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Norman P. Merrill
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The 17th International Geological Congress

(To Geology Club, Nov. 11, 1937)

A more colorful country could scarcely have been selected for the convening of the 17 International Geological Congress than the Soviet Union. The titanic social upheaval now in progress in Russia, the traditions in geology, the very people themselves, marked as they are by oriental influence , standing so to speak at the crossroads of Europe and Asia, lent an added interest to this Congress that could not have been furnished by any other European country.

More than 1000 geologists, representing 50 countries met in Moscow between the 20th of July and the 1st of August for the general convention. In this group the Americans numbered more than 150 and were second in numbers only to the Russians. Germans, Austrians, Scandinavians, and Italians were conspicuous by their absence. There were, however, many delegates from Japan.

Preceding the general Congress there were 6 excursions operating simultaneously through a period of 19 days. These included (1) a trip to Karelia and the Kola peninsula, for the purpose of studying Pre-Cambrian geology; (2) a trip to southern European Russia to study coal fields, tectonics, iron deposits and pre-Cambrian geology; (3) a trip of more than 1000 miles by boat along the great Moscow-Volga waterway, to study problems of engineering geology, and the stratigraphy of eastern European

Russia; (4) a trip to the Caucasus Mts. at the Persian frontier; (5) one through regions of classic exposures of Permian rocks on the east slope of the Ural Mts.; (6) and lastly a special, non-geological tour of resort places in the Ukraine and Crimea on the Black Sea. I attended the Permian excursion, organized for the purpose of examining the Permian System in its type region.

Following the general congress in Moscow there were 6 field excursions of from 3 to 40 days; of these I attended a 3 day trip through the Moscow Coal Basin. The other five post-Congress excursions included a brief survey of the oil fields of western U.S.S.R.; another, a trip across Siberia, with several side trips out from the trans-Siberian railway for the purpose of illustrating the economic geology and stratigraphy of portions of this vast area. Two somewhat shorter trips of 23 and 22 days respectively were made to Nova Zemlia in the Arctic, and to the Ural Mts. A non-geologic trip for members of families visited many of the principal cities in European Russia.

In general these excursions were made by participants in all reasonable comfort and safety. Much more so than has ever before been possible to foreigners, and certainly the comforts available to us were much greater than could be expected by Russian geologists travelling on government business. Travel was chiefly by train and river boat, and congress members lived in private compartments or cabins on train and boat. There was very little travel by foot or horseback, and the greatest inconvenience experienced by most persons was during overland trips by auto caravan over rough and dusty roads.

Our travel by boat and train was particularly convenient because we often travelled at night, enabling us to cover an enormous area in a relatively short time. I suspect that our private trains frequently had the right of way over regular traffic because we scarcely ever were forced to wait on a siding for more than an hour while waiting on regular trains. Such flexibility of trian schedules is of course possible only because the railways are owned and operated by the government.

The train on which I travelled while on the Permian excursion consisted of 4 coaches, one diner, one combination kitchen, bath, and servants quarters, and the locomotive with tender. The coaches were of the regualre European type with private compartments ~~and~~ opening on a corridor along one side of the coach. Generally two persons were placed in a compartment which ordinarily would accomodate four. Members of the train crew were courtous and helpful at all times, although it was perfectly obvious that they were constantly on the alert for evidences of espionage on the part of the passengers. The tracks and bridges were always carefully inspected by officials travelling immediately ahead of our train. They could not risk the international complications that would arise from a train wreck. A docter and nurse travelled with us at all times for emergences. The only serious sickness incurred in our group was occasional attacks of dyssentary from infected food or water. It is customary in Russia to drink only boiled water or some beverage in which the water has been sterilized. Consequently we drank chiefly tea which could be obtained from our porter. Our food , although not particularly palatable, was apparently much better than that to which many of the Russian geologists had been accustomed.

Although we tired of it quickly our food was interesting. Our meals were served in two shifts because the single dining car would not accomodate the 42 members of our excursion. At 6:30 or 7:30 we would sit down at breakfast tables on which were little individual dishes of black caviar, black bread with a sour taste, and occasionally a small amount of butter. Because of the lack of refrigeration milk and butter could be had only periodically. Presently our charming steward would bring a tray loaded down with thin slices of raw sturgeon, which although comparatively mild has about the consistency and appearance of very fat raw bacon. On occasion fried potatoes, fresh tomatoes, or other vegetables were served . I think that our cooks were anxious to humor our whims as much as was possible because our steward was interested in pleasing us and studied carefully our response to each dish that was tried out on us. He soon learned that most of the foreigners were afraid of infection from fresh vegetables so that lettuce, radishes, and garnishes of various sorts were all but eliminated. Omelettes were in evidence only after the discovery was made that the Americans desired them. We were not served liquors of any kind on train or boat, but frequently used a bottled mineral water to take the place of boiled water. Our noon and evening meals were similar to breakfast in the everpresent caviar and raw sturgeon, but considerable variety was had in the other dishes. The Russians are particularly capable at making the most amazing kinds of soups.

