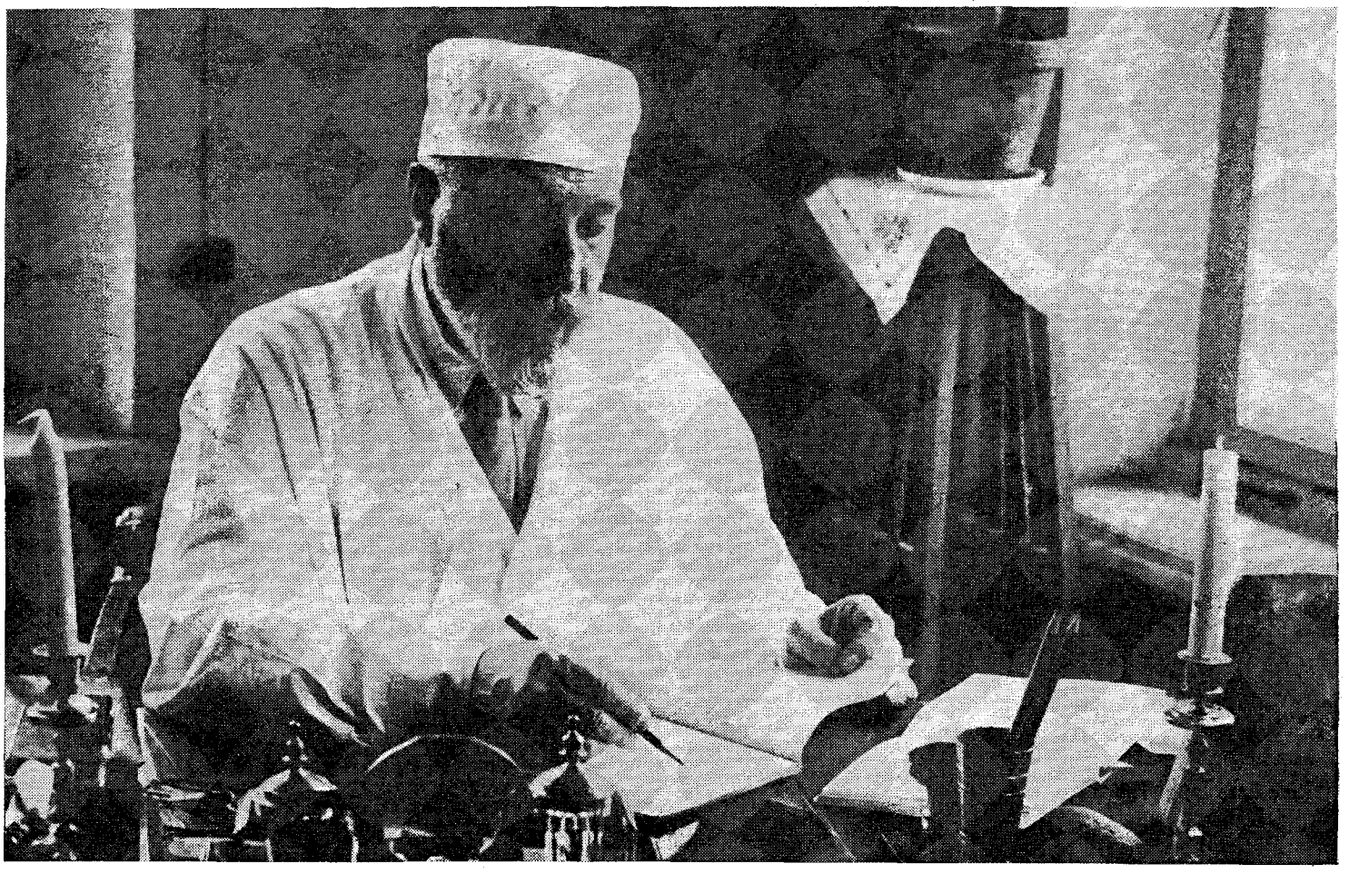

Dr. Vladimir Filatov of the Ukrainian Academy of Sciences. He has saved the sight of hundreds by grafting the cornea from the eye of a dead person to the eye of a living patient.

