enemy should have found so warm a welcome from all the most important personages connected with the technical side of Russia's army and navy.

Two years passed, and it was then suggested to Mr. Kennedy that he should turn his attention to aviation. In 1908 he had already finished the design of a first Russian aeroplane. It is interesting to remember that at the time he was beginning his aviation career the science had made small strides both in Great Britain and Russia, and neither country possessed a developed aero club. In 1909 Mr. Kennedy began to experiment with the hydroaeroplane. His efforts were made under the patronage of the Imperial River Yacht Club of Petrograd and yielded most satisfactory results. They were reported in the Russian press of September, 1909, and the name of the young British engineer became known to the Russian public. One consequence was the formation of a private company called the Kennedy Aeronautic Company, and this enabled Mr. Kennedy to go on experimenting. He spent 150,000 roubles on these experiments. He gave his attention principally to the study of aero-dynamics and the application to the aeroplane of slow-revolution air screws of large diameter and pitch. It was not till

1913 that he obtained any positive results. During this time, however, he accomplished much for aeroplanes and assisted in the construction of the Russian dirigibles "Golub" and "Sokol."

Mr. Kennedy was presented to the Czar at the first International Aviation Exhibition in Petrograd in 1911. The Czar personally congratulated the young inventor, and he was given the medal of Trade and Industry for the improvements he had made in the details of flying machines. The Russian Press christened Mr. Kennedy "the jeweller of aviation," owing to his particularly fine work. About this time ever vigilant Germany began to pay great attention to this British boy working in Russia, and his name was often mentioned in the German technical press. He was regarded as a possible danger, and the usual Teutonic intrigues were started against him. In those days the British colony in Petrograd, in common with the British at home, were curiously uninterested in the real Russia. Its members went about their business mechanically. Few of them were really acquainted with the

Russian language, and most of them were largely under German influence. At German instigation they regarded Mr. Kennedy with suspicion and refused him any financial help, and all his work was accomplished by means of Russian capital alone.

In 1911 Kennedy met the famous Sikorsky, then a student at the Kieff Polytechnic. The two young men became friends, and their friendship has had a most important effect on the development of Russian aviation. A year before they met, Kennedy had begun to be interested in the construction of giant aeroplanes. Sikorsky was greatly assisted by his association with the Russo-Baltic Wagon Works, and in 1913 he surprised the world with his giant plane "Russky Vitias," which made a series of most successful flights. In the period 1912–14 Kennedy was busy designing giant flying machines and continuing his experimental work in aero-dynamics in the splendidly equipped laboratories of the Petrograd Imperial Polytechnic, the results of his work frequently receiving official commendation.

As a Russian, I know how difficult it is to win the confidence of highly placed Russian experts, and Mr. Kennedy may well be proud that he, a foreigner, should have been so intimately connected with Russian military aviation. He was elected to the Imperial All-Russia Aero Club on its formation, and he became a member of several of its committees. He was one of the four " Aviation Arbitrars," among his colleagues being Mr. Shipoff, once Russian Prime Minister, and Mr. Sikorsky. He enjoyed the close friendship and patronage of the directors of Russian Military Aviation, and he was assisted in his experiments by the best-known Russian scientists. At the present moment gigantic aeroplanes are being built in Russia according to Mr. Kennedy's theories, under the direction of Professor Slessareff. While in Russia Mr. Kennedy was offered the post of Professor of Aero-Dynamics in the Riga Polytechnic.

When war broke out Kennedy, as a British patriot, came to London to offer his services to Great Britain. He is convinced that it is only by means of gigantic machines such as

those of Sikorsky that this country can be adequately protected from Zeppelin attacks. He was naturally disappointed to discover that Great Britain was entirely ignorant of the development of aviation in Russia, which country, from a purely scientific point of view, is undoubtedly at present leading the whole world in the conquest of the air.

CHAPTER II

THE FIRST STEPS

RUSSIAN aviation may be considered to have been born at the beginning of the reign of the Czar Alexander III, who succeeded his assassinated father in 1881. They say that one of the murderers of Alexander II, the Deliverer, was a skilful mathematician and engineer called Kibaltich, and during his imprisonment in the Fortress of St. Peter and St. Paul he worked out the details of an airship. After Kibaltich's execution his scheme was brought to the notice of General Vannovsky, the War Minister, who was immensely interested. General Vannovsky may be regarded indeed as the father of Russian aviation. Kibaltich's scheme convinced him that sooner or later flying machines would have an immense military value, and he

was constant in his interest in the latest science of war.

I, myself, had an intimate personal knowledge of the first practical steps in Russian military aviation. In 1900 and 1901 I was editor-in-chief of the *Military Almanack* and afterwards of *Army and Navy*, and I may boast that I was the first Russian military editor to pay serious attention to aviation. Colonel, now General Kovanko, Captain, now Colonel Hermann, and many others of the early members of the Russian Flying Corps were among the contributors to one or other of my publications. Russian aviation owes an immense debt to General Kovanko. He founded the Central Aviation School for Officers, and became its first chief, a post which he occupies to this day. This school possesses an aerodrome, its own workshops and laboratories, and an officers' club. The students are given every possible facility for experiments, and are especially trained in the science of aerophotography, which has been developed to a very high standard in the Russian service. It is a rather interesting fact that during the

reign of Alexander III General Kovanko directed the test trips of the first model submarine built at Kronstadt.

During the early days of his directorship of the Aviation School Kovanko was brought in touch with an extremely clever engineer and inventor in Captain Kostovitch of the Merchant Marine, who more than thirty years ago built a rigid dirigible and demonstrated its power to fly. This machine, which was constructed in the late 'eighties, may certainly be regarded as the prototype of the Zeppelin, and the German inventor unquestionably was aware of Kostovitch's experiments when he began the construction of his own gigantic airships. It is gratifying to a Russian's pride to know that the Zeppelins owe their birth to a Russian inventor's ingenuity.

Captain Kostovitch's machine can still be seen in Petrograd. He himself remains a valuable worker of the aviation world, but unfortunately he is a type (a common type everywhere) of the "capricious" inventor, and his undoubted genius has not had the practical results that it should have had. His

negotiations with the Government were brought to nothing by his difficult temper and inordinate jealousy, and a private company formed to carry out his ideas was ruined by the large personal remunerations demanded by the inventor. For years, however, he was practically the only constructor of aerial machines in Russia, and a large part of his work was accomplished in the workshops of the Officers' Flying School. As a Government institution this school was of course subject to the common bureaucratic restrictions, and General Kovanko had too settled an official mind to break the bonds of red tape. He realised that commonsense organisation was necessary, but he could hardly suppose that the conquest of the air would proceed as rapidly as it actually did proceed, and that the nation that remained subject to cumbrous officialism would necessarily suffer in the international advance. Fortunately, though the Russian military authorities were slow to move, private initiative came to the rescue. About twenty years ago Mr. Riabushinsky, a wealthy banker and merchant, opened a private aviation labora-

tory near Moscow, and the splendid work done here is known throughout the aviation world. Its first director was Professor Joukovsky, Rector of the University of Moscow, and Professor Slessareff, the research worker of the giant flying machines, acquired his technical equipment in the laboratorium. Riabushinsky's enterprise gave scientific aeroplane construction its first serious impulse in Russia. The results of its experiments were placed at the disposal of inventors, and were used as the basis for lectures in technical schools throughout the Empire.

The reports of the successful flights of the Brothers Wright began a new period of development.

In the years 1908–9 the abortive experiments of an engineer called Tatarinoff seriously affected Russia's faith in the possibility of sustained flight in heavier than air machines. Tatarinoff built a machine which General Kovanko and other experts declared was entirely impracticable. Unfortunately, he was able to obtain considerable public support, and about 200,000 roubles, collected from the

public, were ultimately lost. The consequence was that the Russian investor came to regard aviation with suspicion, and future inventors were unable to obtain the smallest financial help.

At the Sports Exhibition in Petrograd at the end of 1909 only one aeroplane was exhibited. That had been constructed by Mr. Kennedy, who also exhibited the results of his investigations in the building of hydroaeroplanes and rigid dirigibles. At the exhibition the following year Mr. Kennedy had many competitors, and among the exhibits were several freak machines, of little use in themselves, but evidence of the growing interest in aviation. A certain Mr. Svertchkoff, for instance, exhibited a flying bicycle with paddle-wheels. This inventor, just after the war in Manchuria, vainly tried to persuade Field-Marshal Linievitch to adopt his devices.

The Kennedy Aeronautic Company, Limited, incorporated in 1909, was the first Russian aviation company. In 1910 Messrs. Stchetinin and Company opened the first Russian private aeroplane factory. They obtained little or no

support from the Government, and the company collapsed the following year. Later it was reorganised under the name of The First Russian Aviation Company, Limited. Other companies were formed soon afterwards and opened well-organised factories, most of which prospered.

The Imperial All Russia Aero Club began its existence in 1908. It at once became socially popular and in many ways vastly assisted the progress of aviation. In 1911 the Club became possessed of a large and well-equipped aerodrome and began its special aviation weeks.

The history of Naval Aviation began in Russia in 1910. A committee was formed under the presidency of the Grand Duke Alexander Michailovitch and a Naval Aviation School was opened in Sebastopol. Moscow, Kieff, Odessa, and other Russian cities were attracted by the new interest, and most of the technical institutes created aerial laboratories. The first all Russian aeroplane "concours" took place in 1911 at Gatchino, a suburb of Petrograd. The War Office offered several prizes, and as a result of the meeting gave con-

tracts to the constructors, and this encouraged the manufacturers and stirred the scientists to the achievement of improvements and developments.

The second aviation meeting was organised by the military authorities in 1912, and foreign aviators were invited to attend. Among them were the famous Dutchman Heir Fokker, Lieutenant Bier, the representatives of the German makers of the Mars and the Albatross aeroplanes, and a representative of the German Wright Company, who was incidentally the famous Russian pilot Abramovitch. The prize won by Sikorsky on this occasion enabled him to begin building the giant aeroplane that made his name famous and that will probably prove to be the most important aerial achievement the world has yet seen.

From this time the Russian War Office adopted the policy of encouraging aviation in every possible way. The Gatchino Aerodrome was greatly improved. Mr. Kennedy was invited to act as one of the experts of a specially appointed Government commission, and aviation corps were established in various parts of

the Empire. The Admiralty established several aviation harbours on the Baltic and Black Seas, and the naval authorities also frequently consulted amongst others Mr. Kennedy. As in England, the two services had separate and distinct aerial departments.

The Czar and the Russian Royal Family showed a keen interest in the new movement. The Grand Duke Alexander Michailovitch and Admiral Grigorovitch did yeoman service, and the late War Minister, Suchomlinoff, greatly helped Sikorsky to carry out his schemes. It may be safely said that when war broke out in August, 1914, the Russian Air Services were from the scientific point of view the best in the world. Unfortunately, the Russian constructors largely depended on foreign manufacturers, and with the outbreak of war the import of aviation material naturally came to an almost sudden end. This has inevitably created serious difficulties. None the less, the Russian aviators have covered themselves with glory and have made it practically impossible for the enemy to bombard from the air their important cities and strategical points. The

Zeppelins have been almost regularly kept at a reasonable distance from the Russian front, and have not, together with the German aeroplanes, dared to face the insistent risk of attack by Russia's giant planes up to the present time.

CHAPTER III

RUSSIAN MILITARY FLYING SCHOOLS

MILITARY authorities in almost every country are slow to adopt new inventions and new ideas, and long after aviation had become a civilian pursuit it was regarded with a certain amount of suspicion by the Russian War Office. At the same time I am able to state that the official attitude was not entirely hostile. The strategical potentiality of the aeroplane was admitted, but it was considered necessary that the whole science should be very carefully studied before aviation was accepted as part of the equipment of an army.

Instructions were given that the Officers' Central Aviation School, to which I have referred, should conduct a comprehensive survey of the whole question, and the result of this survey was that the War Office officially

declared its adoption of the aeroplane. Flying schools were at once instituted in various parts of the Empire. The first school, to which reference has already been made, was opened in 1910 in Gatchino, a suburb of Petrograd, and the favourite residence of the Czar Alexander III. The chief was Lieut.-Colonel Ulianin, a well-known figure in Russian aviation circles, who has been in Paris during a great part of the present war. Lieut.-Colonel Ulianin began his career under the Command of Colonel—now General—Kovanko, and in pre-aeroplane days he made many flights in military balloons. He persuaded the War Office to allow him to invite the co-operation of civilian aviators and manufacturers, and both Mr. Stchetinin and Mr. Gakkel tested their machines in this military aerodrome. The world-famous Sikorsky pilot, Lieutenant Alechnovitch, began his career under the auspices of Lieut.-Colonel Ulianin, as indeed did most of the aviators who have distinguished themselves during the last two years. In 1911 Colonel Semkovsky initiated another aerodrome near Petrograd. It is one of the

largest and most important in Europe, being five miles long and two miles wide. The dirigible "Koptchik," built from the designs of Colonel Nemtchenko, was launched from here in 1912, but since then it has been exclusively used for aeroplanes. Its chief was my old friend Colonel Hermann, a well-known Russian balloonist, who on one occasion suffered severe injuries during a descent, which injuries, by the way, in no way diminished his enthusiasm for flying. This aerodrome, called the Korpusnoi Aerodrome, may be regarded as the cradle of the Sikorsky giant planes. Here the first giants made their serious trial flights. It is a remarkable fact that, although the aerodrome has been the scene of ceaseless activity and experiment, not one single fatal accident has occurred there. On one occasion Sikorsky himself had a very bad fall in one of his smaller planes. Everyone expected that his dead body would be taken from the wreckage, but, as a matter of fact, he escaped without the smallest injury except the loss of four teeth.

When the aero-dynamic laboratory was

MR. KENNEDY OPENING THE AIRSHIP SHED ON THE KORPUSNOI MILITARY AERODROME AT PETROGRAD, 1912

opened in the Petrograd Polytechnic the War Office arranged that the officers attached to the flying corps should go through a course of study in the technics of the science of flight, and this step unquestionably led to a largely increased efficiency. Among the many students at the Polytechnic was Lieutenant Nesteroff, who looped the loop three days before Pégoud accomplished the same feat in France. The French aviator was furnished with a Blériot machine specially built for looping. Nesteroff was flying in an ordinary military Nieuport, and this fact makes his achievement the more remarkable. Nesteroff was put under arrest for ten days for having taken "undue risk with a machine which was the property of the Government." It is sad to note that both Pégoud and Nesteroff have lost their lives during the war while performing brilliant feats for the common cause.

The officers of the Southern Russian army were afforded opportunities for a thorough training in flying in the school established in Sebastopol by the Grand Duke Alexander Michailovitch. The first chief was Colonel

Odinzoff, a staff college officer and one of the heroes of Port Arthur. He was succeeded by Captain Andriadi, an aviator whose career was as brilliant as it was tragically short. When he entered the Sebastopol School he was an infantry officer without distinction or influence. After two months' training he flew in a Nieuport monoplane from Sebastopol to Petrograd, but, unluckily, soon after he was appointed chief of the Sebastopol School, he was killed while testing a new machine.

