

Diary of My Trip to the U.S.S.R.

MICHAEL E. DE BAKEY, M.D., F.A.C.S., Houston, Texas

THROUGH the kind invitation of Professor A. A. Vishnevsky, chairman of the Organization Committee, I attended the All-Russian Surgical Congress in Leningrad from December 15 to 20, 1958. I was able to obtain my visa through the good offices of Dr. Valeri N. Butrov, counselor of the U.S.S.R. embassy in Washington.

Saturday, December 13, 1958. I left Houston at 8:50 a.m. via Delta Airlines. The flight to New York was so smooth and so fast that we arrived there 30 minutes ahead of schedule. The same afternoon at four o'clock I departed from New York on an Air France Constellation. The plane was fully loaded, the food was quite good, and the flight was very comfortable.

Sunday, December 14, 1958. We arrived at Orly Airport in Paris two hours ahead of schedule at 7:25 a.m. Our departure from Paris was delayed owing to mechanical failure of the plane, and we left finally at 3 p.m., arriving in Moscow at 11 p.m. The temperature was about 10° below zero and there was snow. I was met by Dr. D. D. Venediktov and found that the plane I was supposed to have taken to Leningrad had already left. I had to stay at a small hotel near the airport.

Monday, December 15, 1958. At 6 a.m. I finally left Moscow on a Russian two-motored plane and arrived in Leningrad about 10:30 a.m. Because of a mix-up in the schedule no one was at the airport to meet me, but I called Dr. Vishnevsky, who arranged for a taxi to take me to the Astoria Hotel. That afternoon we spent looking around the city and attending the meeting of the Congress.

Tuesday, December 16, 1958. Today I visited Professor Fedor Uglov's clinic at the First Leningrad Medical Institute. The hospital is quite old, having been built in the nineteenth century with

From the Cora and Webb Mading Department of Surgery, Baylor University College of Medicine, Houston, Texas.

large corridors and high ceilings, but it is well equipped and spotlessly clean. The operating theater is of the old type and is very spacious.

Two operations were performed by Professor Uglov, a mitral commissurotomy and a pericardiectomy.

The surgeons do not remove all their street clothes. A plastic apron and cloth overshoes are used, with separate cap and mask. Iodine is used for skin preparation, both for the operating field and the surgeon's hands. White sheets are used for drapes.

The operating room equipment is excellent. General anesthesia with muscle relaxants was employed, using a modified McIntosh anesthesia apparatus with automatic respirator for controlled respiration. A vector-cardio-oscilloscope was used during the entire operation, along with an ear oximeter. Color television was also used to televise the operation.

A modified Brock incision was made for the approach in the mitral case, with excellent exposure. The valvotomy was done by finger fracture and the auricular opening closed first with a modified von Petz clamp, using tantalum clips and a second row of interrupted silk sutures. The operation was completed in about one hour.

For the pericardiectomy Uglov used his own incision, which is a flap approach (Fig. 1). This pro-

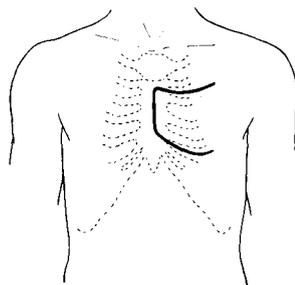


FIG. 1—The anterior thoracotomy approach employed by Professor Uglov is illustrated.

vided good exposure. Technically the procedure was well done with precision and dispatch.

After these operations we visited the experimental laboratories which are located in the basement of the hospital. These include special laboratories for pathologic anatomy, histology, bacteriology, biochemistry, respiratory function, animal surgery, and other purposes. Here we saw some experiments on demonstration of cancer cells in urine (90 per cent of cases with cancer of the lung have been found positive); also some experiments with vascular substitutes using a woven plastic material as a tube. One of these is made of an absorbable material, some type of plastic, which is supposed to be absorbed in three weeks.

Professor Uglov is a rather small, alert, and congenial person with an engaging smile. He is a self-made man, having cut trees in Siberia in his early life. He then studied medicine and became well known in Siberia and was appointed to the professorship at the First Medical Institute about ten years ago.

Wednesday, December 17, 1958. I visited Professor Pjotr Andreivitch (Peter Andrew) Kuprijanov of the Surgery Clinic, Leningrad Military Academy of Medicine. This is primarily a military hospital, but all types of patients are admitted.

This morning we saw two operations being performed simultaneously in the same large operating room. One was a case of mitral stenosis operated upon by Professor Kuprijanov, and the other a case of pure pulmonic stenosis by his assistant, Dr. Vladimir Misura.

The first procedure was done in much the same way as the case described previously done by Professor Uglov, using a Brock incision and finger commissurotomy.