The favorite is a deliceous thick vegetable and meat soup called borsht. This soup is a meal in itself and is more nearly a thin stew than a soup. A curious soup like conglomeration is made with vegetables, mutton, and sour cream from sheep. Probably the most unforgettable soup was served on board a river boat during a five-hundred mile trip down the Kama River. A pale broth was served in which lay a large and wholly complete sturgeon, head, fins, and tail, innards and all, coiled around the innside of the bowl. I suppose one of the most ludicrous incidents connected with meals that I saw occurred aboard the boat at about the same time. A deliceous chicken broth was served and we were gobbling it down after the manner that we had learned from the Russians. A Chinese geologist sitting across from me gazed into his soup in undisguised disgust. The cook had tossed in the feet and head of a chicken as added delicacies.

During our nineteen day Permian excursion we were feted and banqueted six times by local governments and geological organizations. These banquets had a great deal of oriental pomp and ceremony that entertained us mightily at first, but soon tired us. The first, and therefore the best remembered of these was given by the Rulers of Bashkiria, a remarkably progressive republic in eastern European Russia. The people are mongoloid but look very much like our American Indians. At Ufa, capitol city of Bashkiria, we were entertained with native dances and folk songs during our banquet. The Soviets have adopted the far sighted policy of encouraging the revival of local customs and folk lore, and even endorse the innumerable separate languages of the little nations that make up the Soviet Union. We were amazed at the forest of liquor bottles supported by tables that were literally

staggering under the load. Over twenty kinds of liquor were served, most of which I had never heard of. Vodka was served, as is customary, in narrow mouthed pitchers, or carafes. The only Russian liquor that was generally palatable to the foreigners was a Russian champagne of rather low alcoholic content. It seemed significant to me that here as at other banquets only Americans became intoxicated or lost their composure. French and Russian geologists in some instances drank heavily, but they seem to value dignity and were mildly contemptuous of instances of drunkenness.

To me a treasured memory is the recollection of a luncheon prepared elaborately for us in the wilds of the Bashkirian Ural Mts. We were treated to weird, but beautiful melodies played on native flutes by med men who could have stepped out from among the long dead hordes of Ghengis Khan. Native dances added color to the entertainment. An exotic treat was the local native drink Koumis, which is fermented mares milk.

I cannot speak too highly of the perfect organization of the entire congress wherever the administration of our activities was in the hands of the Russian geologists. Only when at Moscow or Leningrad where we came under the care of Intourist, the government travel agency, or other petty officials did we suffer inconvenience. It was our observation that organization in gereal is rather loose-jointed and inefficient. It became obvious that much of the inefficiency is due to a pernicious habit of passing the buck that seems very characteristic of the entire system. Innumerable promises were made and lightly broken, we were constantly reassured regarding petty greivances without any actual assumption of responsibility. Not so however with the geologists. These

persons were anxious to please us. Of all the people in Russia they alone were happy to have us present. Only the geologists avoided embarassing us with propaganda. In general the entire Congress was eminently successful from every point of view. A vast amount of money was expended by the government in the elaborate preparations. The great Academy of Sciences building in Moscow was the scene of the general assembly. At the general sessions all speeches were translated simultaneously into Russian, English, French, German, Spanish, and American. Inasmuch as continental Europeans regard American as a separate language, distinct from English it was deemed necessary to use an extra interpreter. Immediately below the central platform sat the six interpreters, each with a microphone. These men translated simultaneously as the speeches were delivered. These translations were transmitted to the audience by a system of wiring, so that the desired language could be secured by plugging in ear phones to any of a number of sockets at the front of the seats.

Innumerable displays and wall charts, as well as enlarged photographs were everywhere evident, not only at the Academy of Sciences but in all of the geological museums that were in evidence in all of the communities of any consequence that we visited. Although most of the outcrops visited by us in the field were easily accessible to us from our train or boat the most extravagent preparations in the form of artificial excavations, long board walks, special wooden bridges, high wooden stairs up steep bluffs, new pathways cleared of rocks and weeds, indicated an incredible amount of planning for our comfort. At the top of every long climb we would find a supply of cold bottled mineral water and in some instances newly made rustic but comfortable benches to sit on.

Much or all of this elaborate preparation had been personally supervised by our geologist friends. So far as I know there was not one serious miscarriage of plans in the entire Congress. To me this seems miraculous in view of the somewhat disorganized slip shod way of doing things that seem to be the usual thing in Russia.

A lasting impression, a correct one I think, gained by foreign geologists is the exalted place played by geology in Soviet science. Geological organizations were in evidence in every town of note. The important place of geology is highly and efficiently publicised by the innumerable museums that have come to play an important role in the Soviet plan of public education. Every geological oil field, every mining camp is equipped with an adequate laboratory in which is used the most elaborate and expensive apparatus that I have seen in any field laboratory. In all of these places were exhibited rck samples and numerous maps and charts. We were assured that such exhibits were not put up simply for the benefit of the congress members, but form an important part of the general scheme of education and stimulating of interest on the part of the workers. We were told that the tremendous industrial development of the country has put undreamed of ~~pressure on~~ emphasis on geological exploration. As a result there is a greater concentration of workers in the field of geology in Russia than in any other country. The Geological Society of Moscow is said to have around 5000 members, probably a figure greater than that for the entire United States.

Geologists become public heros. The man who predicted the occurrence of huge salt and potash reserves below Solikamsk on the upper Kama River, basing his guess on the large number of salt springs in the region, is now relatively wealthy and honored,

and possesses about all of the worldly comforts that are obtainable in the Soviet Union. Public heroes are generally granted prizes for their achievments, either in money, or in property or other privileges.