Other schools were opened by the War Office in the Caucasus, in Turkestan, in Siberia, and in other parts of the Empire, and it soon became possible for every section of the Russian army to educate its own officers and men in its own local aviation academy. The naval authorities followed the same plan as the War Office. Naval officers were allowed to attend the Sebastopol School with their army comrades, and one of them, Lieutenant—now Lieut.-Commander—V. V. Dibobsky, was Captain Andriadi's competitor in the flight from Sebastopol to Petrograd. The effectiveness of the Sebastopol School has been amply

proved by the success of Russian naval aviators in the Black Sea. Naval aviation in the Baltic had its first centre at Kronstadt, where a school was opened in 1910. It is interesting to remember that the flight of Lieutenant Piotrovsky from Kronstadt to Petrograd on a Blériot monoplane established a record in those early days, although to-day it would be a commonplace. It was soon discovered that the Kronstadt station was absolutely useless for hydroplanes. It was first proposed to remove the headquarters to Hungerburg, close to Narva, where the mouth of the River Narova would have provided a capital hydroaeroplane harbour, but for some inexplicable reason the choice of the Naval Commission fell on Libau, where special docks were built in 1912. Mr. Sikorsky made many experiments here with his giant hydroaeroplanes and obtained good results, but it was a grievous mistake to set up an important station at Libau which the Russians were obliged to destroy so as not to allow it to fall into the hands of the enemy. When it became evident that Libau must be abandoned, the seaplane dock was blown up and all the

apparatus and material destroyed. Specialists agree that there was being brought into existence at Libau one of the most perfect aviation organisations in the world.

The Russian Government indeed has not hesitated to spend enormous sums of money both on the construction of machines and on the education of the officers of the flying corps. This education is far more complete and comprehensive than in this country. Mr. Kennedy tells me, and this is an absolute fact, that even after a Russian pilot has obtained his certificate and passed through the schools he is expected to continue his study of aerial art. The education of the Russian pilot begins with an elementary acquaintance with the parts of an aeroplane. This enables him to become recognised at the local Aero Club, where he then learns to fly and, after an examination, receives his pilot's diploma. He then enters a military flying school, where he stays about six months, flying practically every day and in almost all weathers. After this period of training he must pass another examination for his military pilot's diploma. The tests are as follows:

(1) A flight at not less than 2000 metres.

(2) Volplane with cut-off engine from a height of not less than 1500 metres.

(3) A cross-country flight without stop of not less than 200 kilometres.

When he has obtained his military pilot's certificate, the officer must spend about seven months in one of the aero-dynamic laboratories, studying the theory of aviation, and he then must pass a difficult and searching examination. He is expected to know the construction of aeroplanes of all the principal types. He must be able to put together any type of aeroplane, selected by the examiner, without any prompting. He must prove his knowledge of motor mechanics and particularly of all the engines used by the Russian military and naval aviation corps. He must have a comprehensive knowledge of the history of aviation as well as of astronomy, meteorology, aerophotography, wireless telegraphy, and aerial and army strategy. If he can satisfy the examining commission in all these subjects and prove

that he is a " finished flyer " on at least four different types of aeroplanes, he is admitted into the ranks of army pilots. In peace times, it generally happens that even after this the enthusiast will arrange to spend some time at the Central School at Petrograd, completing his knowledge of balloons, kites, and dirigibles. Without all this information, it is impossible to obtain distinction in the Russian Flying Corps. On one occasion Mr. Kennedy told me the names of nearly fifty Russian officers, most of whom I know, who are masters of naval as well as of military aviation.

The earnestness with which the Russian officer regards his profession is well illustrated by the career of Captain N. A. Jatsuk. After leaving school, Captain Jatsuk entered the naval engineering school, where he spent five years, and was then gazetted as a mechanical engineer in the navy. After three years' service he entered the Supreme Naval College. Successfully completing the course there, he was appointed first engineer on a destroyer on the Mediterranean and Black Sea Station, where he made many experiments

CAPT. N. A. JATSUK

with submarines. During the Russo-Japanese War, Jatsuk was with the fleet of Admiral Rojdestvensky. He took part in the Battle of Tsushima, was rescued from the water by the Japanese, and became a prisoner of war. By good luck he succeeded in escaping and reached Shanghai, from which port he made his way to Petrograd, where he at once began a course of studies at the Imperial Technological Institute. Soon afterwards aviation began to interest Captain Jatsuk. He learned to fly, and received a pilot's diploma from the Imperial All Russia Aero Club. He then qualified himself both as a military pilot and a naval pilot. He went through the course at the Central School, to which I have referred, and was given the title of " Aeronaut." He passed a special examination as a captain of dirigibles. He then obtained special distinction in the technics of aviation, which gave him the right to be called an " engineer of aviation," a very high Russian distinction. Before the war, he was for more than a year Director of the Imperial All Russia Aero Club School. Since the war began, Captain Jatsuk has performed steady

and most valuable service as the commander of a small section of flying machines.

" Believe me," said Mr. Kennedy, " Captain Jatsuk is no exception to his comrades. The Russian Flying Corps is full of such earnest and enthusiastic workers."

Captain Jatsuk, like the great Russian Admiral Makaroff, comes from the very heart of the Russian people, from one of those simple Russian villages which have given the nation so many thinkers, writers, artists, and soldiers, and whose spiritual resources are absolutely inexhaustible.

When war broke out Russia had at its disposal about 300 highly trained military pilots, about 100 naval pilots, and more than 200 civilian pilots, while a large number of officers were in course of training at the various schools. Even the Germans were surprised at the extent of Russia's aerial resources, and Great Britain had no idea whatever of the progress made by her new ally.

CHAPTER IV

THE IMPERIAL ALL RUSSIA AERO CLUB

RUSSIA has for years had an all-round admiration for the sporting life of Great Britain, and she has created many clubs on British lines for the improvement and development of Russian sport. The Imperial All Russia Aero Club was founded in 1908 by a few members of the Russian aristocracy, who were interested in aviation from a purely patriotic point of view. The Aero Club soon became a popular institution, and it has certainly played a most important part in the progress of Russian aviation. It owed its initiation principally to the world-famous Russian General Baron A. Kaulbars, and its first president was the well-known millionaire, Count Stenbok-Fermor. At the beginning the Club was mostly occupied in

experimenting with balloons and box kites. The balloons, "Vasily Korn" and "Count Rostovtzeff," made several interesting flights under the pilotage of Ulianin, Sredinsky, and Kuznetzoff. Members of the Russian Flying Corps were interested in the Club, among them the famous Captain Shabsky. The Aero Club indeed succeeded in uniting, through their common interests, the civilian and the military airmen.

In 1909 the Club began to pay serious and persistent attention to the aeroplane. It sent Mr. Raievsky, Mr. Sredinsky, and Mr. Lebedeff to Paris to study the developments of aviation in France, and the result of this visit was the opening of the Club's Flying School. In those days it had no aerodrome of its own, and it hired a field from the Wing Company, the chairman of which was Mr. Boris Souvorine, the son of the editor of the *Novoie Vremya*. The school, which was directed by Sredinsky, had at first little success. Sredinsky himself was a good aeronaut and an experienced balloon pilot. He flew in aeroplanes with courage and enterprise, but he was never able

to land safely, and he contrived to smash up all the machines he used.

The Aero Club's first contests were organised in 1910 with a flight from Petrograd to Moscow. Mr. Wassilieff reached the ancient Russian capital (603 versts) in the same day, and won the prize. Another competitor, Mr. Slessarenko, had a bad fall, severely injured himself, and killed his passenger, and none of the others succeeded in reaching the goal.

With the assistance of private capitalists the Aero Club also began in 1910 the organisation of "aviation weeks," during which for the first time in Russia military aviators were allowed to fly before the public.

In these early days the few companies formed to build aeroplanes were almost bankrupt, and even the Wing Company, despite the fact that its chairman was of a rich family, was on the point of collapse. In order to keep the aerodrome the Aero Club bought it outright from the Company. The Flying School was reorganised by Mr. Lebedeff, who from that time supplied Russia with a succession of well-trained pilots.

The 1911 Aviation Week ended in disaster. The aeroplane "Sommer," built by the Russo-Baltic Wagon Works, crashed down and its pilot, Mr. Schmidt, was instantly killed. During the same year the Aero Club hangars began to shelter many new machines built by native inventors, and from then until the outbreak of the war new apparatus was constantly tested in the Club's aerodrome.

Since 1910 the Aero Club has made a practice of inviting famous foreign aviators to visit Petrograd. Latham was one of the first visitors, but his flight from the Jockey Club Racecourse was an utter failure. In 1911 Christians, Vincieas, and Morane flew in Petrograd, and they were followed by Blériot, who lectured and had a most enthusiastic reception.

The success of the Imperial All Russia Aero Club led to the institution of sister clubs in other cities. At first the club depended on the subscriptions of its own members, but in 1911 the Czar granted it permission to open public subscriptions for the creation of a Russian Aerial Fleet, and this permission gave the

Club considerable political importance. In a very short time £20,000 was collected, all of which was spent in the construction of aeroplanes, the types including the "Wright," "Curtiss," "Blériot," "Antoinette," "Pichoff," and "Farman."

Until 1914 the Club was handicapped by the want of good hangars, and in that year the first of these were constructed under the direction of Captain Jatsuk, who had succeeded Lebedeff as Director of the Aviation School. Jatsuk's administration was in every way successful, and it was owing to his efforts that military officers were enabled to obtain their elementary flying education from the Aero Club's instructors.

In 1912 Prince Abamelik-Lazareff offered through the Club a prize of a thousand pounds to any aviator who succeeded in flying from Petrograd to Moscow and back in two days. The competition took place but nobody fulfilled the conditions. Next year the prize was offered again. The conditions were made more severe, the two journeys having to be completed within twenty-four hours. Was-

silief was the only flying man who finished the course, and he was seventeen minutes too late for the thousand pounds.

During these years Sikorsky was experimenting with his giant planes on the Club's aerodrome, and a Mr. Steglau was constantly testing a highly interesting type of machine which he had invented, and which was built entirely of wood, even the wings being constructed of three-ply wood instead of fabric. The Steglau machines flew very well. Unfortunately the inventor insisted on flying them himself, and, as he was anything but a good pilot, there occurred a whole series of accidents. Steglau was a large contractor and an important financier and his bankers were naturally keenly interested in his career as an aviator. His death would have meant considerable loss to his financial associates and they read the accounts of his almost daily accidents with apprehension. The banks therefore decided to stop credit and Mr. Steglau was forced to abandon his career as an aeroplane pilot.

Among the Club's members was a young

THIRD ALL-RUSSIA AVIATION CONGRESS AT PETROGRAD ON THE 7TH APRIL, 1914
FRONT ROW: FROM THE LEFT, 3RD, COLONEL PROFESSOR NAIDENOFF; 4TH, PRESIDENT OF THE IMPERIAL ALL-RUSSIA AERO CLUB, COUNT I. V. STENBOK-FERMOR; 5TH, MR. SREDINSKY; 6TH, PROFESSOR N. A. RINEN
SECOND ROW: FROM THE LEFT, 2ND, MR. POROHOVSTCHIKOFF, THE YOUNG CONSTRUCTOR; 7TH, CAPTAIN N. A. JATSUK
THIRD ROW: FROM THE RIGHT, 7TH, MR. KENNEDY

student of eighteen called Porohovstchikoff. This boy built an aeroplane of his own invention and fitted it with a hundred horse-power Gnome engine. His machine was copied by the Germans and they have used it as the model for some of the types of their battle aeroplanes. The distinctive feature of the Porohovstchikoff is its double fuselage.

When war broke out the Imperial All Russia Aero Club placed all its pilots at the disposal of the General Staff and they are being maintained in the field at the Club's expense. In addition to this direct help the Club has rendered good service to the Government in the drawing up of new aviation laws.

For years it has carried out a sustained aviation propaganda by means of popular lectures in every part of the Empire. This propaganda has had the happiest results, and in 1914, in spite of the vastness of Russia and the general ignorance of the Russian peasant, there was scarcely a village in the Czar's dominions where the people did not know that men had learned to fly.

When in the early days of the war two

AERIAL RUSSIA

Austrian aeroplanes landed in a Russian village, where every man had gone to the front and only women were left at home, these women met the aerial visitors without any apprehension, captured them and looked after the machines until they were fetched away by the authorities.

CHAPTER V

GENERAL BARON KAULBARS AND AVIATION

GENERAL BARON KAULBARS is a member of the Supreme Military Council of Russia, and one of the most brilliant of contemporary Russian soldiers. He is seventy-four years of age, though both his appearance and his energy suggest a man still in the prime of his powers. He is strikingly handsome, and on first meeting him one would take him for a recently appointed general rather than a general with many long years of service. Baron Kaulbars is distinguished by his charm of manner, and he has the Russian characteristic of extending a common courtesy to men of all classes. He indeed commands universal respect and admiration. He is a type of the working officer, brilliant in the field and tireless in the constant preparation

for war that fills a soldier's time during peace. He has reached his high position, not by mere luck, but by genuine hard work. Baron Kaulbars was a general as long ago as 1880 and his military biography would fill a large volume. I have had the honour to serve under his command, and the details of his career are quite familiar to me, although I am bound to add that they are equally familiar almost to every Russian and particularly to men interested in aviation. Baron Kaulbars' father was also a general and served in the Russian army for more than fifty years. His son has served for fifty-four years. He has seen seven wars and taken part in eighty-two battles, and he has received practically every decoration that a general can receive, among them the Star of St. Alexander Nevsky, set with diamonds, and the Grand Cordon of the Legion of Honour.

He began his service in the Life Guards in Petrograd and was subsequently at the Staff College with Skobeleff. He took part in the Khiva Expedition and afterwards made an exploration tour in the then unknown parts of

GENERAL BARON A. KAULBARS

In the corner of the photograph the General has written the following: –
"To Mr. Kennedy the constructor of the giant Aeroplane, from his friend of Russia,
Baron A. Kaulbars, 9th June, 1916, London."

Central Asia. His exploration of the Thian-Shan Mountains led to a most important addition of general geographical knowledge. Baron Kaulbars discovered the old bed of the River Amu-Daria and he worked out a plan for diverting the river back to its original channel. He found out the reasons why the Amu-Daria had changed its course and he convinced Russian geographers that if it could be again turned into the Caspian a highly important waterway could be constructed by which goods could reach Afghanistan from Western Europe.

Baron Kaulbars was one of the heroes of the Russo-Turkish War of 1877–78, and he acted as one of the Russian Plenipotentiaries at the famous Berlin Congress. He was afterwards appointed the first Minister of War to the newly created state of Bulgaria, and afterwards was Regent there for some time.

General Kaulbars has spent the greater part of his military service with the cavalry and the General Staff. He first commanded a cavalry division, afterwards became chief of a cavalry corps, and later of an army corps. During the

Boxer Rising General Kaulbars was at the head of the Russian army in Korea. He crossed this difficult mountainous country with Cossacks and artillery with the temperature at 20° below zero, and this experience proves the extraordinary power of the Cossacks to withstand the severest physical conditions.