SUTURE NURSES ARE WELL TRAINED

The case of pulmonic stenosis was done by the Brock method, using a modified Brock instrument. Both procedures were done with precision and dispatch. Both men are excellent surgeons, and both had women assistants. The suture nurses are well trained and anticipate the surgeon's needs. Controlled respiration anesthesia was used. The operating room equipment is excellent, with monitoring devices and color television.

After completion of the operations we visited the research laboratories, which included biochemistry,

histology, respiratory function, and a recently developed cardiac surgery animal laboratory. Here we saw an artificial heart-lung apparatus that they had recently received from Moscow. It is well designed and well made and consists of a bubble type oxygenator made of plastic material, not disposable, and a pumping device utilizing flap valves and intermittent hydraulic pressure balloons in closed chambers to pump the blood. The mechanism is sterilized by passing an antiseptic solution through it. It had only recently been received and had been used in a few animals.

In the evening we went to a ballet, *Don Quixote*. It was beautifully performed and the audience was most enthusiastic.

Thursday, December 18, 1958. Today I visited the Leningrad Institute of Blood Transfusion, where Dr. Alexander D. Belakov is director, Dr. A. N. Filatov is chief of surgery, and Professor Petrov is chief of physiopathology.

BLOOD TRANSFUSION INSTITUTE

The name of this institute is somewhat misleading. To be sure, one of its primary functions is the collection, preparation, and distribution of blood for this entire region, but it has a number of other functions which are investigative in character. It is concerned, for example, with research work on blood substitutes, blood vessel substitutes, shock, tissue transplantation, and other problems related to the vascular system, but excluding heart disease. Laboratories for all of these purposes are available, but in addition it is also a small hospital with all clinical and surgical facilities for the care of patients. These clinical facilities are limited, however, to the care of patients with clinical problems of research interest to the institute. In this respect it is somewhat similar to our Rockefeller Institute, or to the Clinical Research Center of the National Institutes of Health in Bethesda, Maryland.

We first visited the laboratory of Dr. L. G. Bogomolova, a woman, director of Medical Preparations and Blood Substitutes Laboratory. We were shown the following preparations:

Blood substitutes: (1) Dried blood plasma, said to be free of hepatitis virus. This is prepared by adding tripoflavin or suphamides to the blood and then extracting the plasma and drying by lyophilization. (2) Dried hemoglobin, which is stated to contain no impurities or metahemoglobin. (3) Preserved erythrocytes which may be stored for 30 to 40 days. (4) Aminokrovin, a solution prepared from elements of blood obtained by oxygen hydrolysis of residual

blood clots after extraction of serum, of the erythrocytic mass after removal of plasma, or of cadaver blood. It contains about five per cent proteins obtained from blood and the essential amino acids and is used for nutritional purposes as well as for shock and blood loss replacement. They have also developed a somewhat similar solution made from animal blood and from plants (beans) but without proteins—only certain amino acids. All of these solutions may be preserved by freeze-drying. (5) Carbohydrate colloidal blood substitutes, including dextran, polyglukin, and syncol. These are prepared as dextran is by bacterial synthesis. They have, however, prepared other solutions of high molecular colloidal nature without bacterial synthesis. One is a colloidal polysaccharide called AP; another is of the polyvinylpyrrolidone type. (6) Combined solutions, mostly amino acid-protein solutions such as one called L103 which contains one per cent human plasma. Another is ABP containing carbohydrate, human plasma, and syncol (dextran-like solution). Various other combinations have also been prepared.

SPONGE FROM CATTLE BLOOD

Hemostatic preparations: Hemostatic sponge consisting of thrombin and fibrin is prepared as “cotton wool,” powder, and suppositories. Hemostatic sponge is derived from blood plasma and looks like a white, soft rubber sponge. It is resorbed and is supposed to produce vasoconstriction as well as coagulation. More recently a similar sponge has been prepared from the blood of cattle. Dried thrombin is

used in skin grafting along with fibrinogen. “Cotton wool” is dipped in thrombin solution before application. Another hemostatic and antiseptic agent of this type is prepared as a tampon or suppository and is composed of plasma derivatives, gelatin, penicillin, and streptomycin.

TREATMENT FOR PEPTIC ULCER

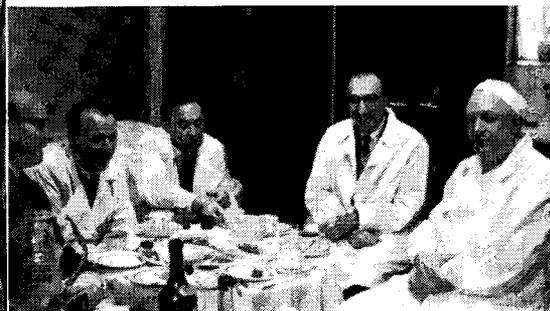
Stimulating preparations: These are made from pressure sterilization by autoclaving human blood serum at 125° C. Presumably this causes a disintegration of the serum into a protein preparation that has stimulating qualities for the process of regeneration of tissue in the healing of resistant ulcer, gastric and duodenal. It is given intramuscularly in one to 10 cubic centimeter doses for 10 to 20 injections. More than 1,000 cases of peptic ulcer have been treated, with favorable results in 90 per cent. Another of these preparations called hemohormostimulin is made from retroplacental blood and contains hormones used in hormonal disorders of women.