Of great interest is the determined effort in the Soviet Union to bring about social equality between men and women. The almost complete effacement of sex in the Russian scheme as to make for striking contrasts to life in America. On the streets of Moscow or Leningrad one sees occasional women traffic police. Nearly all bus drivers and many truck drivers are women. Women are found in all types of activites, many of which are followed only by men in this country. In quite a number of instances women are employed at work that could be more efficiently done by men. This seems to violate the general Soviet aim to achieve greater efficiency and to placed an individual where he can render the greatest service.

As a case in point I recall a time when our excursion train was parked along a siding in Ufa. On the adjoining track and immediately opposite my window was an open box car in which two women were working. One of the women was about 40 years old, swarthy, bare armed. As she worked the muscles of her arms corded and bulged like the arms of a man. With her worked a young girl of about 12. They were shoveling gravel out of the car on to the ground.

In the great potash mine at Solikamsk I saw a number of women weilding picks and sledge hammers. Some of these women were certainly not yet twenty, and were exceedingly strong and healthy looking.

It must be kept in mind that 25 years ago Russia was floundering in a feudal system not appreciably different from that of western Europe in medieval times. 95 percent of the people were serfs, in effect slaves of the lords of the land. These peasant classes for a thousand years or more have been beasts of burden, women as well as men. Natural selection has eliminated women of small frame and delicate features. Partial immunity to disease has been acquired by a people who did not even have the judicious care granted to chattel slaves. These peasant women have been used to manual labor for centuries. In fact hard work has been one of the least of the burdens that they have had to bear. As a result the Russians have much of the virile resistance to hardship that characterizes savage races. Many kinds of hard labor that most American women could not endure are not injurious to the Russian women. Working conditions for women have, of course, improved greatly. Working hours are limited, vacations are more frequent. Where the Russian peasant mother formerly bore her children without medical aid, she now has medical assistance and advice for various ailments.

The grace and feminine beauty that used to characterize many of the women of the privileged classes is scarcely seen in Russia and is to be found only on the stage. Since the fine arts are receiving a great stimulus as one desirable phase in education of the masses a beutiful women are encouraged to under take work in the ballet, the theater, or the movies.

In an attempt to achieve social equality between men and women in which the women are neither exploited nor favored curious little ~~ø~~ customs have developed. The recognized titles for formal address do not distinguish between men and women. For example one never says Miss Kovanka, but it is proper to say Comrade Kovanka or Geologist Kovanka. Also it is now customary for a married woman to retain her family name, so that we could not recognize man and wife by their common name. It is also customary to place unaquainted men and women together in sleeping compartments in the trains. An instance of this happened on our Permian excursion when our young and hansome lady interpretor was assigned the same sleeping compartment with two American geologists, one a student at Columbia, the other a Professor in a New York college. Naturally the Professor, a married man, was disturbed by the arrangement and at his suggestion the young lady was transferred to another compartment shared with two women geologists where she could have been placed originally.

Nude bathing in more or less public places has become illegal recently. This primitive custom which is as old as nature and not inherently unwholsome is too deeply ingrained in the age old customs of the people to be quickly eradicated.

While anchored near the shore on the Volga River my wife was seated on deck idly watching some women bathing in the river. The women were clothed in their undergarments. One of the Russian men geologists walked ashore and in full view of my wife and the women bathers disrobed, folded his clothes carefully on the ground, and waded serenly into the water.

While located at Moscow four of the men of my group were fortunate in being conducted to certain classic outcrops of Pennsylvanian rocks near Moscow. Our hosts on this little private trip were two lady geologists and a man, director of the Moscow Geological Institute. Our trip was largely by motor launch along the Moscow River. All along the route we passed nude bathers, single or in small groups. There was no obvious separation of men and women. Of the dozens of nude bathers apparently not one was bathing for sport, because none was swimming, and all were using soap. There was absolutely no hint of any but the most dignified conduct. Not the slightest evidence of self /illegible/ consciousness was evident either on the part of the bathers or our hosts. I must confess that I was heartily ashamed of the conduct of two of my three American comrades who were startled out of their self control into making unrefined comments and gestures. What a shame that our generations of prudish training in this country make it impossible for any American to relegate sex to the subordinate place that it merits.

A great deal of adverse comment has been published in recent years regarding the moral conduct of the Russian people. Most of the criticism originates in the antireligeous trend, convenient divorce, and legalized abortion. These purely social problems do not necessarily imply that the average Russian /illegible/ lives a sordid and immoral existance. In all seriousness I did not detect on any occassion the slightest evidence on the part of the Russians of unwholsome thinking or unbecoming moral conduct. Invariably the geologists were

unreceptive or cool toward jokes or witticsms involving sex. On one occasion for example one of our exhuberent Amerieans in the course of a thank you speech made the blunder of remarking that the foreigh geologists admired the Russian women very much. I was sure that I detected a little irony in the tone of our host when he replied that he was glad that we were pleased with their women. The Russians find the flagrant emphasis on sex displayed by many countries as dinstincly distastful.

Foreign geologists were agreed that the industrial development observed by us was phenomenal. The Soviet Union is naturally endowed with tremendous natural resources that are only now becoming known and exploited. It is as though a continent had just been discovered by science.