General Kaulbars commanded the Third and Second Manchurian armies during the Russo-Japanese War, and the outbreak of the Revolution found him Commander-in-Chief of the Odessa Military District. It was a trying experience, particularly for a man of conspicuously kindly heart, but Baron Kaulbars succeeded in obtaining respect even from the enemies of the Government. Baron Kaulbars was in Switzerland when the present war broke out, and with his wife and daughter, who is a lady-in-waiting to the Empress, he was arrested by the Germans on his way to Petrograd and treated with considerable indignity. They were afterwards exchanged for a number of German officers who had been detained in Russia. Since then the Baron has been badly injured in the course of an aeroplane recon-

naissance—a sufficiently hazardous adventure for a man of his age—and he has lost a son, a captain in the Life Guards, who fell on the field of battle as a true son of Russia. The Baron was in London during March of last year, on his way to France, and had the honour to be granted a special audience with the King and Queen.

I recently had the honour again to meet this great soldier in London, and I spent several happy days with him. His connection with aviation began with his founding of the Imperial All Russia Aero Club, and his first flight experiences were with balloons and kites. At the time when the Grand Duke Alexander Michailovitch founded the Aviation Section of the committee for enlarging the Russian fleet by voluntary contributions, General Kaulbars was appointed its Vice-President, an office which he still holds. He was almost the first Russian soldier to realise the potential military value of the aeroplane, and it was he who urged that the most promising Russian pilots should be sent to France to study the construction of machines and the development

of the art of flying. He himself attended the early French aviation meetings, and he also paid considerable attention to what was being done in Germany and Austria. It was not necessary for him, alas, to make investigations in England, for in those early days England was utterly uninterested in the new science, and the few Englishmen who had been attracted by the conquest of the air were working in France.

The General organised the first Petrograd-Moscow Aeroplane Race in 1910. He twice motored to Petrograd and Moscow and back —a total distance of over 1600 miles—and he personally prepared the maps of the course, on which were marked the marshes, forests, railways, towns, and villages, as well as all suitable landing-places.

He afterwards persuaded the War Office to construct the famous Gatchino Aerodrome, which is still regarded as one of the best-equipped aerodromes in the world. It has magnificent hangars, an officers' club, barracks, and modern workshops where complete aeroplanes can be constructed. It also possesses

the most recent apparatus for facilitating night-flying.

The General's connection with the Grand Duke Alexander Michailovitch's committee brought him into close touch with the developments of Naval Aviation in the Baltic and Black seas, and he did excellent service in the establishment of Naval Flying Schools and the building of hydroaeroplanes. He was the founder of the Odessa Aero Club, which, thanks to him, has become an institution of the first importance and the centre of aviation in the south of the Empire. The Odessa Club possesses a fine aerodrome and every facility for the study of aviation problems. As I have said, he lent his energies to the appeals for voluntary contributions for the founding of a Russian Aerial Fleet. These appeals led to the collection of many millions of roubles which much enabled Russia to be so well prepared for war in the air when Germany launched her bolt against Europe. Thanks to his suggestion, a great deal of money was saved through economies in the building of warships, and these savings were spent in the construction of aero-

planes instead of airships, for Baron Kaulbars has always believed that the aeroplane was a much more valuable military weapon than the dirigible. In this respect his foresight and understanding have been quite remarkable.

As the art of aviation progressed, the General continued to keep in touch with all that was being done outside Russia's borders, and the journeys of the various technical committees were largely undertaken at his suggestion. The information they collected was placed at the disposal of native engineers, inventors, and manufacturers. It may indeed be safely said that there is not one single well-known aviation constructor in Russia who has not, at one time or the other, received timely and invaluable assistance from General Baron Kaulbars.

The work of Sikorsky, Kennedy, and Slessareff, in designing and constructing giant planes, attracted the attention of General Kaulbars at the beginning, and he watched their efforts with the closest interest. It was principally owing to his influence that the Baltic Works were persuaded to finance Sikor-

sky and to place their unrivalled technical facilities at his disposal. General Kaulbars was particularly pleased by the close co-operation which existed between the three men who brought the giant aeroplane into existence. This co-operation, by the way, is the more remarkable when it is remembered that each has his own very definite ideas. Sikorsky and Kennedy are both practical aeroplane constructors, and Professor Slessareff made the scientific investigations essential to them at various stages of the actual building. Readers of this book should note how successful the co-operation has been and that it has enabled Mr. Kennedy within the last few months to construct a giant aeroplane for Great Britain.

General Kaulbars attended all the early trials of the giants and made many flights in them himself. This actual experience enabled him to speak with first-hand authority and to convince the War Office of their supreme military importance. The consequence has been that Russia has abandoned the dirigible altogether and that she is now devoting all her

energies to the construction of a great aerial fleet of giant planes.

General Brussiloff's recent advance in Galicia, which has filled the world with admiring astonishment, has been greatly assisted by the magnificent scouting work performed by the Sikorsky aeroplanes attached to his army.

British sportsmen will be interested to know that General Kaulbars, in spite of his age, is the only general who has made hundreds of flights in seventeen different types of machines and has over fifty times looped the loop. Last year, although while making an aerial reconnaissance over the German positions he had a bad accident while landing and broke three ribs, his enthusiasm was not the least affected by this incident, and the General has since made other flights in Russia, in England, and in France. He is, in sober truth, the "Grand Old Man of the Air."

CHAPTER VI

THE IMPERIAL RUSSIAN TECHNICAL SOCIETY

RUSSIAN aviation has received invaluable support from the Imperial Russian Technical Society, which in 1909 added an aviation section to its existing sections—"Land," "Water," and "Mining." The President of the Technical Society, Professor Maxime Kovalevsky, became President of the Aviation section and weekly lectures were held during the winter. From 1910 to 1912 the Technical Society took a leading part in the aviation exhibitions held in Petrograd and Moscow. I have before pointed out that aviation in Russia was the cause of an entirely new co-operation between the army and well-known civilians, a co-operation which has undoubtedly done a great deal to establish the national unity which has characterised

Russia during the great war. This co-operation is evident in the fact that the second president of the Aviation section of the Technical Society was Colonel Naidenoff, a professor of the Military Staff College. Colonel Naidenoff did much to bring together the various agencies for the education of Russian flying men, and it was much due to him that aviation received the steady support of great technical institutes.

In order to keep in touch with all the latest developments of aviation the Imperial Russian Technical Society has every year sent representatives to France. Professor N. A. Rinen was one of these representatives and on his return to Russia he formed an aviation section in the Petrograd Institute of Ways and Communications with a splendidly equipped laboratory. Russian scientists have indeed taken aviation very seriously. No member of the Technical Society has patented an aeroplane invention until it has been carefully studied and discussed by a special expert committee, which has included among its members such men as Joukowsky, Kouznetzoff, Slessareff,

Pomortzeff, Botezat, and Sikorsky, men well known throughout the whole scientific world. I have occasion frequently to mention Russian names which will be unfamiliar to the majority of British readers, but there is such a growing interest in Russian affairs in this country that I need make no apology for referring to those fellow-countrymen of mine whose work is not only intimately concerned with the history of Russian aviation, but as a matter of fact intimately concerned with the history of aviation generally.

The Imperial Russian Technical Society has been particularly careful to discourage all freakish futility, and it gave scarcely any support to the impracticable inventions of Tatarinoff and Svertchkoff, which I have described in a preceding chapter. On the other hand, the Society gave generous assistance to Mr. Stchetinin and his partners, Mr. Stcherbakoff and Mr. Vorobieff, and many others seriously working for the benefit of aviation. Stchetinin was a wealthy young man who spent his entire fortune in the development of an aeroplane factory, and thanks to the support he

has subsequently received the factory is now established on a sound commercial basis. Another prominent Russian aeroplane constructor is Professor Gakkel, a chief engineer of the Russian Westinghouse Company. He joined the Aviation section of the Imperial Russian Technical Society in 1910 and delivered frequent lectures on his ideas. His first aeroplanes were built at the Russo-Baltic Works at Riga, where the aviation department was directed by Prince Koudasheff. These first machines were an utter failure, and a seaplane built by Professor Gakkel in the spring of 1911 was unable to rise from the water. He persisted, however, and in the summer of the same year he achieved a great success, a tractor biplane constructed by him and piloted by Lieutenant Alechnovitch gaining the first prize at the first Russian Military Aviation Meeting.

Jews were admitted as members of the Imperial Russian Technical Society, and excellent work for the cause of aviation was performed by at least one of them, Mr. Rosenzweig, a clever organizer, to whom the success of the

aerial exhibitions was unquestionably due. It was at the Moscow Exhibition that the Sikorsky aeroplane first attracted considerable attention. This great Russian, who is now only thirty years old, was a student at the Kieff Polytechnic. He is very reserved and shy, dreads publicity, and always listens rather than talks. Perhaps in consequence of this his early work passed almost unnoticed in the aviation world, and it was only when he made his flight on his first giant plane, " The Knight of Russia," that he became something of a national hero. The Imperial Russian Technical Society once arranged a series of remarkable lectures, which had an enormous effect in focussing public opinion on the possibilities of the new science. The first series was delivered by Professor Slessareff, the expert scientist ; the second by Mr. Sikorsky, Russia's giant aeroplane pilot ; and the third by Mr. Kennedy, whose knowledge of the construction of aeroplanes was unrivalled. Among the people attracted by these lectures was Steglau the millionaire, whom I have already mentioned. A simple peasant by origin, Mr.

Steglau started life as a navvy on drainage construction. He performed his military service, of course, as a private, and after four years went back to his old work, becoming a ganger in a short time. Circumstances enabled him to start business for himself and in a few years he became one of the richest contractors in the Empire. The possession of money made no difference in Mr. Steglau's character. He was a millionaire at forty, but he remained the same simple, good-tempered peasant. He began to study the theory of aviation. He designed plans for an aeroplane of his own, built it himself, fitted it with the best engine obtainable, and then flew in it himself. Mr. Steglau as a contractor had been famous for the solidity of his work and he astonished the aviation world in the spring of 1911 by denouncing the use of fabric for the wings of the aeroplane as being far too flimsy and urging that three-ply wood should be used instead. The experts were naturally unconvinced by suggestions coming from a theoretically uneducated man, but in the spring of 1912 Steglau appeared on the aerodrome of the

Imperial All Russia Aero Club with his new tractor biplane entirely made of wood and fitted with a hundred horse-power engine.

"Who is going to fly on this machine?" Mr. Steglau was asked.

"I am," was the answer.

"Have you ever done any flying before?"

"Never," was the reply.

Whereupon he climbed into the aeroplane, started the engine, and began to rise from the earth to the stupefaction of the onlookers. He rose to a height of 600 feet and flew above the aerodrome for nearly an hour. His landing was less successful than his rising. He smashed down a fence ten feet high, but his machine was practically undamaged. The ends of the wings were slightly broken, the propeller was smashed, and one of the cylinders of the engine was crumpled. That was all. The pilot himself climbed out of the seat with the same unconcern as might be shown by a coachman who has noticed that there is something wrong with one of the wheels of his carriage, although the shock of the landing had been so great that any ordinary aeroplane

must have been smashed to pieces. He was surrounded at once with astonished enquirers.

"There is nothing in the least wonderful in what I have done," said Mr. Steglau. "I have watched other men flying, and I saw how they did it. As soon as I got up into the air I began to think how I should land and "—looking at his machine and the broken fence —" it might have been worse."

The Russian peasant takes a long time to make up his mind, but when he has once determined on a course of action nothing can stop him. In this, indeed, he is very like the Englishman. During the summer of the same year Mr. Steglau flew at the second Military Aviation Meeting, and his apparatus was soon regarded as the safest that had ever been constructed. He never flew without an accident. On one occasion he killed a cow. On another occasion he wrecked the top of a hangar, but whatever else happened neither the pilot nor the machine was ever seriously damaged. The principal technical defect of his aeroplane was its lack of great lifting power. At the end of 1913, as I have related, Mr. Steglau was

obliged, by the pressure of his financial associates, to abandon flying, but he has continued his connection with the Imperial Russian Technical Society and has constantly been lavishly generous in the assistance he has given to struggling inventors.

The Imperial Russian Technical Society has given valuable assistance in the development of inventions made by officers of the Russian Flying Corps. Among them were Lieutenant Bogatireff and Lieutenant Kovanko, the son of the famous general. The young man Porohovstchikov, only seventeen years old, made many important aerial inventions and received the congratulations of a committee presided over by the Grand Duke Alexander Michailovitch.

The Aviation Section has always carefully watched foreign inventions and has collected every possible form of information about aviation which has been regularly published in its journal. During the present war it has carefully studied the comparative utility of the various types of machines used at the front. I do not think it would be possible

to exaggerate the scientific value of the work performed for aviation by the Imperial Russian Technical Society, and it would be a splendid thing for both countries if a close entente could be established between the Society and those English scientists who are concerned with the conquest of the air.

CHAPTER VII

THE PROTOTYPE OF THE ZEPPELIN

I HAVE already mentioned the fact that thirty years ago the first rigid dirigible, the prototype of the modern Zeppelin, was built in Petrograd by the Russian, Captain Kostovitch. Its capacity was about 9,000 cubic metres of hydrogen and it was entirely constructed of a special light three-ply wood called "Arborit." Captain Kostovitch was obliged to devise machinery for the preparation of this wood, and the sheets, although they consisted often of twenty plies, could be made as thin as the thickness of a visiting card. Captain Kostovitch also invented a special method of his own for pressing the wood into any shape and using it for hollow spars and girders, and his method was so successful that the wood became extremely strong and could

the potentialities of the dirigible. Yet even before Kostovitch, Russians had thought out the possibility of constructing aircraft that could be steered, and a Russian Pole actually suggested to Napoleon that he should invade England by means of airships.

When at the beginning of what may be called the "Era of Air Conquest," both France and Germany began experiments with dirigibles, their efforts were watched with interest by the Russian authorities, who made many purchases in both countries. In 1910 the Russian army possessed twenty dirigibles of different types, eight of which were of considerable size. In that year Russia practically ceased to buy her dirigibles abroad and began to manufacture them herself. The War Office gave special encouragement to rubber and fabric manufacturers, and it is now generally admitted that the Russian envelopes are from the technical point of view superior to those manufactured in Germany and France. Russian dirigibles were built by Captain Shabsky, Colonel Golubeff, and Colonel Nemtchenko. Just before the war, a Shabsky

airship was launched with a capacity of 20,000 cubic metres. The Zeppelin capacity is 22,000 cubic metres. It was fitted with four 170 h.p. Laviator engines. Four months earlier Colonel Golubeff's "Albatross" successfully took the air. Its capacity was 9,700 cubic metres and its engines had a total of 400 h.p. This airship beat the world's speed record for semi-rigid dirigibles. It is certain that both these dirigibles have performed valuable service during the war.

So careful and experienced are the officers and crews of the Russian dirigibles that Russia has acquired a unique distinction among the countries that possess airship flotillas. Up to the outbreak of war there had not been one fatal accident resulting from their navigation, nor had one of the pilots been seriously injured.

CHAPTER VIII

CONSTRUCTORS, AVIATORS, AND WORKMEN

THE intimate relations that exist between employers and employed in Russia is something quite unknown in this country, and their almost brotherly friendliness is absolutely unaffected by social or financial differences. Count Leo Tolstoy has described these relations in his famous story, *The Master and the Workman*, and as long as they continue, social revolution in Russia is impossible.

The Russian workman, engaged on a task of national importance, regards himself as a soldier, and he performs his duty without complaint, however unfavourable may be the circumstances. It is true that there was something like a rebellion in Moscow in 1915, but it was essentially a patriotic rebellion.