SOVIET QUEST

Arresting old age—a dream moving to reality in the USSR's laboratories. The search to find new sight, new limbs for those blinded and crippled in the war.

"If man were completely deprived of the ability to dream, if he could never look ahead and mentally conceive in an entire and completed picture the results of the work he is only just commencing, then I cannot imagine what stimulus there would be to induce man to undertake and complete extensive and fatiguing work in the sphere of art, science and practical work. . . . If there is some connection between dreams and life then all is well."—Quoted by Lenin from Pisarev in "What Is To Be Done."

A FEW years ago I wrote a short story for an American magazine—a somewhat grotesque fantasy about a young biologist who stumbled across the possibility of producing complete regeneration of damaged and amputated limbs. He was himself the accidental experimental subject and was driven mad by the fear of personal immortality and the knowledge that the power of regeneration was dependent upon the modification of cancer cells transplanted from a rat. I did not realize at the time how close was this fantasy to the real possibilities opening up in the spheres of experimental biology and human surgery.

Many are the physicians, surgeons, biologists, and philosophers who have speculated upon such fascinating themes as the arrest of old age, regeneration, rejuvenation, and grafting. These closely linked problems are only now being removed from the realms of fantasy. Only during the past fifty years have we been able to tackle them scientifically—practically.

The valuable additions to our knowledge which have been made in the rest of the world have constituted the basis for the planned approach to these problems by Soviet medical science.

Millions throughout the world have been amazed since the beginning of the great battle which is raging in the eastern plains of Europe, by the proof that the Soviet peoples know what they are fighting for. Millions of Soviet citizens have shown their readiness to destroy all their possessions, to give more than life itself, in defense of their freedom to continue in the way of life which they had established. Is it any wonder, then, that the prolongation of life itself has become for them a practical problem?

Millions are being blinded, maimed, scarred, and crippled by the hideous destruction of this war. Is it any wonder that the problem of restoring these people to a useful state is being tackled at its roots?

The people that built the Dnieper Dam refuse to accept the biblical threescore years and ten as the normal span of healthy life. They refuse to be restricted to the limitations of existing medical and surgical skill. The blind *shall* be made to see, the crippled *shall* be made to walk again, lost limbs *shall* be restored. This is the dream that lies behind the work of men like Bogomoletz, Filatov, and Lapchinski. The fantasies of the ages are being transformed into facts in laboratories and clinics. The "realists" of the Soviet Union are leading the way.

ALREADY the vision of Soviet Medical Science has outgrown the conception of "normality" as an ultimate objective. Increasingly with the establishment of a general basis of economic security the role of medicine was bound to emerge from

the purely preventive and curative to an acceptance of its responsibility for changing not only human nature but the human frame itself. Once and for all we must leave behind the conception that socialism aims at any equalitarian poverty. Equally we must not restrict our conceptions of socialized medicine in the Soviet Union to the mere eradication of disease. The possibilities of medical science are only just emerging. The struggle in the Soviet Union for a basic theory of pathology is a reflection of the fact that this emergence cannot take place smoothly. The very fact of conflict in the realm of theory is a sign of virility and health.

Bogomoletz, President of the Academy of Sciences of the Ukrainian SSR, has recently been awarded a Stalin Prize for Medicine for his work on pathological physiology. In contrast to Speransky's concentration upon the role of the central nervous system in local pathological processes, Bogomoletz insists upon the anatomical and functional unity of the center with the periphery. In an earlier work he developed the idea of the "physiological system of the connective tissues." He describes the connective tissues as a "root" for the other tissues, as a link between the blood and the rest of the body. He attempts to attribute cancer and the degenerative changes associated with old age to changes in these supporting tissues. It is impossible to evaluate this work without careful study of the original publications and of the experimental work upon which they are based. What is of immediate interest, however, is the attempt to establish a theoretical synthesis and the vast amount of practical study which is accompanying this attempt. The problem of old age and of the possibility of extending the probable duration of life has been one of Bogomoletz's particular interests.