The Soviet Union is very vast covering about 1/6 of the land surface of the world and is only slightly less than three times as vast as the United States, falling just a little short of equalling the area of all North America. The density of population in the United States is about 40 per square mile, but it is only 19 per square mile for the Soviet Union. Vast areas of the land is covered with virgin forests that have scarcely been touched. The northern third of European Russia is largely forested by dense woods that reach right down to the environs of Moscow. Wild bears and deer are hunted within sight of the city. Although the population is largely centered in European Russia it is by no means a national unit. There are scores of little republics in the Union that were kingdoms before the revolution. Many of these little republics

are actually separate nationalities with different languages and traditions. Racially they range from pure caucasian to pure mongolian, with many variations of each. It is said that there are five principal alphabets used widely in the Soviet Union. Although pure Russian is taught in all schools the varieus local languages and alphabets are not only tolerated but are actually encouraged.

The vast mineral resources of this nation are only now becoming known through modern methods of exploration. The amazing development of new mines and plants has been possible only because the government has spared no expense and immediate profits are not necessarily requisite as they are in private enterprise. In many respects far below the cultural level of the civilized world Russia has obviously become an industrial power in an amazingly short time. The Soviet Union is now producing her own iron, coal, manganese, aluminum, zinc, magnesite, asbestos, phosphates, mica, potash, sulfur, oil, gold, and many other minerals, some of which are exported in considerable quantities. By 1936 most of the machinery used in the Union was manufactured there.

The great industrial development of the Soviet Union, plus the introduction of mechanized agriculture has caused a great immigration into the cities. Many new cities have sprung up around new plants and mines. Most of the progress made thus far has been imitative. The Soviets recognize no international copyright agreements or patent rights. American machines are shipped to Russia where they are torn down and imitated or duplicated piece by piece.

The new subway system in old Moscow is probably the greatest technical achievment in all of Russia. Under the guidence of American engineers 12 kilometers of subways and 13 stations have been completed, and plans are laid for an extension of the system to about twice this size. The electric trains are very comfortable and attractive and the stations are unparalleled for real beauty. Each station is appointed with beautiful mosaic work in marble and illuminated with indirect lighting.

From the American viewpoint working conditions for either laborers or profesaional men are not good. Most workmen appear to be ill housed, although new appartment buildings visited by us in a mining town disclosed rather nice quarters, inadequate only in spaceousness. The clubhouses around mines and plants are characteristically covered with posters and displays bringing various sorts of propaganda to the people. Copies of the new constitution, slogans are everywhere in evidence.

A popular movement for greater efficiency in all kinds of work is called Stakhanovism. It was discovered that specialization in piece work in plants made for greater output. To this inovation was added an incentive in the form of increased pay and public honor in proportion to the actual output by any individual. The race against time develops into bitter rivalries which are aggravated by the public awards made to the weekly winners.

Considering the low pay scale food at the plants is relatively expensive. Soup for example is 1 ruble, meats 3 to 5, and so on. Some workers make as little as 150 rubles a month.

The rest rooms are generally dirty in the clubhouses and are inadequate. They are commonly not furnished with toilet paper, towels, or soap, and would not be tolerated by American workers. The houses of the workers, except for the new apartment houses that are being constructed everywhere, are made generally of trimmed logs, and though fairly attractive do not look comfortable. It is significant that we were not invited to visit any of these dwellings nor the private homes of any of the geologists.

In violence to the principles of communism, which seem to be fading out of the picture so far as Russia is concerned, are the large comfortable and attractive houses with grounds and gardens belonging to the superintendants and engineers. A new class distinction has already arisen in Russia, one that is amazingly like that in America.

In general the workmen look healthy as do the children everywhere. The Soviets are taking good care of their children and we saw nothing that would indicate that the children are being taught games of war. . One commendable feature of the entire system of industry is that every worker is urged to study his work, to take and interest in it, and he is taught that he must expect to advance himself.

It was somewhat difficult in many instances to acquire reliable information regarding wages. After making a number of inquiries I came to the following generalization. The pay is not established by a set salary but by a norm under

the Stakhanovite systme. A good worker can make twice the average pay. The best workers periodiaally get their records and photographs posted for all to admire and they become momentary heros comparable to members of our American athletic teams. The defects in the system appear to be due to poorly trained and inefficient supervision.

It is said that a laborer will earn from 150 to 350 rubles per month; skilled laborer from 400 to 1000; foremen, from 800 to 2000; engineers, from 1500 to 3000; plant superintendants, from 2500 to 5000. This span in wage scale represents a difference of 1 to 30, whereas the span in equivalent American plants is commonly not greater than 1 to 5.

Living quarters appear to be generally quite crowded, due to the great country to city movement and because construction of new apartment buildings has lagged far behind the needs available private homes are quite expensive. It is said that a small and rather ordinary home can be bought from the government for 60,000 rubles and up. Only the high salaried men can afford such a home at all. Therefore most urbanites live in crowded appartments.

This housing situation must render family life difficult and probably creates uncomfortable situations where professional men are forced to live more or less closely with laborers of different tastes.

It is possible through the government grants and prizes to amass a certain amount of wealth. Money placed in banks draws a small rate of interest and such fortunes can be inhereted. Real estate can be inherited, but not sold because it is state property. Persons and property cannot be exploited for personal monetary gain. This means that a man may own a large house,

but he cannot rent rooms. Servants can be hired, but they must not earn money for their employer.