MR. KENNEDY WITH ALEXEI, A FAVOURITE WORKMAN OF HIS

The workers resented the presence of Germans in the factories. Most of these men were foremen and technical experts and the Russian Government hesitated to accede to the demands for their dismissal. This hesitation caused first a strike and then some regrettable street fighting.

The Russian workman concerned with new inventions and modern technical developments puts his whole soul into his daily task, eager to have a hand in an interesting enterprise, and desirous of learning as much about it as he possibly can. At such a time he forgets his unfavourable economic situation and the fiercest revolutionary propaganda cannot persuade him to drop his tools. The trade unions regard these men with peculiar tolerance, and, if it is considered that their work is of real national significance, they are not expected to join the strikers if an industrial dispute should occur.

In the early days of Russian aviation, inventors had the greatest difficulty in collecting money for their enterprises, and their success largely depended on the good faith and en-

thusiasm of their workmen. During the period 1908 to 1910, not one single aviation inventor contrived to escape serious money troubles, and they were often obliged to keep their staff without wages for weeks on end. In not one case did the workmen leave the factory or sue their employer for the money due to them. On the contrary, in order to hasten the success of what they regarded as a joint enterprise, they volunteered to work overtime and they contrived to live somehow or the other on borrowed money. The risk was a considerable one because, if, as sometimes happened, the works had finally to be shut down and the machinery sold, all the proceeds were seized by business creditors and the workmen got nothing of what was owing them.

Mr. Kennedy had one such experience and this British inventor speaks in the most eulogistic and affectionate terms of his Russian employees. After his temporary misfortune it took Mr. Kennedy a year to recover his financial position and to be in a position to pay his workers, not one of whom had ever asked him for money.

The same kindly relations exist in Russia between the constructors of aeroplanes and the pilots. There is a sort of unwritten law that when there is money everyone must have his share, and when there is none everyone must do the best he can without complaint. This solidarity has, I suggest, been largely responsible for the amazing progress of Russian aviation. Now, of course, the industry stands on a firm economical basis and the financial arrangements are normal.

I propose in this chapter to give some account of the earlier Russian aviators to whose courage and persistence the Empire is so considerable a debtor.

Mr. Popoff was a pupil of Wilbur Wright's in Paris, working there with another Russian, Count Lambert, the first aviator to fly round the Eiffel Tower. Mr. Popoff took part in the first Russian aviation week in 1910 and made several interesting flights, which attracted the attention of the military authorities and caused them to send several army officers to France to be taught by Wilbur Wright. Popoff's career was not long. He

had a bad fall during one of his flights and became a permanent invalid. His successor was Captain Matzievitch of the submarine service of the navy. He was a first organiser of naval aviation, but he was unfortunately killed in the summer of 1910. His successors have included Lieutenant Piotrovsky and Captain Brodovitch, best known as a pilot of the Sikorsky giants.

In 1910 quite a number of Russian aviators became famous—Lebedeff, Utochkin, Segno, Kostin, Slessarenko, Raievsky, Alechnovitch, Yankovsky, Kioni, and Sikorsky. Many of these men had been prominent in other branches of sport before they took to flying. Mr. Lebedeff, for example, was a champion cyclist and skater and a well-known driver of racing motors. He learnt his flying at the Henry Farman School in France. As a pilot, Mr. Lebedeff was noted for his carefulness and his avoidance of unnecessary risk, and these qualities caused him to be regarded as a most reliable flying instructor in Russia. In 1911 he resigned his position in the Aero Club School and started a factory for the manufacture of

MR. POPOFF
A famous pioneer pilot

aeroplanes. He is the representative of the French "Integral" Company and his manufacture of air screws attained great success. At the present time Mr. Lebedeff is building aeroplanes for the Russian army. His brother occupies a high place in Russian scientific aviation. He is a professor of the Petrograd Imperial Polytechnic, his special subject being internal combustion engines.

Mr. Utochkin, whose death was announced in the British press in the early days of 1916, was the most noted all-round sportsman in Russia. He was a fine skater, a world champion as a bicyclist, a boxer, a fencer, a swimmer, an accomplished motor cyclist, and an almost unrivalled motorist and aviator. Mr. Utochkin made many fine flights in various parts of Russia and was a great national hero. One of his peculiarities was that he always refused to wear any special aviation costume and indeed he made his flights wearing a bowler hat. He had many accidents, most of which were due to his own folly. On one occasion in the aerodrome of the Imperial All Russia Aero Club in Petrograd, he flew in a Farman

machine after a heavy and extremely Russian luncheon. Some officers were testing military kites at the time. Utochkin's machine struck the cord of one of the kites and at once fell to the ground. Every one present rushed up to the machine expecting to find the aviator dead. As a matter of fact they discovered him calmly searching among the wreckage for his bowler hat, which had dropped off his head at the moment when the machine struck the ground. The injuries which Utochkin received during his flight from Petrograd to Moscow undoubtedly affected his reason, although they did not prevent him continuing his profession. His eccentricities were accepted with characteristic Russian tolerance. Utochkin attended a general meeting of the Aero Club in 1913 and three days afterwards he was arrested by the police as a lunatic. He was in dire financial straits. It was discovered that a week before his arrest he had paid his bill at the Hôtel de France and had gone out into the streets, absolutely penniless, being forced during the intervening nights to sleep under bridges. A course of treatment restored him to his normal

condition and once more he was seen on the aerodromes. When war broke out he was given a commission in the Army Flying Corps, but he was again seized with madness and eventually he died in an asylum.

Utochkin was a brave man with fine human sympathies. In 1905, when the "Pogroms" broke out in his native Odessa, he openly took the side of the Jews and was severely wounded while protecting them from the hooligans. His great and unrivalled popularity would have made it easy for him to have acquired a fortune, but he cared nothing for money. Flying for him was a splendid exciting sport, and when he died, he left behind him nothing but the love and respect of his fellow countrymen.

CHAPTER IX

FAMOUS RUSSIAN FLYING MEN

MR. SEGNO was the first aviator to fly a German aeroplane in Russia. He was a pupil of Herr Eterich, and in 1910 he bought an Eterich monoplane fitted with a Daimler engine and flew in public in Warsaw and afterwards in Petrograd. These flights produced a considerable sensation. The stability of the monoplane so astonished the public that it was christened "The Dreadnought," and Mr. Segno was overwhelmed by requests from would-be passengers. In 1911 this skilful aviator suddenly abandoned the air to become private secretary to Mr. L. Nobel, one of the famous oil magnates. He gave no reason for his sudden change of career, which in its way was a notable event, since when once a man has been smitten with

the love of aviation, he rarely is able to abandon the excitement of battling with the air.

Russian social life is always a difficult problem for the foreigner. Despite the fact that the Government is an autocracy, there is in Russia a familiar friendship between gentle and simple not to be found in any other country. All classes, moreover, have a deep respect and admiration for the arts and sciences, and scientists and artists find ready admission to the most exclusive circles. Even the artist Jew is welcomed where the millionaire Jew would be shunned. Money indeed by itself does not impress the Russian, and the merely rich bourgeois has no sort of chance of establishing intimacy with even the poor aristocrat. On the other hand, achievement, talent, and kindliness ensure hospitality throughout the Empire. Aviation has played its part in breaking down social barriers. The new science attracted universal attention, and the men whose courage and enterprise enabled them to conquer the air were fêted by noble and peasant alike. This is well illustrated by the career of Nicholas Kostin. who from being

a Petrograd chauffeur became one of the most famous aviators in the world.

Kostin was the son of a peasant and in character he himself remained a peasant all his life. He began as a cycle mechanic and he finished as one of the most important pilots of the Aero Club. He was the first Russian pilot, able, himself, to build a whole aeroplane and to regulate its engine. He learned to fly in two months and he was soon afterwards the principal instructor in the Aero Club School.

Kostin was the first aviator to attempt to loop the loop on a Henry Farman machine, and this attempt was made without design. He was trying the machine when he was struck by a side gust of wind which would certainly have turned him over had he not been an expert flying man. To escape disaster he made what is called a " false loop," and finding that the machine could fly in that position, he twice repeated the same manœuvre, in which the aeroplane was so nearly upside down that the tank sprinkled Kostin with petrol.

Kostin was always very careful in his dealings with his pupils and never allowed them to

THE EXPERIMENTAL AEROPLANE "KENNEDY NO. 1," ALTERED CONSTRUCTION, ON THE AERODROME OF THE IMPERIAL ALL-RUSSIA AERO CLUB AT PETROGRAD IN 1914

On 5/18 July, 1914, this aeroplane made an unbeaten world's record by lifting 22 kilogrammes per horse-power

have quickly a complete control of the joy-stick of their machine. His flights became famous throughout Russia and he was as popular as a favourite actor. He was the first man to fly in one of Mr. Kennedy's aeroplanes, no mean feat when it is remembered that these machines are fitted with two air-screws each four metres in diameter.

When the Balkan War broke out in 1912, Kostin, influenced by Pan-Slavonic ideals, went to Sophia and joined the Bulgarian army in which he was given the rank of lieutenant. Unfortunately during one of his flights over Adrianople his engine stopped and he was obliged to land, with the consequence that he was captured by the Turks. He was thus the first aeroplane pilot in history to be taken prisoner.

The Turks treated the gallant Russian airman with every consideration. Ismail Pasha, the commandant at Adrianople, instead of sending Kostin to the concentration camp with the Bulgarian prisoners, took him into his own house and introduced him to his family. It is interesting to know that his experiences in

the Balkan War entirely changed Kostin's opinion of the Bulgars. He went back to Russia convinced that they were a people not to be trusted, and that they were ready whenever the occasion appeared propitious to play the traitor to their brother Slavs. This expression of opinion has frequently been remembered during the last year. Four months after Kostin's return from Turkey he died of cancer in the stomach, probably the result of the privations he suffered during early years.

Many stories are told of Kostin's ingenuity and resource. During his famous flight from Petrograd to Moscow, he was obliged to land under very unfavourable circumstances near the town of Tver, breaking the main spars of the lower wing of his Farman. He was not the least disturbed and at once began to repair the damage. His fall had been seen by the local policeman and some peasants. They hurried to his help and found him busy binding the broken spar between two narrow planks with a stout cord.

"You don't intend to go on flying?" asked the policeman.

"Of course I do," was the reply, and the airman took his seat in the machine and renewed his flight. Fate was, however, against him. Soon after his engine stopped again and he fell in a marsh. This time the aeroplane was seriously damaged and he was obliged to abandon his attempt.

When he went to Sophia and joined the Bulgarian army he was more than punctilious in the exact obedience to orders. On one occasion at Nish the colonel in command gave him the following instructions: "To-morrow morning at seven o'clock punctually an observer will join you, and you will fly in the direction of Adrianople, remaining over the enemy's fortress for not less than an hour."

Kostin was ready the next morning at half-past six. At seven the observer had not reported himself. Kostin made inquiries but could hear nothing of him and he flew off alone. He remained for two hours in the air, as he had been instructed, and then landed in the aerodrome and reported himself to the colonel.

"You left the aerodrome at seven?" asked the colonel.

"Yes, sir."

"You flew for two hours?"

"Yes, sir."

"What have you observed during your reconnaissance?"

"Nothing, sir."

"Nothing!" repeated the colonel in surprise.

"It was not my duty to observe, sir."

This conduct may perhaps strike the reader as rather stupid, but it had its effect on the Bulgarian officers, and observers were afterwards more careful to keep their appointments with the eccentric Russian.

A month before his death Kostin experimented with a new aeroplane built by Mr. Kennedy. It was a large machine and needed an experienced pilot. Towards the end of the trials, one day Kostin remained on the aerodrome tuning up the engine and examining the parts and he arranged to make an experimental flight the next morning, but he did not put in an appearance. Several days

passed and the aviator was not seen at any of his usual haunts. His friends were naturally anxious. Some of them went to his house and found him prostrate with illness.

"Why didn't you tell us before that you were so ill?" they asked. "You must be operated upon at once."

"I should not have suffered any the less if I had worried other people," was the reply. "Besides, what does it matter? I have done my job."

Shortly afterwards he died in hospital.

There is a general opinion that a scientist cannot be a good business man and this has been proved in many branches of industry and commerce. It often indeed happens that a half-educated man gifted with a business instinct will succeed where a learned specialist will fail. Russia, however, believes in the specialist, and is insistent that men in responsible positions shall receive an adequate technical training. It is, for example, required by the Russian authorities that every newspaper editor shall have a university diploma. The old idea that the merchant

required no education has absolutely disappeared, and the general belief in the superimportance of technical training has had the most remarkable effect on the development of Russian aviation. Let me quote one story that illustrates it. In the winter of 1910, Mr. Slessarenko, a young student at the Riga polytechnic, went to Petrograd and learnt to fly on a Farman machine. After the Petrograd-Moscow flight he went back to Riga to become the first pilot in the Baltic provinces. In the spring of 1912, in collaboration with a few of his fellow students, he started to build a machine of the Henry Farman type in a simple shed. The work was so well finished that the military authorities became interested and gave him considerable assistance. Slessarenko was a fine pilot, and his flights on his own machine led to the War Office giving him a preliminary order for three others. Money was advanced to him, and when the first three machines were delivered another ten were ordered, and Mr. Slessarenko, who started business four years ago with a capital of five pounds, now owns a large factory in Riga where

MR. A. E. RAIEVSKY
A great monoplane pilot and aerial photographer.

military aeroplanes are being turned out in great numbers. Slessarenko had a very bad fall during his Petrograd-Moscow flight, but this did not dampen his enthusiasm and he is still considered a most accomplished biplane pilot in Russia.

The first Russian to fly in a Blériot monoplane was also a young student, Raievsky. He made his first flight on this type of machine in 1910, and he flew against Pegoud when the famous French aviator visited Petrograd. Raievsky did on his Bleriot everything that Pegoud accomplished on his machine. He has only had one bad accident and that was in 1912 when he was testing a Pichoff monoplane, a type absolutely new to him. Mr. Raievsky is the best aerial photographer in Russia, and the pictures he took while flying in Sikorsky giants are simply marvellous. I have never seen anything more perfect except the collection of aerial photographs I was shown in General Henderson's office in Whitehall when I called on the director of the British Military Air Service with my friend Captain Roudneff. The British military aviators are astounding

photographers and I was able afterwards, when I visited the school where the aviators are taught photography by Captain C. D. N. Campbell, to understand how the super-excellent results are obtained.

Among Russia's military pilots, Lieutenant Alechnovitch may be regarded as an entirely national aviator. He has never experimented with foreign aeroplanes, and all his flights have been made on machines of Russian construction, made by Gakkel and Sikorsky. Lieutenant Alechnovitch has beaten many records on the small Sikorsky aeroplane and indeed has piloted them better than Sikorsky himself, although the inventor is a first-class flying man. Alechnovitch gradually became Sikorsky's first pilot, and he is generally regarded as a most efficient tester in Russia. Both Raievsky and Alechnovitch are very shortsighted and wear strong glasses while they are flying.

Mr. Yankovsky is a great pilot. He was a student at Heidelberg and a scar on his cheek is evidence that he shared the German student's love for the duel. Pégoud watched one of

RUSSIAN OFFICER PILOTS AT THE FRONT

Yankovsky's landings and said to him : " There is only one man in the world who can land better than you." He of course was Pégoud.