Anti-anemics: Hemostimulin made of animal blood with trace elements including iron, copper, and cobalt, presumably effective in treatment of hypochronic anemia.

Bioplastics: (1) Fibrin film, used in burns. Some has been prepared with bactericidal agents. (2) Resorbable plastic for use in gastrointestinal anastomosis and for intra-osseous splints.



To left Professor Vishnevsky, in white coat, and some members of All-Russian Surgical Congress stand in front of statue of the professor's father, for whom hospital in Moscow visited by Dr. Michael E. De Bakey is named. Below (second from right) is Dr. De Bakey with his host, Professor Boris Petrovsky, wearing white cap, at luncheon at the First Moscow Medical Institute with other guests and staffers.



We next visited Professor Filatov's Laboratory for Blood Vessel Substitutes and Vascular Surgery. There were several patients with arteriosclerotic occlusions of segmental type involving the femoral artery in which bypass homografts were employed successfully. This work began only about a year ago, and they have operated upon 10 cases. Postoperative arteriograms in one of these patients showed normal restoration of circulation. In another case the postoperative arteriogram showed a small aneurysm beginning in the homograft. A third patient was demonstrated with a low popliteal obstruction with diffuse peripheral occlusion of the branches of the popliteal artery and with only collateral flow. Professor Filatov stated that he hoped to restore normal circulation in this patient by operation consisting of endarterectomy. In response to their inquiry concerning my opinion on this case, I stated that on the basis of our experience I did not believe that this type of occlusive lesion was suitable for endarterectomy and that under these circumstances sympathectomy was the most appropriate procedure.

We were also shown some recently started experimental work concerned with blood vessel substitutes. So far they have developed a polyvinyl alcohol type of vessel substitute. A tube of this material, resembling our polyvinyl type of tubing, was demonstrated. I did not consider it promising.

TISSUE TRANSPLANTATION JUST BEGUN

Tissue transplantation: This laboratory is concerned with various phases of tissue transplantation, including the preservation, mostly by freezing, of various tissues removed from the cadaver by sterile technique and the maintenance of viability. This work has only recently begun, and so far they have not achieved success in the transplantation of any tissue, either experimentally or clinically.

Professor Petrov's shock experiments are primarily concerned with experimentation on shock in animals. He has published his concept of shock, which stresses its nervous origin. He does not believe that bacteria or toxic materials play an important role.

After our tour of the laboratories, we were given a delightful luncheon and most cordially received. There is a fine dedicated spirit in this institute.

During the evening I went to dinner at a supper club in the Astoria Hotel with Dr. Misura, Profes-

sor V. K. Stojanovich, of Yugoslavia, and Drs. Androsov and Jarozow of the Sklifosovsky Institute in Moscow. This is essentially a night club and resembles in many ways our own type of supper club, with a dance orchestra that played American jazz music and a girl singer. There was a small dance floor in the center. I felt as though I were in the Emerald Room at the Shamrock.

Friday, December 19, 1958. Today I gave my lecture with slides. They kindly allowed me 30 minutes, although the general rule for speakers is only 10 minutes. My remarks were translated by Dr. Manidsky, who is an orthopedic surgeon and the grandson of the surgeon who founded the Lenin-grad Institute for Blood Transfusion.

Following my lecture, my five motion pictures were all shown to a large crowd, and immediately after their presentation I was given a rising ovation, with most enthusiastic applause.

RESPIRE AT THE BALLET

In the evening we went to the ballet, the Blue Danube. The music was good, but the dancing, though enjoyable, was not up to the quality of the previous ballet, Don Quixote. Afterwards we returned to the hotel for dinner.

Saturday, December 20, 1958. This morning we visited Professor Ivan Stepanovich Kolesnikov, chief of the Surgical Clinic at the Military Medical Academy. This hospital has about 130 beds, and although it is a military medical institution, most of the patients are civilians. It is also a teaching hospital with both undergraduate and graduate students—about 25. Their main interests are surgical diseases of the lungs, and burns, but general surgical problems are included. There are no research laboratories in this hospital.

We saw Professor Kolesnikov perform a pneumonectomy on a young lady with extensive bronchiectasis. A left anterior thoracotomy was used through the fifth interspace, providing somewhat inadequate exposure. There was much blood loss and the heart stopped twice but was resuscitated by massage. Of interest in this connection is the fact that the bronchus was closed by means of small tantalum clips, using for this purpose a specially designed instrument similar to the von Petz clamp.