Wealth does not mean security in Russia because it is generally frowned upon and causes much worry. Furthermore it cannot buy power at least to any marked degree, /ø/

Unfortunately there is no assurance of permanent security /ø/ at the present time for even high officials. The hazards of high office are producing a demoralizing effect on workers who ordinarily would be ambitious. The difficulties apparently arise largely in two ways. Jealousies frequently lead to betrayal and removal from office. Probably a more important source of trouble lies in the inefficient administration. For example the manager of a gold mine was ordered to make a record output in 1936. He mined only the richest ore for that year and succeeded. In the first half of 1937 he was unable to keep up, so was removed and has faded out of the picture. One of the new oil fields, Ishembayeva, on the west slope of the Urals in southern European Rushia has a remarkable record for 100 per cent discovery in wells drilled. I found that this record, which looks good on paper, is due to the fact that a dozen or more diamond drill holes were made at great expense over the area so that the situation was thoroughly understood before holes were drilled for production. The expense of those exploration holes would have paid for dozens of wildcat holes drilled at random, but a few dry holes on the record would cost some man his job and possibly worse.

Most of the foreign geologists were agreed that an indescribable element of fear enters into the activities of the men and women whom we came to know best. Frank discussions were difficult or impossible and we felt that many statements made to us were qualified or guarded in such a way as not to implicate the speaker. Many of the men were extravagant in their praise of the Soviet government. I suppose that enthusiasm and loyalty are demanded of them. It is certain that every precaution is taken to avert sabotage. The most provoking and at times ridiculous restrictions were placed on field photography. Many charming views and subjects that would have made precious photographs were forbidden to us. Acquaintances of mine were arested on various occassions for taiking pictures in the streets of Moscow. I believe that our geologist friends were sincerely embarassed at these little incidents for they had little reason to be suspicious of us.

In conclusion I think I can sum up my general impression by saying that the numerous Russians with whom I became well acquainted were charming, intelligent, and seemingly sincere people. That Russians as individuals can be as fine as the best of Americans I am convinced. And that although the Russian people are immeasurably better off than they have ever before been they cannot attain a high level of culture and happiness under the dictatorship of Stalin.

Results of the Permian Conference of the 17th International Geological Congress

(N. D. Newell to Geology Faculty, November 17th, 1937)

During the past three years a small group of American stratigraphers interested especially in the problems of the Permian system made joint plans for an examination of the typical outcrops of that system during the Geological Congress in Russia. Leaders in the organization of our plans were Raymond C. Moore of the University of Kansas and Carl O. Dunbar of Yale University. Many of the persons who entered actively into our planning were finally unable to make the trip, so that our party of Permian students finally dwindled to five: Dunbar of Yale; A. K. Miller, of the University of Iowa; G. H. Condra, State Geologist of Nebraska; J. S. Williams, of the U. S. G. S.; and myself. Through the recommendation of R. C. Moore, and Walter C. Mendenhall we were granted special passports and were included in the list of 17 official delegates from the Department of State, in the hope that we would be given special opportunities to investigate problems of the Permian.

Although our main objective was a study of the Russian Permian our itinerary included some other work. On our way to Russia some time was spent examining certain collections at the British museum. As the guests of Lauge Koch, famous Danish explorer and geologist, we spent some time in Copenhagen examining collections of Permian fossils from east Greenland. As you no doubt know Denmark bases its claim on Greenland almost entirely on the exploratory work by Koch and his expeditions. A recent note in Science News Letter remarks that Kochs vessel and equipment was caught in the ice and destroyed off east Greenland in the late summer. I have not heard whether the party safely reached Denmark. A few days were spent in Stockholm as guests of Erik Stensio, one of the world's leading vertebrate paleontologists. Stensio has built up the National Museum of Sweden to a place of real distinction. Without question the paleontological laboratories are the most elaborately equipped of any in the entire world. Stensio obtained his start through Koch and in turn has trained a dozen renowned paleontologists who hold important posts in great Universities of northern Europe. From Stockholm we flew by air along the beautiful Baltic coast to Helsingfors and thence by train to Leningrad and Moscow.

Five weeks were spent in Russia, during which time we travelled more than six thousand miles, after which period we spent a week in Austria studying the classic section of Permian rocks in the Carnic Alps along the Italian border. After a few days spent in geological sight seeing in Switzerland and France we turned our faces homeward.

Between the 20th of July and the 1st of August more than 1000 geologists, representing 50 foreign countries met in Moscow for the discussion of world problems of geology.

There were six geological excursions of 19 days each, conducted before the main conference in Moscow, made simultaneously. And six excursions, ranging in duration from three to forty days, were offered after the congress. Of the Pre-Congress excursions one visited the Kola peninsula for the purpose of examining the pre-Cambrian geology at the east edge of the Fenno-Scandian shield. Another trip visited southern European Russia to study tectonics, stratigraphy, and pre-Cambrian geology. A third trip was taken by boat along the great Moscow-Volga waterway for an examination of the engineering problems and inspection of the stratigraphy, tectonics, and economic geology of the region. Probably one of the most interesting trips was made to the Caucasus Mts. and trans-Caucasia on the Turkish and Persian borders. A special, non-geologic trip was offered for members of the families of geologists. This trip visited the resort cities of the Ukraine and the Black Sea. And finally, the Permian excursion, which I attended, visited the classic outcrops of the Permian system in its type region along the east flanks of the Ural Mts.