Yankovsky first flew on a Blériot and then changed to a Farman biplane, but finding that unsatisfactory he began to use the Nieuport monoplane, which became his favourite type. Many Russian officers have been taught by him to fly Nieuports. When Mr. Sikorsky started to build machines of his own, Yankovsky became his pilot and his work was so good that Sikorsky entrusted all his monoplanes to him and has never piloted them himself.

Sikorsky and Yankovsky were among the spectators when Pégoud looped the loop in Petrograd. Yankovsky watched the evolution very carefully and then said to Sikorsky :

" That really is not very difficult. I am going to do exactly the same."

" What machine do you propose to use ? " asked Sikorsky.

" My Sikorsky monoplane, of course," was the answer.

Yankovsky had never attempted to loop before and the type of aeroplane he selected

had certainly never been designed for such an evolution. Sikorsky and the aviator's colleagues tried to persuade him to abandon the idea but he was determined. He flew into the air and made several loops one after the other, exactly as Pégoud had performed them a little while before. The French airman was naturally surprised that it should have been possible for a Russian on an unknown type of machine to rival his own achievements on an aeroplane especially devised for the purpose and it was not easy to persuade him that this was Yankovsky's first attempt. It would be easy for me to mention many other names of Russian military and civilian pilots, many of whom have given their lives for the conquest of the air.

Every pilot in Russia is at the present time engaged in the fight against the common foe, and the efficiency of their service to their fatherland is not merely the result of their courage and indifference to death, but is still more due to their complete training and technical knowledge.

CHAPTER X

I. I. SIKORSKY

THE name of I. I. Sikorsky is already familiar to the British public and his giant aeroplanes have frequently been discussed and explained in the British Press. Sikorsky has been responsible for a genuine revolution in aviation, and he has succeeded in finding a solution for a problem which was regarded by the majority of aeroplane experts as utterly insoluble. The great Russian aviator and inventor is only thirty years old, and his youth lends additional interest to his personality and his career. He is the son of Professor Sikorsky, a well-known physicist, and he received his technical education at the Kieff Polytechnic. He began to take an interest in aviation some six years ago, and he became one of a small circle of student aviators. His

initial experiments were made with the appliances known as "helicopters." In those early days Mr. Sikorsky believed in the possibility of constructing a machine of the vertical lift type, but he very soon discovered that this was not practical. This disappointment, however, did not in the least diminish his energy and enthusiasm. He designed and built a small machine somewhat similar in form to the Blériot monoplane. It jumped rather than flew and Sikorsky's fellow students nicknamed it "the hopper." In the autumn of 1910 Sikorsky built his first tractor biplane, and after a series of further experiments he built several other machines of the same type and these were warmly approved by the recognised aviation experts. The originality and energy of the young inventor soon attracted the favourable attention of the Russian technical authorities, and the famous Russo-Baltic Works financially supported him in the building of his improved type of tractor biplane.

In 1911 Sikorsky took part in the first military aviation meeting in Petrograd. The machine he entered was unsuccessful, the prize being

won by a Gakkel. This failure caused Sikorsky to make still further improvements in his machine and two of them were entered at the second military meeting, one a tractor biplane and the other a monoplane. Sikorsky piloted the biplane, and this time he won the first prize. This success naturally acted as a stimulating encouragement and by it Sikorsky was emboldened to take his designs for a giant aeroplane to the directors of the Russo-Baltic Works. For a long time the possibility of constructing a large type of machine had been discussed by the Russian experts and they were unanimous in their belief that it could be accomplished. Sikorsky, unlike most inventors, was very happily placed in regard to finance. His father was a rich man, and he himself had sufficient resources to make it possible for him to carry out the necessarily costly experiments without help. His relatives recognised his ability and to some extent became his partners, and the Russo-Baltic Works continued their aid. But despite all these favourable conditions the expense he had to meet was so great that he, in common with so many of his fellows,

suffered from serious money troubles before he finally attained success. In the winter of 1912, for example, he was to be seen in the Petrograd streets wearing a thin overcoat bought for twenty-six roubles from a cheap ready-made shop. Every one who has experienced the rigours of a Russian winter will understand that this was not done for pleasure or for the mere desire to be original.

Sikorsky was greatly helped by a well-thought-out series of scientific researches made in the aero-dynamic laboratory of the Petrograd Polytechnic. He gave his whole mind and soul to the task he was undertaking, and in the spring of 1913 his first giant aeroplane was ready to take the air. There was considerable scepticism among aviators as to whether the giant would after all be able to fly. The success of the trial flight was, however, complete. The giant flew perfectly well with its engines running at half power. It presented a beautiful and majestic sight. The span of its wings was twenty-eight metres with a chord of three metres. The length of its body was about nineteen metres. The front half of the body

included comfortably arranged cabins and the bow had a deck of about one and half square metres. In constructing his machine Sikorsky had been influenced by the ideas of Mr. Steglau, which I have already described in a preceding chapter, and the entire body of the aeroplane was constructed of three-ply wood. The landing chassis or under-carriage was very strong—in fact it was discovered that it was too strong—and had eight wheels of the Nieuport type. The power was derived from four one-hundred h.p. German "Argus" engines, driving four tractor air screws. Notwithstanding the fact that the aeroplane weighed about four tons, it flew well with, as I have said, only half its engine power. In the summer of 1913 Mr. Sikorsky entered this giant which he called "Russky Vitiaz" (the Russian Knight) at the third Military Aviation Meeting, during which he made some remarkable flights and beat the world's record for weight-lifting by aeroplanes per square foot of wing surface. The career of the "Russian Knight" came to an untimely end during the competition through a very unusual

accident. One evening towards the end of the meeting Sikorsky was preparing his giant for a flight while the well-known aviator Gabavlinsky was in the air experimenting with a new pusher type of monoplane built by the Dux Works at Moscow. During his flight Gabavlinsky's eighty h.p. Gnome engine fell out of his aeroplane from a height of about a thousand feet, and crashed through the wings of the unfortunate " Russian Knight." Gabavlinsky owed his life to his skill as a pilot and he planed down to the ground without the smallest damage. He was afterwards asked by the people who had watched his achievement if he knew that he had lost his engine. He replied that he did not know of the loss until he had reached the ground. He had suddenly felt the aeroplane become light at the back and he was surprised that he did not hear the engine, but he merely thought that it had stopped and at once planed down to the earth. The two wings of the " Russian Knight " were totally wrecked, and Gabavlinsky was equally astonished at the damage his engine had wrought and at the quiet unperturbed manner

SMALL "SIKORSKY" BIPLANE, 100 H.P. "ARGUS" ENGINE
Machine on which Mr. Sikorsky won the first prize of the Military Competition, 1912

in which Sikorsky accepted his misfortune. Sikorsky did not attempt to repair the "Russian Knight," which he never regarded as more than an experiment, but immediately after the meeting, at which he had won both first and second prizes, he began to construct an improved type of giant. He finished this machine in December, 1913, but to his great astonishment it refused to fly. After making certain alterations he succeeded in getting a very good flight out of it. This second giant was the famous "Ilia Mourometz." The span of its wing was thirty-two metres with a chord of three metres. The length of the body was twenty metres. The "Ilia Mourometz" presented a very peculiar appearance. The front of the body was flush with the front of the wings. The body and the under-carriage were constructed on an entirely different design to that of the "Russian Knight." The body instead of being completely made of three-ply wood was merely webbed with three-ply and covered with canvas, which of course made it considerably lighter. It had a series of cabins which extended for a little more

than half its length, after which a gangway led to the extremity of the tail, where a short ladder and trapdoor gave entrance to the tail deck. This deck was very small, and was only used by the mechanics to regulate the tail plane and the rudder wires. The main deck was in the middle of the body, and it was constructed to carry machine-guns and searchlights. A third deck was fixed to the undercarriage and here, too, there was room for a machine-gun or a searchlight. The aeroplane had four landing wheels. Sikorsky succeeded in getting much better results from his second than from his first giant, and during the spring of 1914 he made many noteworthy flights. The power plant consisted of four engines developing up to five hundred and twenty h.p. The speed of the aeroplane was about one hundred and five kilometres an hour and she could carry a load of two and a half tons, though as a matter of fact she rarely carried more than one ton and three-quarters. Sikorsky flew on this machine from Petrograd to Kieff, from Kieff to Libau, and from Libau to Petrograd.

The War Office was very interested in the "Ilia Mourometz" and General Souchomlinoff gave Sikorsky the most generous encouragement and assistance. The Emperor presented him with a decoration and a money prize, and it was suggested in the Duma that he should be given a public gift of a hundred thousand roubles.

The war broke out and Russia discovered what a valuable asset she had in Sikorsky. The War Office possesses more than fifty of his giants, and they have done invaluable service on the many fronts. It is considered by many as a great honour to be chosen as a Sikorsky pilot and many of the most accomplished of the Russian naval and military aviators now command the various giants. One of them is a well-known Russian sportsman who several times competed for the King Edward Cup at the Horse Shows at Olympia. This is young Captain Voievodsky of the Empress Maria Feodorovna's Regiment of the Cavalry of the Guard. This young man beat all Russian records by learning to fly on a Farman biplane in an hour.

Owing to the difficulty of obtaining materials some of the modern Sikorskys are slightly smaller than the " Ilia Mourometz " and have only two engines, some of which are more than two hundred h.p., which is an improvement over four engines developing only the same power. Sikorsky's great ambition is to make his giant aeroplane a perfect means of transportation, and it is his keen grief in this hour of his country's need that Russia has not the same manufacturing facilities as Great Britain happily possesses. If it had, one would hear far less about Zeppelin raids in Russia. Sikorsky indeed has saved Russia from much possible Zeppelin damage, the commanders of the German airships having a reasonable fear of the giant aeroplanes piloted by daredevil Russian officers. It will be remembered that the Zeppelin was little employed by the enemy during the great German advance into Russia, although they could unquestionably have been of the greatest service. While the German armies were advancing into Poland, the Zeppelins had to content themselves with dropping bombs on London and on unde-

CHIEF MECHANICS OF THE IMPERIAL ALL-RUSSIA AERO CLUB
MESSRS. ODINZOFF AND KISSELOFF TRUEING UP A "GNOME" ENGINE

fended towns on the English coast. I do not think I shall be accused of being unduly patriotic if I add that if Great Britain had produced a Sikorsky these raids also would have been impossible. The giant Sikorsky aeroplane flies practically as safely during the night as during the day.

CHAPTER XI

FOREIGN AVIATORS IN RUSSIA

GREAT BRITAIN paid very little attention to Russia before the war, and only the very few Britons who lived in my country had the smallest realisation of the quality of the Russian nation. This was a general truth. No one here appears to have had the smallest idea of Russia's technical development or scientific achievement, and certainly no one had the slightest knowledge of the condition of Russian aviation. Despite the efforts of a handful of enthusiasts, aviation had been sadly neglected in England itself, and it was therefore not surprising that there should be little interest in the progress of the art in foreign countries. The French and the Germans did not share this indifference to Russian affairs. They paid frequent visits to

Russia. They studied the psychology of the Russian people and they endeavoured to introduce their sciences, their arts, and their industries into the vast empire of the Czar. These visitors experienced a great surprise when they discovered that the prevailing idea that Russia was only a half-civilised country was an entire mistake. The enormous and speedy improvement of aviation in Russia astonished the foreign observers. They immediately, however, took advantage of the widespread interest, and numerous foreign aviators visited the various Russian aerodromes. The first stranger pilot who went to Russia was Legagneaux, who visited Petrograd in 1909, and made two or three flights from Gatchino, a suburb of the capital, on his Voisin biplane. This was one of the first machines constructed by the French firm. In those early days there were absolutely no facilities for flying in Russia, even the aerodrome at Gatchino was not in existence and Legagneaux's experiences were very unfortunate. A great crowd had assembled to watch his flight but unluckily his engine suddenly stopped. He was obliged to

land in the marshes and his machine was badly broken. The public disappointment was very great. High prices were charged for entrances into the field from which the flights took place and the Press severely criticised the French aviator for his failure. In the spring of 1910 another Frenchman, M. Albert Guigot, arrived in Petrograd with a small Blériot monoplane. He had been specially invited by the committee of the Imperial All Russia Aero Club and the race-course at Kolomiagi near Petrograd was put at his disposal. Guigot was more fortunate than his predecessor, and was warmly received by both the public and the Press. So warm was the cordiality and friendship of his Russian confrères that even two years afterwards, M. Guigot recalled his sojourn in Russia with real enthusiasm and in letters to his friend Kennedy described the pleasures of his visit with true French eloquence. In this same spring of 1910, and also by invitation of the Aero Club, Hubert Latham brought his Antoinette monoplane to Petrograd, but he was even more unlucky than Lagagneaux. His machine only succeeded in making a short

jump and then crashed down, breaking the fuselage and the wings. Latham had not brought any spare parts with him, and he immediately returned to France. Soon afterwards the Russian aviators received a visit from the Baroness de la Roche, who brought with her her Voisin biplane. Madame de la Roche made three short flights in Petrograd, but as a matter of fact during her visit she was more interested in the delights of the brilliant society of Petrograd than in the science of aviation. There was indeed a tremendous desire to meet a lady aviator for the first time. It should be added that these early foreign visitors were remunerated with characteristic Russian generosity. Latham, for instance, received a thousand pounds for his abortive flight.

By the spring of 1911, when a real aerodrome had been prepared in Petrograd, an aviation week was initiated, thanks largely to the efforts of Paul Beckel and Boris Souvorin. This week was the occasion of visits from several international pilots: Christians on a Farman, Vincias on an Antoinette, Morane on a Blériot, and Chevalier on a Nieuport. Christians was

a cool-tempered but not very interesting pilot, and for the most part he was content to circle round and round the aerodrome at a height of one hundred to one hundred and fifty feet. Vincias accomplished some short flights accompanied by several accidents and he was seen very little in the air. The Russians were certainly not impressed by the Antoinette, and the Government decided without hesitation not to purchase any machines of that type. Morane produced a great impression on the public by his splendid and courageous flights on his Blériot, but the champion of the week was unquestionably Chevalier on his fifty horse-power Nieuport. The speed of the machine and the evolutions performed by the aviator were astonishing and delightful. It is rather curious to remember that most of the scientific professors who carefully inspected the Nieuport exhibited in the Petrograd International Exhibition, only two weeks before Chevalier's appearance in the new aerodrome, categorically declared that the machine could never fly. The pilot must have enjoyed himself immensely when these same professors warmly applauded

the flights which he achieved with so much skill.

Blériot himself visited Petrograd during the first International Aviation Exhibition, but he never flew in Russia. Some time later M. Segan, the inventor of the Gnome engine, delivered a series of lectures on his inventions to the Imperial Russian Technical Society, and lectures were also delivered in Petrograd by M. Esnault-Peltri, though he, like Blériot, did not fly in Russia.