After completion of the morning operative schedule, Professor Kolesnikov invited us to lunch with all of his other guests, and as is the custom here, there was much toasting to friendship and good will.

In the afternoon we visited the historic battleship *Aurora*. In the revolution of October 1917, this ship

by firing a shot from one of its cannons gave the signal for storming the Winter Palace. The *Aurora* is now used as a training ship for naval cadets and as a museum.

Later we visited St. Isaac's Cathedral, now used as a museum. Built in 1849 by a French architect, it is somewhat remindful of St. Peter's Church in the Vatican—really magnificent.

At eleven o'clock we gathered together at the hotel to take the bus as a group to the railroad station to leave for Moscow. All of the interpreters went to the station with us to see us off and wish us bon voyage. They are indeed warm, hospitable, and responsive. Even Professor Petrov and his wife went to the station with us.

Professor A. V. Baliga, from Bombay, and I shared a most comfortable and nicely furnished Pullman compartment. Tea was served shortly after the train left the station. The distance from Lenin-grad to Moscow is about 500 miles, and we arrived in Moscow about 8:30 a.m. We were met at the station by cars that took us to the Soviet Hotel, which is rather modern with large, comfortable rooms, nicely furnished.

CHRISTMAS SHOPPERS

Sunday, December 21, 1958. About 10:30 this morning Dr. Venediktov met me and took me sight-seeing. We toured the city, seeing some of the old quarters and some of the new parts where many large apartment buildings have been built and many more are under construction. We also toured Red Square and the Kremlin and visited some of the interesting museums which contain relics of the czars, such as their treasures, clothes, and jewels. We also looked in at the largest department store, Gum's, which was crowded with people doing their Christmas shopping much as we do in the United States. Moreover, the store was decorated with Christmas trees and lights in much the same way as our own American stores are decorated at this time.

Monday, December 22, 1958. This morning we visited Professor Vishnevsky. His hospital was named after his father and there is a bust of him in front of the hospital.

He performed two operations for us, the first being on a case of tetralogy of Fallot using a modification of the Blalock procedure. A left lateral thoracotomy approach through the bed of the resected fifth rib was employed. The pulmonary artery was freed and isolated between ligatures, following which the left subclavian artery was dissected free and the distal end ligated. Blalock

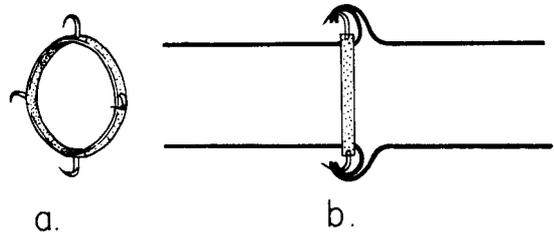


FIG. 2—(A) This is the vascular ring with four hooks used by Professor Vishnevsky, of Moscow, for anastomosis. (B) The diagram illustrates method by which prosthesis is applied. One end of vessel is threaded through ring, and cuffed back through hooks.

clamps were then used to occlude the left subclavian artery proximally and the artery was divided proximal to the ligature. An arterial homograft, preserved by lyophilization, was then used to provide an anastomosis between the end of the subclavian artery and the side of the pulmonary artery. These anastomoses were performed without sutures, using a tantalum ring, with four small hooks, which was first threaded into the graft and cuffed over. The end of the subclavian artery was then pulled over the cuffed ring of the graft so as to be secured by the hooks as shown in Fig. 2.

The second operation consisted of the resection of a posterior mediastinal tumor, probably a neuroblastoma. The entire procedure was performed under local anesthesia using one-fourth per cent of novocain infiltration. A posterolateral approach through the bed of the resected fifth rib was employed. The procedure was well performed without incident.

EVERYTHING EXCEPT GOOD LIGHTING

Professor Vishnevsky is a skilled surgeon. He operates without gloves owing to an allergic condition to rubber gloves. After scrubbing, he uses iodine on his hands, and during the operation from time to time he washes his hands with an iodine solution. The operating room was well equipped and included a cardio-oscilloscope, an eight-channel recording unit of Italian design and make, a bovie unit, and a general anesthesia apparatus with automatic, controlled respiration.

The operating room light was, however, of a rather poor design. It is of interest in this connection that in all the hospitals I have seen, both at home and abroad, this particular piece of equipment, i.e., the light, is generally poor.

Following completion of the operations we had a delightful luncheon with Professor Vishnevsky.

In the afternoon we visited the Scientific Research Institute for Experimental Surgical Apparatus and Instruments. Dr. M. G. Ananiev is the director.

This is an unusual, if not a unique, institute. It is concerned primarily with the development of surgical instrumentation. The personnel of this institute includes 20 physicians, 65 engineers, and 200 employees. Facilities are provided for designing and fabricating all types of surgical instruments. In addition, experimental laboratories are also available, including physiology and biochemistry laboratories, animal quarters, and operating rooms. There is also a 150-bed hospital for surgical patients.