The six Post-Congress trips included a forty day excursion to the Oil fields of European Russia, a forty day trip into Siberia, a non-geologic trip of forty days to principal cities, two shorter trips to Nova Zemlya and the Ural Mts., respectively, and a short trip through the Moscow coal basin. The last trip was attended by my party.

Transportation on these trips was chiefly by river boat and private train, but considerable travel was done by auto caravan over dusty and inadequate roads, and by canoes. Very little travel was done on foot or horseback. Every reasonable care was taken to ensure our comfort and safety on these trips. The Russian geologists were friendly and generous and did not annoy us with political propaganda.

I cannot speak too highly of the efficient operation of the Congress, both at Moscow and on the excursions. Exceedingly elaborate preparations involving many months of work had been made. On a few occasions when we were not directly in the care of geological organizations we came in contact with the inefficient and loosely co-ordinated system of local government which was everywhere so apparent. Not so, however, with the geologists. I know of no outstanding instance of inefficiency. The success of the Congress, I am sure, was largely due to the general acceptance of responsibility on the part of the geologists, where ordinarily individual responsibility is avoided by local officials of government.

Now I would like to summarize as briefly as I can something of the geological results of the Permian conference, which was largely separate in Moscow from the general assembly of the Congress.

This conference, I believe, held a peculiarly important place in modern stratigraphy. Ever since the erection of the Permian system a controversy has raged in many parts of the world concerning the limits of the system.

The Permian period, historically considered, is one of the most interesting periods of all geologic time, not only for the culmination in several continents of one of the greatest cycles of mountain folding, and the vanishing of the Paleozoic life, but even more so because of the rising of the reptilian horde that came to dominate all the continents and was prophetic of birds and mammals.

Historically, Russia is the birth place of the Permian system. After Murchison had studied and classified the older Paleozoic systems in Great Britain and Germany he was urged by Von Buch to further test the validity of his geologic systems in the magnificant flat lying sequence of the Russian Platform. Von Buch had seen fossils from Russia and predicted the recognition of the Silurian and other systems in that country. Murchison and his friend De Verneuil spent a season studying the older Paleozoics in the Baltic part of Russia and their report so pleased the Czar, Nicholas the First, that he invited them to return in 1841 for a time to make a systematic study of the regional geology of European Russia. The published results on this work, appearing jointly by Murchison, De Verneuil, and a Russian-born German Von Keyserling, represent a monument of achievment. An area one-half the size of the United States was covered, in a reasonable amount of detail, within one field season. One of their results was the discovery of a series of strata lying between the Carboniferous and Triassic, which they believed to be better developed in the province of Perm than elsewhere, although equivalent strata were previously well known in Germany and England. These strata were called Permian by Murchison, the term being applied to only a part (Tatarian and Kazanian and in part, the Kungurian) of what is now classed as Permian by the Russians. Subsequent work has shown that Murchison's Permian contained only sparse fossils faunas of an abnormal brackish and fresh water facies. All that is now called lower Permian in European Russia--formations exceedingly rich in marine fossils--Murchison then included in the Carboniferous.

As time went on the Russian geologists gradually came to see the significance of the fossils in the beds that lay under Murchison's Permian yet overlying their unmistakable Carboniferous. Since these intermediate beds contained transitional faunas they were comprehended under the term Permo-Carboniferous, and were named Artinskian ~~and Kungurian.~~ The hybrid term Permo-Carboniferous was never widely popular as a separate system and these rocks finally came to be appended to the Permian , under some protest, as lower Permian.