One approach is based upon the above conception of the role of the supporting structures. Attempts are being made to find specific stimulants to prevent the degeneration of these tissues. This is associated with an intense study of the general physiology and pathology of the aged. A large group of individuals who have lived to the age of between 100 and 150 were found to be remarkably free from the changes generally considered as typical of old age—arterio-sclerosis (the hardening of the arteries), emphysema (a degenerative change in the lungs), brittleness of the bones, etc. These changes are regarded as preventable diseases. Physiological old age is characterized merely by the gradual restriction of the functions of the organism and of capacity for adaptation to environmental changes.

THIS study is not confined to the Soviet Union. Medical science throughout the world has tended of late to pay more attention to these chronic diseases, e.g. to the various forms of chronic crippling arthritis. Nevertheless, in the Soviet Union the approach has been more deliberate and facilities have been greater. The study of these conditions, which vary so widely in their behavior, and continue over such long periods of time, needs to be correspondingly prolonged and widespread. Detailed records are required for the whole period of the disease. Hundreds of thousands of individuals must be studied. Records must be compiled from numerous centers on a unified basis. Wide cooperation is required between hospitals, sanatoria, rest homes, and the doctors who look after the patients at home. This can be achieved only where a unified medical system exists. Such studies can be made only where the aged and the chronic sick are given adequate care and attention. Only too often they have been regarded as a burden on society, and in hospitals have been segregated and regarded as an "inferior" type of patient. This attitude has been ended in the Soviet Union. A new future is visualized for those whose labors have earned them rest, security, and happiness in their old age. At the same time the changing conditions of social and medical care open up new possibilities for study of the conditions which have been for so long regarded as just "senility."

The planned attack upon the problem of grafting tissues and organs has reached a higher level of actual achievement. The present position is summarized in a recent article by Lapchinski, of the Institute of Experimental Biology of the Academy of Sciences of the USSR, a close associate of Professor Filatov, whose work on the grafting of the corneal membrane from the dead to restore the sight of the living is already known throughout the world.

Lapchinski begins by challenging the pessimistic conclusion which many workers had reached that "real" survival and long-maintained functioning of homoplastic grafts, i.e. grafts from another individual of the same species, was impossible in mammals. In human plastic surgery we have been accustomed to limit the possibilities of grafting skin, bone, tendon, nerve, etc., to tissues from the individual requiring them (autoplastic). Very often it is impossible to obtain the necessary tissue. Filatov has shown that grafts of the corneal membrane (which covers the front of the eye) can be successfully transferred from the dead to the living *and that such grafts can and do survive and function*. This membrane depends for its nutrition on fluids which reach it from without. It has no blood supply of its own. Lapchinski is out to prove that it is theoretically possible to extend this work to more elaborate tissues and organs. He produces evidence that in rats it is possible to graft a whole limb from one animal to another with the possibility of prolonged survival (five and one half months), development of sensation, and growth of the grafted limb.

This achievement is not an isolated incident. Similar success was reported by Justin Schwind, an American biologist, in 1938. It is only part of the development of our mastery of this problem. Lapchinski traces some of the phases of the struggle. He shows how the earlier workers did not adequately distinguish between autoplastic (from the same individual), homoplastic (from another individual of the same species), and hetero-plastic (from an individual of a different species) trans-

A seriously wounded Red Army man undergoes an operation in a hospital near the front lines.

plants. Neither did they realize that transplanted tissues could fulfill a useful function without actually surviving as a functioning part of the host (the individual receiving the graft). Dead beef-bone may serve as a scaffolding to allow union to take place in a fracture. Living bone from another or from the same individual may act in this way. Some have maintained that it can only act thus. Portions of the sex glands may act in various ways. They may act merely as a stimulant to the existing glands of the host during the process of their absorption. This may account for some of the apparent success of the original "monkey gland" rejuvenation experiments of Voronoff, the results of which were very transient. Filatov suggests that in some of his cases good results have been due to the stimulating effect of the membrane causing the regeneration of new tissues from the host. "Effective" survival for a period of time, with confirmation of normal functioning by subsequent microscopic study, must be distinguished from "primary survival" or "sham survival" for short periods. Many of the earlier spectacular grafts did not survive the test of time. This, however, must not be regarded as proof that such survival is impossible, so much as a stimulus to study and removal of the obstacles which stand in the way of the wide use of tissue and organ transplants from mammal to mammal and from man to man.