They have a collection of instruments of all types from almost every part of the world. Apparently their major accomplishment in surgical instrumentation consists in the development of automatic suturing devices utilizing the paper clip principle. The clips are made of tantalum and vary in size for different purposes, from very fine for blood vessel anastomosis to quite large for sternal and rib fixation. The instruments utilizing these clips are also variable, being constructed for different purposes including blood vessel anastomosis, nerve suture, gastric and intestinal anastomosis, bronchial closure following pneumonectomy or lobectomy, and the like. These instruments are beautifully engineered and constructed with great precision.

We also saw the heart-lung apparatus which was made at this institute. It is the same as that we saw in Leningrad, with an intermittent hydraulic pressure pump with flap valves and bubble oxygenator. They stated that its output is about 4,000 cubic centimeters per minute. They have used the instrument experimentally but have had little or no experience with it clinically. I discussed with their engineer and some of the physicians concerned with the heart-lung apparatus certain specific problems related to its use, and from the questions raised it is apparent that their experience in this field has not been extensive.

Next we were shown the animal experimental laboratories and some operative procedures on animals demonstrating the use of the tantalum clip suturing devices for blood vessel anastomosis—

utilizing a nylon type of graft in the abdominal aorta, *circa* 1954, intestinal anastomosis, and pneumonectomy. All of the surgeons were women. The laboratories seemed to be well equipped.

We were then shown the laboratories for the transplantation of tissue. They proudly showed some dogs whose hind legs had been completely severed, preserved from several hours to 24 hours using refrigeration and blood perfusion with a bubble oxygenator, and then reimplanted. The dogs were able to walk and run, although in a few slight dragging or limping could be detected. They have tried homografting of whole organs such as the kidney, heart, liver, and even the head of animals but have been unsuccessful so far as prolonged survival—more than several weeks—is concerned. They are working on this problem, but when asked specifically the nature of these studies they indicate that they have only just commenced.

In the evening I went to dinner at the home of Professor Bakulev, who is president of the Academy of Medical Sciences and thus the top man in medicine in Russia. He was the leading thoracic surgeon in Russia, but has had two attacks of coronary thrombosis and is now restricted in his activities surgically. He appears to be about 60 years of age, of medium height with fair complexion, with a pleasant smile and a good sense of humor.

His home is in one of the skyscraper apartment houses presumably reserved for high dignitaries of the government. The apartment consists of a study and living room, dining room, and small sitting room (I did not see the bedrooms or the remainder of the apartment).

In addition to Dr. Bakulev, others at the dinner were Mrs. Bakulev; their married daughter; Professor Vishnevsky and his wife, who speaks English well; Dr. Stojanovich; Dr. Baliga; and Dr. Venediktov.

It was a most enjoyable dinner. The table was simply laden with all types of delectable food and dishes—about 25 varieties, including fish, shellfish both cold and hot, and meat dishes of many kinds, particularly those of characteristic Russian type. In addition, there were several different types of wine, vodka, and cognac.

SHOES AND CALAMITIES

During the meal many toasts were rendered as is their custom, with expressions of warm friendship and good will. In this connection several stories were told of the Georgian custom of toasting, which is apparently legendary. For example,

a Georgian may drink a toast among other things to his guest's shoes. At first it may seem curious that he should drink to his guest's shoes, but later he explains that the shoes brought him the guest and for this he is grateful. In another example, the Georgian in rendering a toast to his host may begin by stating all types of dire things that should happen to his host. After listing many of these dreadful calamities, he will finally conclude by saying that these things should happen to his host only if a single drop remains in his glass. It was truly a delightful evening.

Tuesday, December 23, 1958. This morning we visited Professor Boris Petrovsky's clinic at the First Moscow Medical Institute. This hospital has about 165 general surgery beds, but the main interest in this clinic is in cardiovascular surgery. About 70 medical students remain here at all times for periods of two months. This surgical unit is one of many in this hospital area of about 4,000 beds. This is also one of the main teaching hospitals for undergraduate students, there being about 500 in this medical school.

We saw Professor Petrovsky perform one operation on a patient with patent ductus arteriosus. He used a left thoracotomy approach and obliterated the ductus with the tantalum-clip suturing device without division. He is an excellent surgeon.

Afterwards we toured the hospital and laboratories. The wards vary from four beds to about 30 beds in size. They also have a small recovery room. The laboratories are not yet fully equipped but the heart catheterization laboratory seems to be adequate.

CARDIOVASCULAR SURGERY IN MOSCOW

Professor Petrovsky stated that he has been director of the surgical clinic here for only about one year and is just beginning to develop their experimental and investigative activities. On the wards I saw many patients with mitral stenosis, patent ductus, and pericarditis. Although Russian surgeons have had little experience with surgery of the aorta and major peripheral arteries, they are planning to intensify their interest and activities in this field.