Many German aviators went to Russia, some of them by invitation, but most of them influenced by characteristic German curiosity and eager to know exactly what Russia was doing in the world of the air. The celebrated Wright pilot Abramovitch, who is, by the way, a Russian by origin, appeared in Petrograd in 1912 and rendered priceless service to the Russian military authorities by the information he was able to give them concerning the state of military aviation in Germany. Abramovitch had all the patriotic feelings of a Russian and he professed to have little sympathy with Germany as a people. Had Abramovitch

lived to see the Great War he might have rendered great service to his native land, but unfortunately soon after his return to Germany he fell during one of his flights and was killed. Abramovitch always flew on a German Wright biplane and was universally regarded as Germany's best pilot on such aeroplanes.

At the same time as Abramovitch, the famous Lieutenant Bier came to Petrograd bringing two aeroplanes with him, one of them a big Mars monoplane and the other an Albatross biplane. He only remained three days in the Russian capital. His flights were admirable and he accomplished with extraordinary accuracy everything he attempted to do. The military appearance of this typical Prussian lieutenant could not be hidden by his mufti, and it was soon suspected that Herr Bier was no simple civilian but an officer of the flying corps. He was asked if this was so.

"Oh yes, I am an officer," frankly confessed Lieutenant Bier.

"Then why did you come to Petrograd, since you as an officer could certainly not be

invited by the committee to take part in the competitions ? "

" I came," was the reply, " to discover for myself the state of your aviation and in order to avoid a difficult position I retired from the German army before I left Berlin."

Bier was indeed nothing but a German spy who did not bother himself to hide his position, but, with true German cynicism, confessed it to the Russian officers whom he met in Petrograd. The moment he returned to Germany he was restored to his position in the army.

CHAPTER XII

HEIR FOKKER'S RUSSIAN LADY PILOT

THE third notable aviation visitor to come to Russia from Germany was a Dutchman, Heir Fokker, the constructor of Germany's famous aeroplane, to whom the war has given a world-wide reputation. When he visited Russia, Fokker was not more than twenty-one years old, but although he was a boy in point of age he was already a man of extraordinary ability and originality. Mr. Kennedy met him in Petrograd and the two aerial constructors became close friends, and I have heard from Mr. Kennedy many interesting details of the Dutchman's romantic career. He astonished the Russian aviators by his skilful piloting as well as by the unprecedented stability of his monoplane. The Fokker at this time had its wings fixed at a

considerable dihedral angle. The wings had no ailerons attached to them nor could they be warped. Transversal stability was attained by reducing the engine power immediately the aeroplane took a dangerous angle. Notwithstanding Fokker's many excellent flights, the Russian authorities were not entirely convinced that his system of construction was ideal, and Fokker was unable to receive orders for his machines in Petrograd, although it was admitted that they were easy to pilot.

He had one or two interesting experiences during his stay in Russia. The aeronautic mathematician Botezat was standing with some of his friends watching Fokker assemble his aeroplane, which he could do in a very few minutes. Not knowing that the busy mechanic was Fokker himself, Botezat assured his friends that such an aeroplane could not possibly fly, and he proved his contention by apparently incontrovertible mathematical assertions. The professor was speaking in French, but Heir Fokker understood what he was saying. He introduced himself and laughingly said that he did not care a jot for the mathe-

matics and that he would demonstrate within two minutes that Botezat's assertions were entirely wrong. Whereupon he started his 100 h.p. Argus engine and taking a short run rose gracefully in the air, putting his aeroplane through all sorts of extraordinary manœuvres over the head of the astonished scientist. Botezat turned to his friends and remarked: "Amazing, amazing, quite an optical delusion!"

The scepticism of the Russian authorities towards the Fokker machines is not really surprising when it is remembered that, at this time, the German Government were not yet convinced of their advantages. Heir Fokker consulted Mr. Kennedy as to the best way to convince the aviation world that his aeroplanes were the easiest machines to pilot. Mr. Kennedy advised him to secure a lady pilot and to endeavour to train her to make a record flight. Heir Fokker explained that lady aviators were difficult to find in Germany, where the men preferred their womenfolk to be domesticated and where neither Fraus nor Fräuleins were encouraged to adopt flying as a

pastime. Thereupon Mr. Kennedy introduced a young Russian lady pilot named Golantchikova to Heir Fokker. He immediately engaged her and took her back with him to Berlin, where shortly afterwards she made a world's height record on a Fokker monoplane. The creation of this record was one of the causes that induced the German Government to extend their patronage and encouragement to the Dutch inventor.

Melle. Golantchikova did not like Germany and the Germans, and after a short stay in Heir Fokker's employment, she went to Paris, where she flew on Nieuport and Morane monoplanes.

Heir Fokker has considerably improved his machine since his visit to Russia, and to-day he is properly regarded by the Allies as one of Germany's most considerable assets, his latest very swift monoplanes being a constant source of trouble at the front. These machines are built on the lines of the Morane J, but Heir Fokker has made many improvements that are distinctly his own.

After a stay of some time in France, Melle.

Golantchikova returned to Russia, and she is still prominently associated with aviation. The record of her flights proves her right to be considered the most accomplished lady pilot in the world.

CHAPTER XIII

JUST BEFORE THE WAR

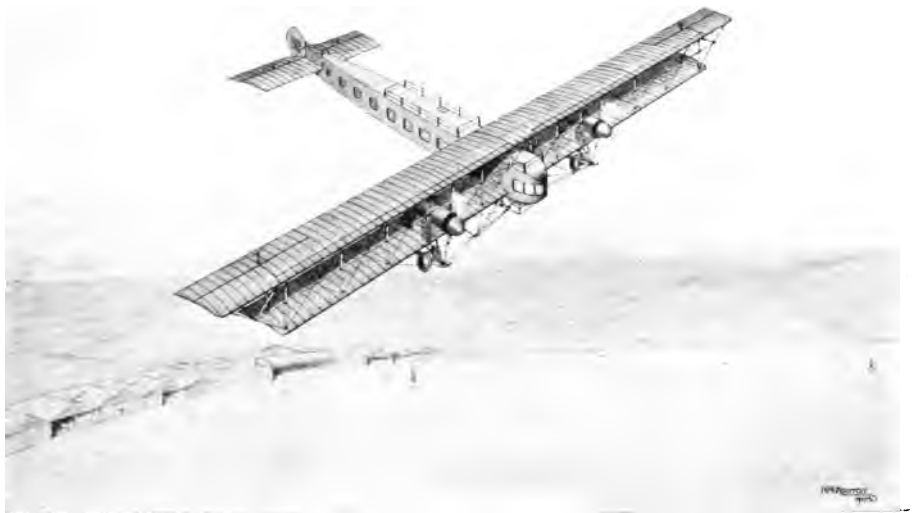
IN the summer of 1913, the Imperial All Russia Aero Club organised an important aviation week which immediately followed the military competitions. This meeting may, I think, be regarded as the most important aviation event that occurred in Russia up to the beginning of the war. The best Russian flying-men competed against a number of famous French aviators. On the Russian side, Sikorsky on his giant "Ilia Mourometz"; Yankovsky on a Sikorsky monoplane; Alechnovitch on a small Sikorsky biplane; Raievsky on a Blériot "looper"; Jatsuk on a Farman biplane type No. 21; Agafonoff on the same type of biplane and also on a Hanriot monoplane; Volk on a School Farman; and several military aviators

on Nieuports, Deperdussins, and Moranes. On the French side were Poirée on a Farman biplane type No. 20, especially strengthened for looping; and Pégoud with two Blériot "loopers," one single-seater and one for carrying a passenger. Audemars, the famous Swiss pilot, took part in the military competition on his Morane, but he was unfortunately obliged to return to France before the subsequent aviation week began. The Russian pilot Gabavlinsky was Audemars's opponent in the competition, and the Swiss flyer afterwards said that he had never met a more dangerous competitor.

During the aviation week, Poirée performed a series of the most amazing tricks on his Farman. He looped the loop. He banked at over ninety degrees when only fifty feet from the ground. He performed the tail dive, and a dozen other thrilling feats. He was particularly astonished at the pluck of the Russian ladies, who encouraged him to his most daring performances while they were his passengers. If Poirée surprised the Russian people, he himself was certainly greatly sur-

GIANT BIPLANE Kennedy No 3

800 HP QUADRUPLE SCREW ENGINE



THE WORLD'S LARGEST AEROPLANE

prised when he saw Sikorsky arrive in the aerodrome on his enormous giant. M. Pégoud was of course the attraction of the week, and he received a most flattering reception. He made many wonderful flights and with characteristic French courtesy he asserted that the charming manner in which he was received and the flattering tributes to him as "King of the Air" caused him to fly better than he had ever flown before. He met a considerable antagonist in young Yankovsky, who though he had never looped the loop before, after watching Pégoud, surprised the great Frenchman by reproducing his feats on the Sikorsky monoplane. Both Pégoud and Poirée received a great deal of money for their services. Pégoud from passenger flights alone made more than £200 a day. So successful indeed was his visit that Poirée remained in Russia permanently. He is now an officer attached to the Russian Flying Corps and has been decorated by the Czar for his fine work at the front.

In the spring of 1914, M. Laporte, the famous French pilot of the Voisin biplane,

Type Militaire, went to Petrograd at the invitation of the Lebedeff Company and demonstrated to the War Office the capabilities of this particular machine. Laporte was a most accomplished airman and he beat the Russian duration record in his first flight, which lasted nine and a half hours. This French pilot also liked Russia so much that he has remained there and he is also now attached to the Russian Flying Corps at the front.

Two other world-famous airmen have visited Russia. In 1913 Beaumont was invited by the Ministry of Marine to test some seaplanes on the Neva. He brought with him from France a flying-boat of the Done-Levecque type, with which he made one or two interesting flights. But the Ministry of Marine was not attracted and none of the flying-boats were ordered.

Brindejonc-de-Moulines flew from Paris to Petrograd in 1913 and this flight, of course, gave him considerable fame in the Russian capital. He made several exhibition flights in Petrograd which served as an admirable advertisement of the Gnome engine. He was

the only foreign flying-man who ever arrived and departed from Russia by the air. The route of his return journey to France was from Petrograd to Riga, from Riga to Libau, from Libau to Stockholm, from Stockholm to Christiania, from Christiania to Copenhagen, and from there through Holland and France. Brindejonc-de-Moulines has a greater reputation in Russia than any other French aviator, and he left many friends behind in my country.

The war has of course put a stop to the visits of foreign flying-men, all of whom are busy in their own countries. It is interesting to note that while Germany and France were sending their best airmen to Russia and paying great attention to the development of aviation in that country, the English, who pride themselves on their sporting qualities, have never adventured over Russia's enormous forests, marshes, rivers, and lakes, where often a landing-place cannot be found for hundreds of miles and where an aviator's capacity can be tested as it can be tested nowhere else. The only British subject who has ever had the smallest connection with Russian aviation is

the Scotsman Mr. Mackenzie-Kennedy, and for years the British colony in Petrograd regarded him as a highly eccentric person for concerning himself with aeroplanes instead of manufacturing cotton, importing herrings, or brewing beer. It is also interesting to remember that despite the thousands of Englishmen who visit Russia, the only British subject who has ever flown in that country up to the outbreak of war was this same Scotsman. The English have certainly visited the Russian aerodromes during the aviation weeks, but Russia does think it extraordinary that her air should never have been traversed by her English friends. It is possible that British aviators may have flown in Russia since the war began, but I have no record of such happenings.

Russian airmen have, however, flown in England and Sikorsky himself has visited this country. With his characteristic modesty Sikorsky stayed in London for a whole week without attracting the smallest notice. At present there is a talented young Russian airman, Mr. Osipenko, staying in London and

MR. KENNEDY'S STAND AT THE FIRST PETROGRAD INTERNATIONAL AVIATION EXHIBITION, APRIL, 1911.

The air-screw shewn beat the world's record for efficiency, its co-efficient of efficiency = 81·6 p.c.

his talents are already widely recognised. I earnestly hope that one result of this book will be the creation of some real interest in Russian aviation. Before the war, Germany had a greater attraction for the British aviator than Russia, the cradle of the mighty giants, those aerial Dreadnoughts that are now Germany's nightmare.

CHAPTER XIV

AERIAL RUSSIA AND THE BRITISH PRESS

ENGLAND'S ignorance of Russia's progress in aviation before the war has been extended to her military achievements in the air since the war began. This is no doubt partly due to the secrecy with which the Russian Government shroud the work of the Flying Corps, the feats of our gallant aviators rarely being published. Nevertheless I have noticed over and over again that the striking achievements of Russian aviators which are published in the Russian newspapers are never by any chance reproduced in the British Press. I imagine this must be due to the shortage of paper in this country. I can imagine no other possible reason. I suppose indeed that only a small proportion of the British people even know that Russia has

squadrons of fighting aeroplanes, larger and more formidable than those possessed by any other of the belligerents. As I have said once or twice before, the Sikorsky giants have succeeded in keeping the German Zeppelins at a reasonable distance from the Russian front and have in their turn delivered heavy blows on German positions. Many Russian officers and pilots have been killed during these operations and their names remain unknown. The Russian aerial losses have not been published. The extraordinary activity of the Russian Flying Corps is very well known to the enemy, who certainly never expected to find the Czar's Empire so perfectly equipped for war in the air. The Kaiser has himself publicly recognised the supreme ability of the Russian flying-men. In one of his "orders of the day" he said: "I am proud indeed of my infantry, my cavalry, and artillery and I should be happy if I could have the same feeling for my flying corps. I desire that my aviators shall be on the same high level as the Russians." This order of the day was captured on the battlefield and it was reproduced in the Russian news-

papers. Its publication, however, passed quite unnoticed in the English Press.

I quote the following interesting article from the *Russkoie Slovo* as an illustration of the attention given to the prowess of their aviators by the Russian newspapers. It is written by a Flying Corps officer and it is a very vivid impression of life above the clouds.

"We flew over the fields! It seemed to me that the earth was running away from us at a mad speed. Away to the right I noticed a tiny cloud of smoke coming from a moving train which suddenly vanished into the shade of the forest. Along the road an endless file of men and transports passed along like a procession of ants. We outpaced two motor-cars which to us seemed like children's toys exhibited in the shop windows. For a moment only I noticed our giant kite-balloon, employed for observation of the enemy's positions. It vanished behind us with the same suddenness with which we lost everything we met on our way.

"The cold wind blew on my face, forcing me half to close my eyes, and I felt the tears

A RUSSIAN MILITARY BIPLANE AT THE FRONT

on my cheek. I felt supremely happy, for I was carrying out the first serious task entrusted to me by my commander. My thoughts were suddenly interrupted by a voice. The pilot, a little man in a leather coat and cap, who had seemed nothing but a moveless wooden manikin, turned to me and said: 'Pay attention! We are now close to our positions.' The road had vanished and on the right a lake glistened like a gigantic emerald. Through the thin fog I caught sight of a yellow German captive balloon, a motionless sentry of the air. The Russian ambulance station was just beyond it. I could see the Red Cross on the top of the largest tent.