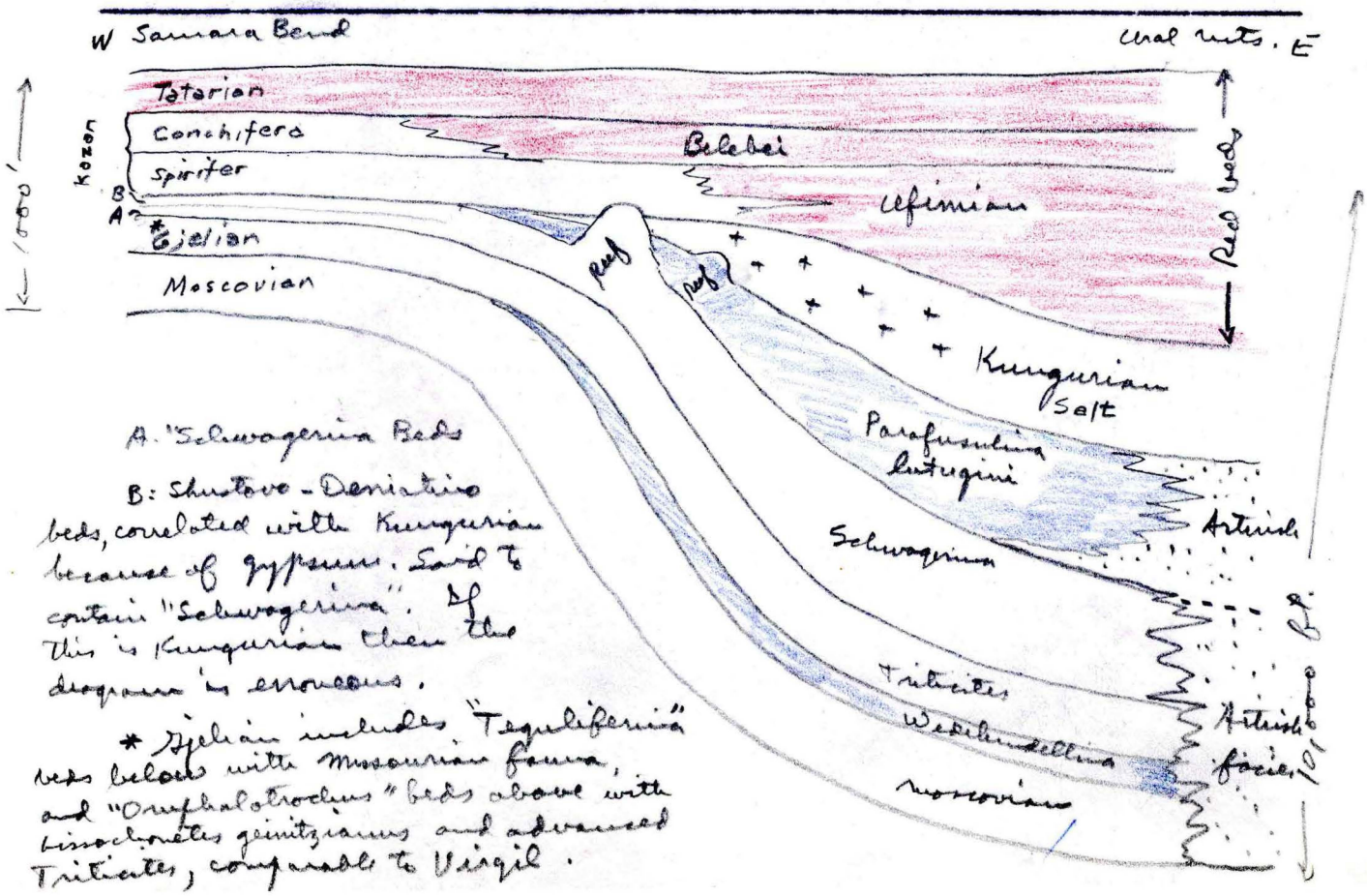
Immediately below the Artinskian beds and equivalents in many parts of the world occur strata characterized by the occurrence, in a narrow zone, of the giant foraminifer Schwagerina. The

Schwagerina fauna, which is a large and distinctive fauna, marks an easily recognized datum in almost every important sequence of late Paleozoic marine rocks in the world. Furthermore on several continents the Schwagerina beds rest with great hiatus on the truncated edges of older sediments, much of the upper Pennsylvanian being generally absent.

Most American students of the Permian system, following Schuchert's lead, argue that the Schwagerina beds rightfully belong in the Permian system, whereas many Europeans prefer either the original classification of Murchison, or an expanded one in which the Artinskian beds are placed at the base of the system. Our problem at the congress then was two-fold; first, to examine the Russian section for a possible recognition of major planes of stratigraphic partition suitable for a systemic boundary; and second, to try to arrive at general agreement regarding the ~~future~~ boundaries of the Permian system.

First, let us examine the new geologic map of Russia. Rocks of Permian age outcrop widely in the great undisturbed area known as the Russian Platform. These rocks are bounded on the east by a long chain of low mountains having Appalachian structure, the Urals. The mountains, like the Appalachian system, are overthrust toward the west, and occupy the site of a Paleozoic geosyncline. As might be anticipated the Permian rocks thicken markedly from west to east, toward the Urals, and become progressively more clastic as the old source of sediments is approached.

Let us refer to the diagram (fig. 1).



The diagram indicates the general situation in the Pennsylvanian and Permian rocks in an east-west section across the Russian Platform. The Uralian geosyncline, is shown restored in its original unfolded condition.

The original Permian of Murchison (Kazanian and Tatarian) has been considerably expanded. Tchernycheff, and Karpinsky, two world renowned pioneers in Russian geology showed that the faunas of the Artinskian beds indicated a much younger age than any Carboniferous of Europe, therefore the term Permo-Carboniferous was coined for the Artinskian division. In 1917 the following classification of the Permian was given official recognition by the Russian geological survey:

	Tatarian
Upper Permian	
	Kazanian
	Kungurian
Lower Permian	
	Artinskian

No special attention was given to unconformities in this definition of the Permian, at either top or bottom, or between subdivisions.