After lunch with Professor Petrovsky we showed my films, and then I went by the American embassy and to the airport to leave for home. I left on Sabena at 6:00 p.m., arriving in Brussels at 9:30 p.m. It was very foggy in Moscow at the time of my departure and planes were unable to land at all. Our take-off was without incident, and I later

learned that mine was the only plane that left there for three days. I left Brussels at 10:00 p.m. on Sabena and arrived in New York the next morning—Christmas Eve—at 7:50. Owing to the airline strike I had to wait for an afternoon flight which arrived in Houston at 9:12 p.m., just about 30 hours after leaving Moscow. Had I been able to leave New York immediately, it would have been less than 24 hours, which reflects well the shrinking size of the world.

Although my visit was a hurried one, it was filled with interesting observations and enjoyable times. This was largely due to the gracious hospitality and warm reception provided me by everyone I met in Russia. Their sincere cordiality was unmistakable, and all of the Russian surgeons I met expressed a genuine desire for closer association with American surgery. I am sure from this visit, as well as from visits I have had the opportunity to make in other foreign countries, that there is a universality in the medical community and that there is no better means by which our foreign relations can be improved than through exchange brought about by visits of this kind.

SOME GENERAL OBSERVATIONS

Medicine in Russia is, of course, completely state controlled. All physicians are on salary and all patients receive free medical care. Both the people and the physicians seem to be completely satisfied with this system. It is difficult to assess the system except against the Russian background. For them it seems to meet their objective of providing adequate medical care for everyone. Whether or not the system in their society has any influence on the quality of medical care would be difficult to say. Within my limited period of observation, I would say that the system seems to be working satisfactorily for them.

Medicine is organized under the Ministry of Health, which is one of the top executive branches of the government, comparable to cabinet rank in the United States. Its function is to provide and maintain personnel and facilities for all types of medical care, including preventive medicine. Under the ministry but somewhat autonomous is the Academy of Medicine, which is concerned primarily with research and education in medicine. I obtained the impression that this organization has high prestige in Russia and receives strong

support from the government. The academicians are also held in high esteem and in their society constitute the privileged class. The professors, for example, receive top salaries, some as much as \$20,000 to \$25,000 a year, which would be comparable to much more in our country.

From my limited observation and discussions I received the impression that the people of Russia are satisfied with their system of government. To be sure, certain changes are taking place gradually toward more concern with individual freedom of activity and away from the original rigid communistic policies. For example, there is some degree of private ownership of property. One may now buy his own property and build his own house. He may even rent it but within government rent regulations, and he may engage in some business activities of his own. Bank accounts are encouraged, and especially savings accounts at interest. During the last five years people have accumulated considerable purchasing power and the shops are crowded with shoppers. Increasing amounts of consumer goods are produced, but production still lags behind the purchasing power of the people. The general quality of these goods is improving steadily. I was informed that one must wait well over a year to receive an automobile which he has ordered, there being about 100,000 in line in Moscow alone for 20,000 new cars. The people in general seem to be well clothed and well fed.

STANDARD OF LIVING

The standard of living, however, is below ours, particularly with regard to housing and consumer goods, commodities, and luxury items. Although adequately clothed, few women, for example, are fashionably dressed. Both in material and in design there is a certain sameness and mediocrity. This is also true of men's clothes and is noticeable in their shoes, many of which are made of leather substitute. Items such as refrigerators, washing machines, and television sets are still at a premium, but I was told they are becoming increasingly available.

Amusements, especially those of the arts such as the theater and ballet, are plentiful and receive enthusiastic support. Indeed, it is extremely difficult to get seats as they are in such great demand. Moreover, their artists are held in high esteem by the Russian people.

I was especially impressed with the surge of

education in Russia. This effort is taken very seriously and education at grammar school level is compulsory. This rule is rigidly enforced. Higher education is also strongly encouraged. Universities are being expanded and new ones constructed. Since higher learning has high prestige, this provides strong motivation. It also provides the best means of climbing up the ladder of their social structure. Our interpreters, for example, were young ladies, most of them married and working, but who in addition were taking university courses in foreign language, history, and social sciences.

ON RUSSIAN SURGERY

It is difficult to assess the surgery of Russia on the basis of my limited observations. For one thing, the surgery I witnessed represented a highly selective segment performed by some of their best surgeons. For another, I had little opportunity to follow through and thus get some idea of the depth of their surgical activities, particularly as it concerns pre- and postoperative management, morbidity, and mortality.