At present it would seem that there are two main obstacles to be overcome. The first is that of the maintenance of blood supply to the graft. Complex organs or grafts of any size cannot function if they are without an adequate blood supply for any length of time. This difficulty is overcome in many autoplastic grafts by leaving the graft attached at one end by a pedicle which continues to allow normal circulation while the other end secures a new attachment. This is the principle of the pedicle skin graft. It is also used by the orthopedic surgeons in moving bone from one place to another close to, leaving muscles and ligaments attached. The problem clearly is infinitely more difficult in grafts from another individual. It has been solved in rats by parabiosis, by artificially joining the animals together as "Siamese twins." They can be trained to feed and live happily in this condiiton for the necessary few days. It is also easier in such small animals than in larger mammals because of the distance to be traversed by the developing new blood supply. Nevertheless the beginning of a solution is in sight. The recent work of Best (of Insulin fame) and others in Toronto has shown that a substance Heparin can be used to prolong the clotting time of the blood and enable blood vessels to be sewn together with very little danger of clotting interfering with subsequent function. In animals and in men a number of remarkable technical performances have shown that the possibilities are tremendous. From the purely technical point of view there is nothing impossible about the grafting of whole organs from one individual to another.

THE second main trouble is that of tissue compatibility. Blood, which is in fact a kind of tissue graft, can be transferred only from one person to another of the same blood group, of which there are four. A recent annotation in the *Lancet,* the British medical journal, suggests that the problem of tissue-grafting in man is as though there were many thousands of such groups, the chance of survival being correspondingly small. In the experiments of Schwind and Lapchinski the results were achieved only in litter mates from a strain of animals that had been closely inbred for generations. Further extension of the possibility is dependent upon being able to modify such tissue compatibility in the host or in the graft. Already the progress which is being made in various fields, in the study of blood and transfusion, in the study of the transplantation of cancerous tumors in animals, in the work of Carrel and others upon tissue culture, in the various factors concerned with wound healing—all suggest that progress will continue to be made. The solution to the problem of successful tissue-grafting from one human being to another or from the dead to the living is dependent upon the correlation of work in a number of different fields. The biologist and chemist must be able to work in close conjunction with the physician and surgeon. Experimental medicine must not be limited to a few institutions. Much can be done with the minimum of risk to the individual patient, provided that the problems can be seen and tackled in a big enough way. Certain types of cases must be concentrated where they can be best studied and treated. Individual treatment can be completely harmonized with the necessary development of science. Soviet institutions and the structure of the Soviet health services are better adapted to the soluion of such problems than are those of any other country. It will be no accident if Soviet medical science continues to play a leading role in the elucidation of problems of this kind. The rat and cancer will contribute to the solution of the problem of tissue-grafting, but the fear of the unknown will disappear with man's progressive mastery of his own fate.

RUSCOE CLARKE.

Medical research to win the war. Hundreds of Soviet women are engaged in this vital scientific work.

NEW MASSES
ESTABLISHED 1911

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How Long?

IN THE first week of September—a week in which the second front was never so badly needed—there was a definite lull in second front talk and second front declarations. There were pro and con statements, to be sure, but you could not tell from the news alone whether a second front was imminent or a long way off. For example, the Polish prime minister, Wladislav Sikorski, speaking from London on the third anniversary of the war, repeated his many earlier appeals for immediate action; both he and the Polish minister to the United States, Jan Ciechanowski, speaking in New York, expressed the fear that if the Allied action were further delayed, virtually the whole Polish nation faced extermination. A second front now—rather than sometime next year—could mean all the difference in the world for the conquered peoples.

On the other hand, while the CIO Executive Board took the significant step of expressing the hope that greater production would realize "the people's earnest desire for the supreme offensive—the second front"—Adm. Ernest King, speaking at ceremonies in Ohio, projected the peak of our offensive as coming next year, and emphasized that we have eight fronts to take care of right now. And Peter Fraser, prime minister of New Zealand, visiting the White House last week, spoke disparagingly of those "who talk glibly of a second front"—indications, if we may judge by them, that the full seriousness of the war's crisis still is not understood in high places.