"Our biplane gradually started to rise. The ambulance station vanished from my view. I could see a mass of wood and thicket and then another lake which I knew was actually beyond the enemy's lines. We were right over our own position. I could see the huts of a small village, the people looking like black beads. I noticed the backs of horses rounded as it were into the earth. In spite of all my efforts I could not discover our battery positions, so

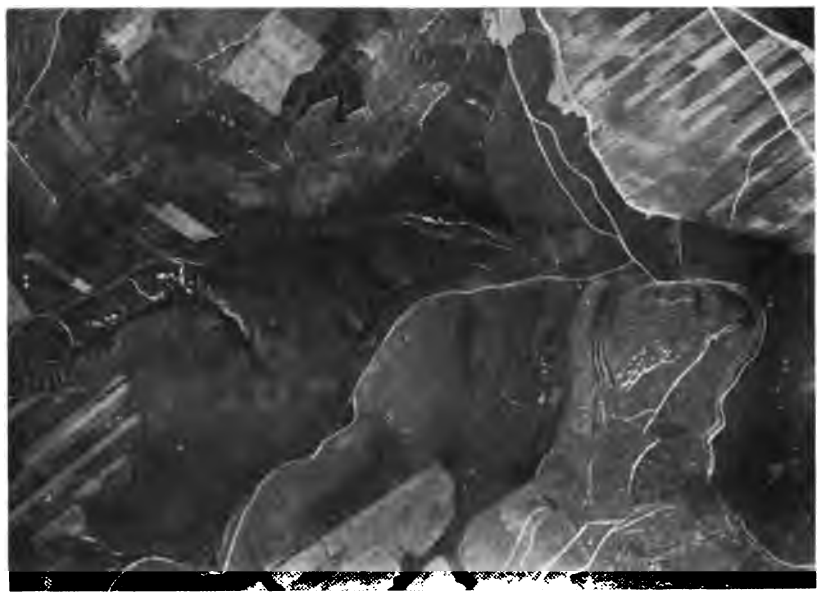
perfectly were they masked. 'One thousand five hundred metres—we are now over the trenches,' said the pilot. I rose slightly from my seat, holding on to the bars of the gondola. A series of thin crevices connecting thicket with thicket were traced on the earth below. Here and there I could pick out the shelters and the grey figures of men. A river that looked like a snake protected our lines and about half a verst farther on I could see the black lines of fresh-digged earth and thousands of little black points moving towards our position. They were the Germans.

"At the same moment a soft white cloud of shrapnel burst just in front and rather below us. Our aeroplane bucked a little, swung slightly, and turned to the right. Three new white clouds followed the first and lazily hung in the air. We were flying now along the German front. With my field-glasses I could make out every detail of the German entrenchments and I hurriedly made notes on my planchette. More soft clouds of white shrapnel smoke, made golden by the sunshine, hung on our left. My heart beat a little, but

neither the pilot nor I paid much attention to the attacks from below. We were nearing the end of my reconnaissance. The church which was its limit came into view and grew larger and larger. Below me I saw a road absolutely covered with German troops and transports. I hurriedly noted the new lines of the German trenches with their barbed-wire entanglement, appearing from the clouds like small white points. That was the end of my work. 'Finished,' I thought to myself joyfully. The explosion of a shrapnel close on my right sent a shudder through my body. I glanced anxiously at the biplane and noticed three holes in its left wing. A moment after we were absolutely surrounded by little white clouds. Suddenly the biplane dived down and I must confess that my heart fell into my boots. Unconsciously my hands clutched the sides of the gondola. Looking downward I saw the German captive balloon again and then on the earth groups of small black figures like little black nails.

" A Taube flew at us from the left evidently meaning to bar our way. The Russian

batteries saw it and at once opened fire and the Taube in its turn was surrounded with a fleece of white cloud. 'Do you see the Taube?' I asked the pilot. 'Yes, I do,' he replied grimly. 'It's a thousand pities we didn't bring a machine-gun with us. Now he is going to attack us.' I fixed my eyes on the enemy. Seconds passed which seemed like hours. The Taube rose a little and, making a semi-circle, flew right at us. It was the time for a critical decision. We could neither fly right nor left, both our flanks being threatened by the enemy's guns. One way only was open to us. We must go forward. The distance between our biplane and the Taube lessened at enormous speed. I could recognise the details of the hostile machine and could pick out the black silhouettes of the heads and shoulders of the officers. My pilot suddenly turned to me and I read his stern decision in his expression. 'Now you'll see,' he said and he went straight for the enemy. For some seconds we flew towards each other, when suddenly our biplane dived down and shot towards the earth like an arrow. I looked behind. The Taube was



AUSTRIAN BATTERY OF ARTILLERY AND FORTIFIED POSITIONS PHOTOGRAPHED AT THE FRONT BY LT.-COMMANDER V. V. DIBOVSKY FROM THE HEIGHT OF 2,000 METRES

far above us and was circling in pursuit. Its speed was much greater than that of our biplane, which was an old machine recently fitted with a new pair of wings. By diving the pilot hoped to entice the Taube into the range of our batteries. At a height of fifteen hundred metres we were utterly powerless.

"The Taube rushed after us at full speed. I looked back and noticed the observer aiming at us with a gun. 'Look out,' I shouted to the pilot, 'they are going to fire on us.' By flying in a series of zigzags we contrived to escape the bullets. The Taube came nearer and nearer. Again my pilot dived down and we dropped almost vertically. The descent was a risky one and it threw me on my back. I could see the roof of a farm-house, meadows, a forest, rushing at us at a tremendous speed. For five hundred metres we remained in the same position and then gradually our course was straightened. I shall never forget those few seconds as long as I live. I cannot tell what I felt, but I am certain that I never thought about the approaching end. The risky manœuvre saved us. When I recovered

myself and was able to look about we were only four hundred metres above the earth. Our batteries opened a terrific bombardment on the Taube, which was now flying in thick clouds coming from the bursting shrapnel.

"'Look,' I shouted to the pilot, but he never moved. My eyes were fixed on the enemy's machine, which suddenly dipped down and crashed to the ground like a wounded bird. 'They have brought it down,' I screamed. 'Good boys,' replied the pilot and his voice was lost in the noise of the motor and the whistling of the wind.

"We were saved. I could see now our aerodrome hangars and a strong smell of oil and petrol told me that we were home again. A few seconds more and we were safely on the ground welcomed by the cheers of our comrades."

This is one of many such thrilling stories that have appeared in Russia since the war began, and it is a matter of deep regret to me that the English public is given no opportunity of becoming acquainted with the fine prowess of their Russian allies. One Russian writer,

Mr. A. Theodoroff, has compiled records of the exploits of Russian airmen which would fill a volume. "During the latest period of the war," says Mr. Theodoroff, "the enemy has been unfortunate in his aerial raids and a very large number of his machines have been shot down by the Russians." It is not an easy matter to hit an aeroplane, particularly when the weather allows the pilot to rise high and get out of the range of shrapnel and bullets. It must be remembered that a flying machine is only seriously affected when either the engine, petrol tank, the propeller, or the pilot himself is hit. One fortunate shot forced a German Albatross to land close to the Russian positions at Sochatchef in Poland, the petrol tank having been hit. The Russians, of course, saw the fall and galloped to the place where the Albatross had alighted, which was some versts away. The German pilot and the observer started immediately to repair their machine and they were able to put things right before the Cossacks reached them. As they approached they saw the observer turning the propeller. Unfortunately for the enemy the

pilot switched on the contact too soon and caused the propeller to hit the observer on the head and kill him on the spot. The pilot left the machine and ran for safety towards a neighbouring forest, but he was captured before he could destroy his note-book, which supplied some particularly valuable information. From it the Russians learned that the German head-quarters was situated in a well-known Polish castle and they also discovered the exact situation of the enemy's aerodrome. The Russian Flying Corps made a raid on both these points the same day, and the most interesting feature of this raid was that the captured Albatross was used against the Germans.

Aviation is a very young branch of military art and it develops so rapidly that every day brings its new surprise. New types of machines and new methods of flying and manœuvring spring up in the aviation world like mushrooms after rain. In peace times hazardous experiments were not encouraged by the authorities responsible for material and men, but war which makes the individual

life of small account is a splendid opportunity for the aviators to test new projects and often to succeed in doing what was regarded as impossible. Despite all the assertions of the so-called experts British aviators have proved that it is quite possible to fly safely even on the darkest night. The same thing was done in Russia in the very early days of the campaign. At ten o'clock one night orders were received at the aviation head-quarters at Blony that Lieutenant Tc. should make a night flight. It was the first time that such a thing had been attempted and the Germans had never dreamt of sending their aeroplanes over the Russian lines after dark. The Russian soldiers were warned that one of their own machines was taking the air. The night was very cloudy and nobody believed that Lieutenant Tc. would be able to carry out his difficult task. He started with two observers at eleven. The familiar noise of the Gnome engine could be heard over the Russian position, but it was absolutely impossible to see the aeroplane even by means of the most perfect optical instrument. The flight through the darkness was

a great and thrilling experience. The pilot had been ordered to land close to the railway station at Sochatchef, which he was supposed to find by observing the railway line by the light of the moon. Unfortunately the moon was hidden behind the clouds and only showed its light on the rails for a very short time. That, however, was sufficient for the pilot and he carried out his landing in safety. The reports which he brought back decided the Russian staff to undertake a night raid on the German positions. Lieutenant Tc. was selected for the task and he was accompanied by Lieutenant B., an expert bomb-dropper. They started at one o'clock in the morning in a strong wind. The moon appeared for a few seconds and then disappeared entirely. For half an hour the flight was extremely difficult, but while the plane was flying along the railway lines the moon appeared for a considerable time. The airmen were able to observe the character of the country and to discover that they were proceeding in an entirely wrong direction. The wind was blowing from the right and continually edging them towards

RUSSIAN MILITARY PILOT RECEIVING INSTRUCTIONS BEFORE FLIGHT ON A "MORANE" PARASOL AT THE FRONT

the left. The pilot suddenly noticed the lights of a city and recognised Warsaw. He picked up his direction, realising that he was thirty versts from the point for which he was making. The aeroplane had been ordered to land at the small town of Blony, a difficult task in the darkness without a single guiding light. Nevertheless the landing was skilfully achieved and Lieutenant B. at once moved towards the railway station. He ran into a group of soldiers. "Halt, who goes there?" The lieutenant answered, "An observer from an aeroplane. We are looking for some one to look after our aeroplane while it is on the ground." And he again approached the soldiers. "Do not move or we will shoot," one of them shouted. Lieutenant B. was able now to see that the men who were stopping him consisted of the station-master, a group of armed civilians, and a number of territorials, all under military age, whose clean-shaven faces and queer uniforms made them look more like music-hall artists than soldiers. The chief of this odd band stepped forward. He was a short man, round as a ball, and carrying as

many different weapons as a pirate chief. He was evidently a man who would strongly object to jokes and Lieutenant B. addressed him with great respect.

"Well," he said after he had heard the explanation, "I cannot permit you to fly any farther without permission from Warsaw. I will telegraph to head-quarters now." And noting the names of the officers and the number of their machine in his pocket-book, he ordered his men to take charge of the aeroplane.

"Why are you all clean-shaven?" one of the aviators asked their guard.

"Oh, your honour, we went to the station with long beards, but the station-master was very much annoyed at our appearance. He said we looked more like scare-crows than soldiers and he ordered us to shave. Of course we did as we were told, but when he saw us clean-shaven, he nearly fainted, and now we are ordered to let our beards grow again."

Lieutenant B. explained the situation to his pilot. It was clear to them that they could not lose their way again and they had no time to spare.

"Are you ready?" whispered B. to the pilot.

"Yes," was the reply.

The pilot ordered the men to hold the wings and Lieutenant B. suddenly turned the propeller. This naturally caused the guard to loosen their hold and after a short run forward the aeroplane rose in the air and vanished in the darkness.

"Stop them, stop them!" shouted the little fat commander—but it was too late. After a short flight in complete darkness, the aeroplane landed again near the town of S. and from there began the dangerous flight over the enemy's position. Bombs were dropped for a period of three hours, and although the Germans' anti-aircraft guns replied energetically, the Russian aviators returned in safety. How near, however, they had been to disaster was proved when the aeroplane was inspected the next morning. There were eight holes in her wings and part of one of the propeller's blades had been chipped by shrapnel. This night raid is regarded as one of the most brilliant achievements of the Russian Flying Corps.

The Russian, even to a greater extent than the Englishman, has the habit of constant self-depreciation. He is always surprised by successes while he accepts failures as normal phenomena. It is the custom of the Russian to profess that he cannot possibly organise anything, that he must learn from the West and obtain Western help before order can be created from chaos. As a matter of fact, and bearing in mind the existence of difficulties unknown in any other civilised country, Russia is organised unexpectedly well and this organisation has been distinctly helped by the national habit of constant criticism. This fact can be proved by the observation of every development of the nation's activity and particularly in the world of aviation.

It must be accepted that Russian organisation to be successful must proceed along its own lines. The Russians have followed with keen interest the developments of military art in the west of Europe, but they have not slavishly copied the innovations of other peoples. Their method is to examine and estimate and adapt that which they con-

sider good to their own customs and their own national mind. It often happens that what is admirable for Germany or Austria would be fatal for Russia. I may state that in this the Russians are much closer to the British. It therefore follows that an accurate judgment of the organisation of the Russian army must be accompanied by a complete understanding of the character of the Russian soldier, who will be happy and content under circumstances that would be intolerable to his Western comrades. In this fact lies the strength of the Russian army and it largely explains the success of the army's aviators.

A story which I have recently read in the Russian papers of the aerial ventures of Captain Tch-y to an extent illustrates this point. The adventure took place during the fighting for the possession of Warsaw. Winter in Russian Poland is often mild and almost snowless, a short rainy season, with oceans of mud on the earth, and high wind above the earth making aviation practically impossible. Nevertheless strategical reasons forced the Russian pilots to ascend even under the most

unfavourable circumstances. On one particularly bad morning Captain Tch-y was ordered to discover a new movement of the enemy towards the Polish capital. The wind was choppy and constantly changing its direction. At the height of twelve hundred metres the aviator got into a bank of thick clouds. He was without the proper instruments for observing direction and he had nothing to depend upon except his own courage and persistence. After about twenty-five versts he was through the cloud-bank and was able to observe that the Germans had occupied several villages. The captain was of course at once observed and he switched off his engine. Generally when an aviator stops his engine at a considerable height from the earth there is a silence, more profound than any silence experienced on the earth. On this occasion, however, the atmosphere surrounding Captain Tch-y was filled with the noise of bursting shrapnel and bullets whizzed by him like flocks of birds. The aviator relates that the sound of explosions seemed to slither along his body and to play diabolic music on his nerves. He

ONE OF THE GIANT AIR-SCREWS OF THE EXPERIMENTAL AEROPLANE "KENNEDY NO. 1," ALTERED CONSTRUCTION, ON THE AERODROME OF THE IMPERIAL ALL-RUSSIA AERO CLUB AT PETROGRAD IN 1914

saw that the wings of his aeroplane had been pierced in several places. He started his engine again, and as he did so a bullet struck his petrol tank and the petrol sprinkled into the fuselage. It was a critical moment. Nothing remained for him to do but to plane down as near the Russian lines as possible. He landed safely in a field between the hostile armies. His aeroplane was a pitiful sight, a large sadly wounded bird. Parties of Germans at once hurried towards him, for a flying-man is always a good prize. The captain was only armed with a revolver and defence was impossible. The only thing for him to do was to run away.