Certain impressions, however, were clear. First, with regard to facilities and equipment: In general, the hospitals are of the old nineteenth century type of construction with large corridors and high ceilings. Moreover, they are built on the old European institute plan in which each building is devoted to its specialty, i.e., surgery, medicine, obstetrics and gynecology and so forth. There is little or no air-conditioning, even for the operating rooms, but it is really needed for only a short time in the year. I did see a Philco air-conditioning unit which was proudly pointed out to me in the recovery room of Professor Petrovsky's hospital. The operating rooms are of the old large theater type with huge windows and some skylights.

There is a curious and somewhat baffling contrast in the character and quality of some of their surgical equipment. For example, they may have some of the most modern and elaborate equipment, such as color television, eight-channel recording units, and vector-cardio-oscilloscopes, while at the same time the operating room lights, operating table, and some of their basic surgical instruments such as hemostats, tissue forceps and even scalpels are constructed along much older design. I rarely saw a "mosquito" type hemostat or a pair of Metzenbaum-type scissors.

This is especially curious in light of their rather unusual institute for the development of surgical instruments where they have placed great empha-

sis upon design of new instruments to facilitate surgical technique. That they are able to design and fabricate surgical instruments of high precision and quality is well demonstrated by the tantalum-clip suturing device which they have developed. Here is an instrument reflecting fine craftsmanship and good engineering design, yet their basic surgical instruments remain of the older type.

In other respects, too, some of their surgical practice is reminiscent of an older surgical era. For example, some of the surgeons still operate in their street clothes, although they put on a plastic or oilcloth surgical apron and cloth overshoes, before scrubbing. Iodine is used lavishly as a skin preparation both for the surgeon's hands and the operating field, and drapes are often applied before putting on gloves. Some of their surgeons, however, such as Professor Uglov and Professor Vishnevsky, have considerable technical ability in carrying out the essential objective of the operation. I saw both of them perform thoracic procedures with precision and dispatch and exercise considerable care in the dissection.

The old German "herr professor" system seems still to dominate in Russia, but I have the impression that its days are numbered. The young generation of surgeons is eager, restless, and especially desirous of learning about surgery elsewhere and particularly American surgery. There can be no doubt that everything American is greatly admired by the young Russians. At every place I went—the medical meeting, the hospitals, the research laboratories—their questions about our surgical practice were endless and were obviously directed toward learning more about how we do things. They know a great deal about our surgery, read our publications extensively, and have an excellent knowledge of our literature. I was amazed at their knowledge of my own publications, and they often asked me questions about something I had written which I had either forgotten or only vaguely remembered.

They are especially eager and enthusiastic about our developments in cardiovascular surgery. Their response to my presentations and movies at the Surgical Congress in Leningrad was heartwarming.

This is a field in which they know they are lagging behind us, and this results in rather conflicting emotions. On the one hand, they have tremendous admiration for our advances in this field, while on the other, their pride is hurt by the knowledge that they have been excelled. Apparently it is

a part of the nature of Russians to hold an almost worshipful esteem for talent and skill in any field. This is reflected by their emotionally enthusiastic response to great artists—not only to their own but also to foreigners who may perform before them. Witness, for example, their response to Van Cliburn. They are also deeply prideful, and this probably accounts for some of their reactions. Of one thing I am certain, however, and that is their determination to catch up with us and even to excel us. They made no bones about this.

To return to the present status of cardiovascular surgery there—most of it is of the closed type, including cases of mitral stenosis, which is apparently common in Russia, patent ductus arteriosus, constrictive pericarditis, Blalock procedure for tetralogy, and Brock procedure for pulmonic stenosis. They have done little in the way of open heart surgery—and this has been done under hypothermia—but they are making urgent efforts to develop this field of surgery. The heart-lung machine which they have constructed for this purpose was designed and built by the Institute for Research in Surgical Instruments. It has been tried experimentally but I was unable to obtain any definite information about its clinical use; as I have indicated previously, this heart-lung machine does not represent the best design, and I am sure it will be modified. This apparatus provides a good example of both the strength and weakness of their system of research. By concentrating research and development of such instrumentation in one institute, it is possible to intensify the activity and perhaps increase its efficiency. On the other hand, this tends to depreciate the development of a wide base of initiative and ideas. Moreover, the opportunities for objective evaluation are less likely.

They are also lagging behind us in the field of aortic and major peripheral arterial surgery. Only during the past year [1958] have they begun some work of this type. Lyophilized homografts have been used for the most part, although in a few instances they have employed a nylon type of woven seamless tube. Their lack of experience in this field was well demonstrated by a case of popliteal occlusion in which the arteriogram revealed extensive diffuse obstruction of the peripheral arterial bed. The patient was obviously not a candidate for this type of surgery, yet the case was pre-

sented by Professor Filatov as an indication for surgical correction by endarterectomy.

They recognize, of course, their deficiencies in this field of surgery and are making strong and determined efforts to catch up. This is exemplified by their great interest in our work and in our dacron grafts. They asked numerous questions about technical details, medications, and preparation of our grafts. They were also greatly appreciative of samples of our graft which I gave them.