On the third anniversary of the war, there were many statements which point to offensive action—the British Army's review of three years' events, for example, which said that all army training is now directed toward an offensive on the continent. And there were many declarations that the tide is now turning in favor of the democratic side. But it was not clear whether the statements for the offensive had *this year,* and *this year's crisis,* in mind—or were merely abstract considerations for the future. Likewise, all the optimism to the effect that Hitler has been exhausted and is now on the downgrade ignore the basic changes in the military perspective that would develop if the Germans were able to take Stalingrad. (See Colonel T.'s article this week on page six.) For, in the absence of a second front, it is by no means certain that the tide has changed, that Hitler is on the downgrade. On the contrary, the Axis will retain the initiative, and will have secured such strong positions as to make our ultimate victory uncertain and the chances of an ultimate offensive much more difficult than it would be today.

Evidence that it is still the Axis which has the initiative came in all the speculation about the resignation of the Japanese foreign minister, Togo, and the continued withdrawal of Japanese troops in Chekiang. It is hard to say what these events mean in so many words; it does not necessarily follow that because Togo was associated with the Soviet-Japanese neutrality agreement of April 1940 that an attack on Siberia is impending. But it does mean change. It does imply basic decisions of strategy in Tokyo. The absence of initiative on the Allied side constitutes almost an invitation to the Japanese to choose their next major theater of operations—an attack in the north, or an attack in western India's industrial regions. How long can we permit the Axis such freedom of choice, such initiative? How long can we possibly delay the second front, that great stroke which alone would mean the turning point, the military, political, psychological turning point of the whole struggle?

They Want to Fight

FOR some time now the country has been arguing the advisability of lowering the draft age to include the youth of eighteen and nineteen. Last week Sen. Chan Gurney of South Dakota took the bull by the horns and introduced legislation to bring them into the army. His proposals follow by several days the warning of Gen. Lewis B. Hershey, director of Selective Service, that the remaining supply of men who were "reasonably able-bodied" and without dependents was small and decreasing "so rapidly that it will be exhausted in a matter of months." This was further underscored when the Army raised the enlistment age to fifty.

Obviously it is necessary to dig deeper into our sources of manpower. That is one of the exigencies of this war and it must be faced. If the Army needs more men—and clearly it does—more men of all categories will have to go. The Army has been quite explicit on the question of men under twenty, it wants and needs them. This is the kind of war where youth—with its hair-trigger reflexes and greater endurance—is at a higher premium than ever. Experience has shown that the finest pilots, the surest bombardiers, the canniest gunners—the soldiers who need the quick eye and steady hand—come from the youth. It's that kind of war. When the Army requires more men the married men and those with dependents will go too—all the more readily as adequate provisions are made for their families.

Do the youth want to go? Their attitude was well presented over the radio several days ago by a lad of eighteen who said: "The government wouldn't draft eighteen-year-olds unless it needed them urgently. If it needed them urgently and Congress refused to draft them, it wouldn't matter whether or not eighteen-year-olds were alive to build a post-war world. The Axis would probably have won."

This is the spirit that should pervade Congress on this issue. Certain congressmen, speculating in election day returns, have been afraid to tamper with this question. These are the men who play politics with our nation's life: these men must be defeated. Rep. James W. Wadsworth of New York talked directly to them when he said, "Drafting of eighteen-nineteen-year-old boys is inevitable and I feel it should be done immediately and should not be left to become an election issue." And Senator Gurney reflected the will of America's fathers and mothers when he said they are "ready to make every sacrifice." They are ready and so are their sons. That's the spirit that guarantees victory.

Student Manifesto

THERE can be no mistaking the position of world youth in this war: it made itself sufficiently clear—if further evidence were needed—at the International Student Assembly in Washington last week. The delegates of thirty-eight nations, many of them in the fighting uniforms of their lands, affixed their signatures to a manifesto which will bring heart to millions in the oppressed countries, and which can bring light to other millions of their compatriots and allies, old as well as young.

Foremost, their manifesto made clear, is the necessity to win the war and toward that end they will spare no sacrifice "at home or on the battlefield." They saw the relation of a Second Front to victory: "We await the signal,"