"It was with a very bitter feeling that I abandoned my aeroplane," he said afterwards, "but I was as helpless as a hare and I had to attempt to escape. The heavy slushy earth hung on my boots and it was with the greatest difficulty that I could drag my feet from the ground. Indeed, I was obliged frequently to stop to relieve my boots of some of their weight. I dodged the bullets as well as I could and I imagine from the wild shooting of the Germans that they had been ordered to endeavour to

take me alive. As I ran, first I noticed a small hill in the distance and said to myself, 'If I reach that I shall be safe.' Then I looked ahead again and saw another hill and the same thought came to me. Farther along still there were some bushes that gave me another inspiration. Often, though I was running as hard as I could, I felt that I was not moving at all. But I never despaired. I expected that at any moment a miracle would save me, and it did. Three horsemen suddenly galloped towards me and with a great relief I saw that they were Cossacks. Filled with new hope and energy I rushed towards them. Three hundred feet separated us when one of the horses gave a spasmodic jump and then fell to the ground. His rider sprang to his feet like an acrobat in a circus and jumped behind one of his comrades. The third Cossack still galloped towards me. I hardly know what happened next, but I found myself on horseback clinging to the Cossack who had saved me and riding hard for home. I afterwards learned that of the three Cossacks who had come to my rescue one had been killed and another grievously wounded."

Captain Tch-y's pursuers were attacked by Russian infantry before they could capture the aeroplane and it was brought into the Russian lines on a motor-car. The village of R., where the Russian local head-quarters were situated, was afterwards severely bombarded by the Germans and it was impossible to repair the aeroplane there or to take it away when the Russian line fell back.

"It almost broke my heart to leave my Farman behind," said Captain Tch-y. "We had had so many adventures together and we had passed successfully through so many perils that I regarded the machine as my best friend, and I felt guilty of treachery in allowing it to fall into the hands of the enemy." Captain Tch-y went back to R. next day only to find his aeroplane completely destroyed by the enemy's shells.

CHAPTER XV

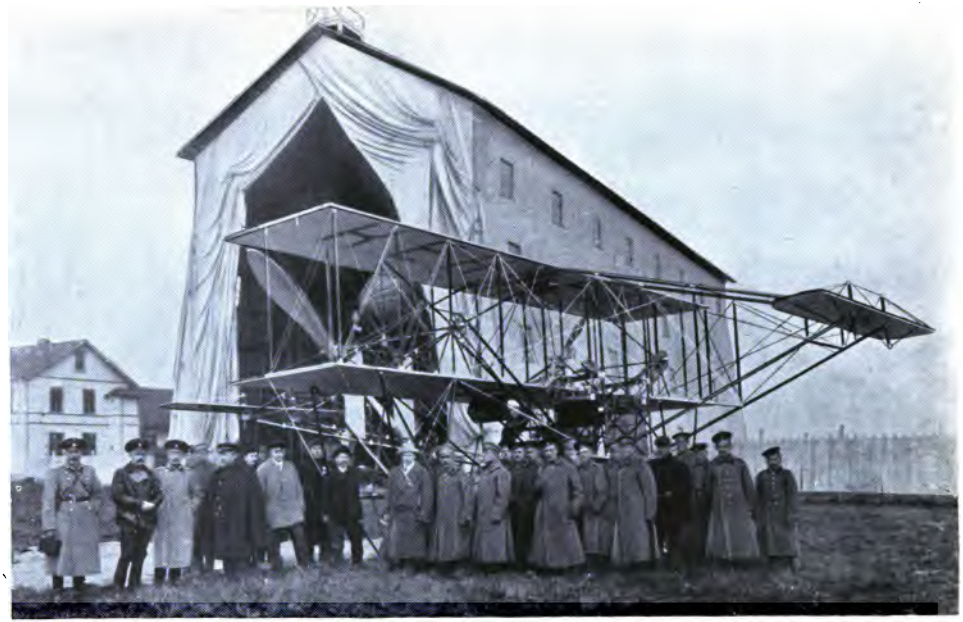
AVIATION AND THE RUSSIAN PRESS

THE Czar Alexander III, the creator of the modern Russian navy, was naturally and inevitably interested in the airship invented by Captain Kostovitch. It is evident that even at that early day the Russian monarch realised that the future of the navy and of aviation would be closely and intimately connected. This belief caused him to issue his historic order to his War Minister, General Vannovsky, " to study the science of aviation, and after careful and elaborate examination to introduce this new branch of military art into the Russian army and navy." General Vannovsky, in spite of his very limited general education, shared his master's conviction, and with his characteristic energy he at once set himself to the creation of Russian

military aviation. It will be clear to English readers that the circumstances prevailing in an autocracy are favourable for experiments with new ideas. The Czar having himself declared that aviation was an important subject demanding thorough and careful study, the good offices of the high authorities were at once assured and the interest of the whole people awakened. Without this approval of the sovereign, the history of aviation in Russia must have been very different. As a general rule unfamiliar innovations and new inventions are met in my country with great suspicion, particularly in bureaucratic circles. The aviation inventors never had to overcome this particular difficulty. On the contrary, from the very beginning they were assured encouragement and sympathy from the authorities, and in a short time aviation became the favourite child of the Russian nation and the Russian Government.

Until the day of his death the Czar Alexander III was keenly interested in the progress of the flying officers' school, and since his death the present Czar, Nicholas II, has ceaselessly

striven to carry out the dream of his father. It may be news to the Western world that the Czar was himself largely responsible for the raising of the necessary capital for the creation of the powerful aerial flotilla which has played so great and splendid a part in the present war. Where the Czar leads the people follow, and the monarch's interest in aviation has stimulated public sympathy and has no doubt been one of the reasons why the Russian Press has steadily paid such helpful attention to the conquest of the air. Every Russian newspaper, every periodical, every weekly and monthly review have been for years eager to collect all the available information connected with the new science, and they have shown wonderful accuracy in the details they have printed of foreign aviation as well as of Russian aviation. It is particularly interesting to note that even the smallest Russian papers have refrained from publishing frothy nonsense written by self-appointed experts. Before printing articles on aviation careful inquiries have been made into the technical credentials of the author, and editors have made a practice of asking



THE EXPERIMENTAL AEROPLANE "KENNEDY NO. 1" ON THE KORPUSNOI MILITARY AERODROME AT PETROGRAD IN 1912. THE FIRST AEROPLANE FITTED WITH LARGE DIAMETER AND PITCH, SLOW REVOLUTION AIR SCREWS

whether he has himself had aviation experience, either on its scientific, technical, business, or sporting side. It has never been easy to be recognised by the Russian Press as an aviation expert and great care has been taken to allow no one to go outside his own particular sphere. Thus the sportsman has only been allowed to write on the sporting side of flying, the business man only on the business side, and the scientific man only on the scientific side. Each writer too must have his special qualifications and must be accepted as an authority by his own associates. In Russia a brewer who knows nothing about aviation is not accepted by the Press as an expert because he has had a dream about aeroplanes. He is allowed to advertise his beer in the advertising column, but he is not permitted to mislead the people by posing as an expert. The serious spirit in which the Russian Press has treated aviation has enabled the Russian public to have a real and valuable knowledge of one of the most important sections of modern science. Of course the Russian Press in the early days made many blunders, but they were the

blunders inevitable to all men at the beginning and they were not mere arrogant inaccuracies of ignorant boomsters.

The Russian newspaper censorship sometimes has beneficent results. The Government is always particularly careful about the educational matter put into the hands of the people, and if a charlatan had persuaded any editor to publish a series of ignorant articles on aviation the publication would almost certainly have been forbidden to continue by the Director of Public Matter, acting either on his own initiative or after a protest from a recognised scientific society. One of the greatest pioneers of Russian aviation, Mr. Riaboushinsky, about whom I have already spoken in a previous chapter, regularly publishes the bulletin of the Kutchino Aero-Dynamic Institute. These bulletins are printed in French and are used as handbooks by both Russian and foreign constructors. Mr. Riaboushinsky is particularly interested in the problem of the air pressure on the surfaces of flying machines while they are flying in different positions. His distinguished

collaborators include the celebrated mathematician Professor Joukovsky.

It is in my opinion singularly unfortunate that the freedom of the British Press has enabled humbugs, imbeciles, and fanatics often to pose in this country as aviation experts even in war time and thus to mislead the people. The British authorities have, through this abuse of freedom, been constantly placed in a position of difficulty unknown in Russia, where the accord between the Czar, the Government, and the people have made it possible for there to be a widespread accurate and practical knowledge of the science of aviation.

Russia, on the other hand, has grievously suffered from the lack of manufacturing facilities. She has been obliged to make most of her purchases abroad, and foreign aviation constructors have been astounded by the thorough knowledge of their Russian customers. This knowledge has enabled Russia to lead the nations in the aviation of the future. As I have said over and over again, I regard the type of the Sikorsky giant planes as the

most important aerial machines yet constructed, and they have come into being as the result of their inventor's own studies and of the ceaseless experiments and investigations of a whole body of Russian scientists. Although the Sikorsky aeroplane, as soon as it took the air, beat all the world records at the time, it speaks much for the seriousness with which the Russian engineer regards aviation that Sikorsky and his works, the Russian Baltic Wagon Company, Ltd., declined to sell their first machine to the Russian War Office on the ground that it was not yet perfect and that they were about to build a better one. This was the "Ilia Mourometz." The British public with its commercial instinct will be interested to know that the Russian Baltic Works spent a hundred thousand pounds in building and equipping the necessary shops for the construction of the giant aeroplane and another hundred thousand pounds in experimenting with them, and that they then declined to sell the plane to their country before they were convinced that it was as good as it could be. I admit that this sounds like a fairy story and that such conduct is the last

thing to be expected from a commercial company. I quote the incident with considerable pride. It is possible that it could not have occurred anywhere else but in Russia, and I regard it as evidence of that staunch patriotism which will enable Russia to overcome all her difficulties and to attain that great position in the world which is hers by right. Self-sacrifice and hard work are the only bases on which national greatness can be built. I claim that these qualities are to be found in Russia. They exist supremely in Germany. Writing in all sincerity and as a friend of Great Britain, I am forced to the opinion that until sacrifice and hard work become more popular among the British people the thorough crushing of Germany will still be eagerly awaited but will remain a dream.

CHAPTER XVI

BY WAY OF CONCLUSION

THE beginning of the war found Great Britain with an entirely inadequate miltiary aviation service. The high efficiency of the enemy has, however, awakened the nation to the necessity of properly organising her aerial forces. There is, I suppose, no question that the jealousy between the naval and military aviation departments has been most unfortunate, and has considerably hindered the development of a service, the importance of which cannot possibly be exaggerated. However, as I write, it is true to say that a great change has come over the organisation of Great Britain's aviation forces and that something like efficiency has already been attained. It is a matter of history that the success of the early Zeppelin raids was

entirely due to the insufficient anti-aircraft defences. As soon as aerial defence was improved, the damage caused by the Zeppelin visits became less, despite the facts that the raids were more frequent and the raiders more powerful.

The radical improvement, in a very short time, of military aviation in this country can only be explained by the high level of capacity possessed by the aviation authorities and the magnificent courage and enterprise of the British flying-men. I was privileged, in company with some of my comrades of the Russian Flying Corps, to visit, by special permission of Lieut.-General Sir David Henderson, several centres of British aviation. I was immensely impressed with the fine organisation and complete equipment of the British aerial forces, and my opinion was fully shared by such aviation experts as Captain Roudneff and Commander Dibovsky, the first aviator who devised a means of firing a machine-gun through the propeller of an aeroplane. British aerial photography is unquestionably the best in the world. This branch of the service has

made reconnoitring an exact science and has entirely replaced the cavalry as an observation force.

It is perfectly obvious that the aeroplane must play an ever-growing part in the wars of the future. The cavalry has already lost most of its importance in the field owing to the progress of aviation. The same thing will happen, I believe, to land artillery, and there will come a considerable modification in the use of the navy. It is already recognised that the flying-machine supplies the best means of attacking the enemy's bases and his means of communication. Operations at the enemy's rear by means of brilliant cavalry raids become more and more impossible. Their place has been taken by the raids of aerial flotillas, by which desirable results can be obtained with the use of very limited forces.

The Russian strategists realised the transformation that was imminent, and they were persuaded that aerial flotillas must be created on the lines proved successful in the navy. Modern sailors agreed in their high estimate of the fighting value of Dreadnoughts, and,

A LATE TYPE OF GIANT SIKORSKY BIPLANE ABOUT TO ASCEND FOR RECONNAISSANCE

adopting the same principle, Russia gave its most serious attention to the development of the Sikorsky giant. It is indeed obvious that these powerful aerial cruisers, armed with comparatively heavy guns and capable of attaining a high speed, must have a supreme tactical and strategical importance in battles in the air. I re-affirm my conviction that the Sikorsky giant, of the "Ilia Mourometz" type, is, up to now, the most important development of the aeroplane, and Russia may well be proud of the achievement of her son, and I repeat my astonishment that the fact of the construction of this "Monarch of the Air" has remained utterly unknown to the British public.

But Russia has not remained content with the "Ilia Mourometz." Recently Professor Slessareff has constructed a greatly improved giant on a much larger scale based on the designs of Mr. Kennedy. Professor Slessareff should have joined Mr. Kennedy in London to build this aeroplane in this country, but was unable owing to the war. A certain Polish millionaire provided the Grand Duke Alexander

Michailovitch with the necessary money for this new enterprise, and the super-Dreadnought of the air is now ready to begin its career in Russia. It will be piloted by Captain Roudneff, one of Russia's most experienced aviators, who was recently with me in London. Captain Roudneff has commanded the "Ilia Mourometz." He flew on her from Petrograd to Lemberg and bombarded that town. Later on he bombarded Przemysl and made a highly successful reconnaissance over the German army in Poland, discovering a deployment and preventing the Russian forces from being encircled. Captain Roudneff was in London on a highly important mission. Thanks to the splendid co-operation of Sir David Henderson he was able to obtain all the necessary equipment and arms for the new giant. I myself am able to bear witness to the cordiality with which the British military authorities helped my fellow countryman, who left England convinced that in the British flying corps and its chiefs the Russians have loyal and faithful brothers in arms.

To me, living in England and loving England,

it is a matter of great interest that this country should play its part in the history of the Russian giant planes. I am able to state that the Grand Duke Alexander Michailovitch was deeply touched by the sympathy shown to Captain Roudneff, and that he has expressed his personal thanks both to Sir David Henderson and Major L. V. Stuart Blacker, and to Captain C. D. M. Campbell, who spent many weeks with Captain Roudneff and secured him everything he needed. This is a splendid example of the solidarity between two great countries and another step towards the creation of a firm and durable alliance.

Let me assure the British public that in the ranks of Russia's aviators and aerial scientists there is an inexhaustible supply of ideas, which if they could be backed by Great Britain's industrial and financial resources would secure for the two countries a pre-eminence in the air which Germany could never challenge. America has already realised Russia's brain potentialities and American capitalists are at this moment in Russia endeavouring to establish relations with her technical experts.

It will be understood that in this book I have been able to tell only part of my story. The pen of a military writer at a time of war must be restrained, but I trust I have said enough to prove that Russia may claim splendid achievements in the science of aviation and that Russian airmen may look their foreign colleagues in the eyes without apology or shame. One day, perhaps, the world will know how much the Russian airmen have done to stem the German torrent and to save Europe from Prussian tyranny. When that story is told Great Britain will have the same affectionate admiration for the Russian Flying Corps as it has already conceived for the glorious Russian army.