It was interesting to obtain first-hand information about their widely heralded automatic blood vessel suturing device. It is beautifully designed and well made and works satisfactorily in the experimental animal. When asked about their clinical experience with it, however, they admitted that it had not been used extensively. A few of the surgeons were more objective and readily stated that they had tried it and found it too complicated or too inflexible for wide clinical use. Indeed, Professor Vishnevsky, for example, had developed a much simpler device for vascular anastomosis.

SURGICAL RESEARCH, AND MEDICAL EDUCATION

In general, the Russian concept of research is based upon the "institute system" with concentration of personnel and facilities for this purpose separate from clinical activities. To be sure, there are some research facilities in the hospitals, even for animal experimentation, but there is a tendency to separate clinical investigations from basic experimental work and to have individuals engaged in the latter activity devote their full time to it. There are, of course, some advantages and some disadvantages to this system. On the one hand, it tends to increase the general output of research and, to some extent, intensify activity. It may even lead to better basic types of studies. On the other hand, this lack of integration of experimental work with clinical investigation tends to make some of the studies pointless and to provide information that has no clinical significance or orientation and no fundamental value. This is exemplified by the conduction in a few of these institutes of some work on tissue transplantation, such as severance and reimplantation of a part of an extremity. This was proudly demonstrated, yet when I asked about work on fundamental aspects of homotransplantation of tissue and on the rejection phenomenon, it was apparent that little progress had been made in

this important area. Also when I asked about the clinical significance of the work on reimplantation of a severed extremity, I was told that it may have some use for accident cases, but they readily admitted that they had no knowledge about its clinical application. The blood vessel suturing device provides another example in which lack of clinical experience or close integration of clinical and experimental endeavors has led them to expend much research effort on a device that has limited clinical or experimental usefulness.

In some areas, however, their research reflects good imagination and direction toward acquisition of fundamental knowledge. This was well exemplified by the research activities in the Institute for Blood Transfusion where studies are being carried out on better methods of preservation of blood and on better blood substitutes from both animal and plant sources. Moreover, they are conducting some excellent fundamental biologic studies into the nature and behavior of cellular structure, physiology, and biochemistry.

Thus their research activities vary widely from rather pedestrian studies to highly imaginative and fundamental investigations. Furthermore, research receives strong support and high priority. It is also being actively pursued with great vigor and determination. In this connection I obtained the definite impression that one of the strong motivations for research in Russia lies in the fact that it constitutes an excellent means of climbing up the social ladder and of obtaining better living standards.

In order to enter a Russian medical school a student must be a graduate of a ten-year school (equivalent to our high school) and must take a competitive examination. He must also have references as to his personal character and the like.

The medical school curriculum consists of six academic years. The first two are spent studying basic sciences, philosophy and politics, Latin and a foreign language. In the third year the student begins his clinical training and in addition has lectures and laboratory courses in microbiology, pathology, pharmacology, and physiology. The fourth and fifth years are devoted to instruction in clinical work, and the sixth year consists of practical hospital work rather like our internship, using the block system with two and one half months in medicine, two months in surgery, one and a half months in obstetrics and gynecology, and so on.

At the end of the sixth year the student takes a state examination which qualifies him as *vrach*, or physician. He is then offered a position in a rural

community by the Ministry of Health. There are certain incentives offered along with the position, such as free transportation and increased salary. About 10 per cent are offered opportunities for further education to pursue a two-year course in the hospital of a medical institute leading to a specialty designation in medicine or surgery and the title of "ordinator." Others are offered the opportunity to pursue a three-year course in either a medical or research institute to develop their skill and proficiency in experimental research. Upon completion they present theses for consideration for a degree and earn the title "candidate of medical science." The title "doctor of medical science" is reserved for investigators of merit.

Russian medical students devote more time to the study of public health and various medical specialties (otorhinolaryngology, dermatology, ophthalmology, and so forth) than do American students. Their curriculum includes courses of political significance—philosophical disciplines, i.e., Marxism and Leninism, and political economy—and they thus have some ideological indoctrination. Russian medical students receive monthly

stipends of about \$75. They are encouraged to participate in research, and proficiency is rewarded not only by awards and certificates but also by increasing stipends.

In the U.S.S.R. in 1917 the total number of physicians was 19,800. The number of medical schools has quadrupled in the past 40 years, and now about 16,000 physicians graduate each year.

About 70 per cent of medical graduates now are women. This was also reflected in the ratio of about three to one of women to men among the surgical assistants in the various surgical clinics I visited. It is of interest in this connection to observe, however, that at the Surgical Congress in Leningrad all the officials were men and the women in the audience were in the minority—perhaps about 20 per cent. In response to an inquiry about the technical ability of women in surgery, I was told by one of the Russian surgeons that in general they tend to be "rougher," rather than "gentler," technicians than men.