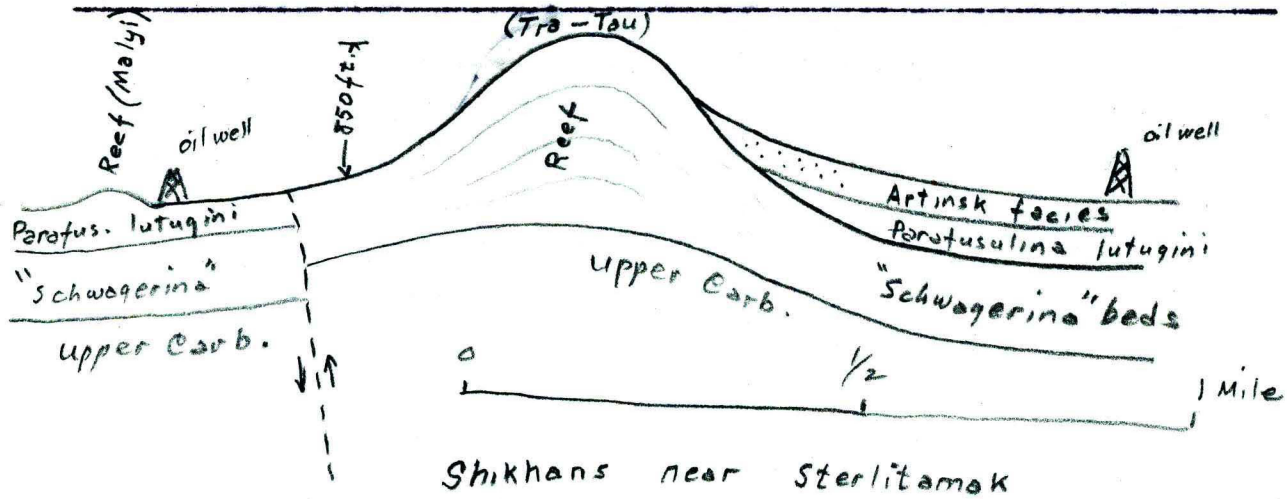
Although the Russians have almost wholly ignored possible unconformities between parallel strata they have recognized one particularly conspicuous overlap at the base of the Kazanian, where these strata come to rest on progressively older strata in a direction away from the Ural Mts.

In the past four or five years faunal studies along the west slope of the Urals have revealed the same faunal sequences that occur in the American Pennsylvanian and Permian, and many faunal breaks occur at the same relative places that they are found in this country. Because of this striking facts, which even in the preliminary faunal studies permits a rather detailed intercontinental correlation, many of the foreign geologists were won over to the American view that the base of the Permian may logically, and for the sake of utility, be drawn at the base of the Schwagerina beds. Although the Russians have not been able to find an unconformity at this horizon there is a marked change in the fusulinid faunas and at least one able student of the ammonites has demonstrated a marked faunal break in the cephalopods at this horizon.

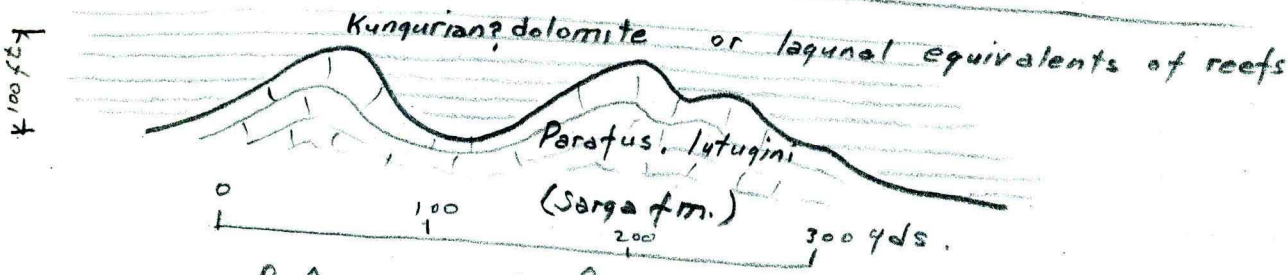
The growth of the Ural mountains, beginning first at the close of Mississippian time and continuing with interruptions into the early Triassic has left a characteristic record in the sediments. As the mountains rose along the eastern edge of the geosyncline their simultaneous erosion produced a series of clastic formations occupying a relatively narrow belt adjoining the old chain of mountains. Some of these beds of clastics are marine and others

are fluviatile. All interfinger with the wholly marine, finer sediments to the west. A lot of confusion has resulted in the fact that the typical Artinksian formation belongs to this clastic facies, and only recently was it learned that the clastic beds belong to more than a single epoch of geologic time. Artinskian equivalents in various parts of Russia are now identified by certain distinctive fusulinids (Parafusulina lutugini fauna).
(formerly classed as Pseudofusulina Lutugini)

Two features of more than ordinary interest in these Permian rocks are the (1) great limestone reefs of the lower Permian, and (2) amazingly vast salt deposits of the Kungurian beds.



Shikhans near Sterlitamak



Reefs on R. R. between Kishert and Chikaly Sidings

Many of us had hoped that the pooling of all the available evidence at our conference would result in a general agreement regarding the boundaries of the Permian system. Many converts were made to the Amerieaan viewpoint, but there were several geologists, some quite distinguished, who prefered , at least for the time to turn to other classifications. Proabably the greater number of geologists, including many of the Russians now look upon the base of the Schwagerina beds throughout the world as the lower limit of the Permian system. The next most favored classification would regard the base of the Artinskian as the logical lower limit of the Permian.

It was strikingly obvious to us from observation and from various papers on important Permian sequeces in different parts of the world that without question our great section of fossiliferous rocks in western Texas is the finest section of Permian rocks in the world, and one of the main achievments of the Permian conference has been to secure general recognition of that fact. Henceforth the Texas section will be turned to as a more important standard section than the Russian one or any other.

Of interest is the following recommendation drawn up by a select committee drawn from the participants of the Permian conference:

1. Despite a great amount of knowledge already amassed the systemic boundary between the Pennsylvanian and Permian is determined according to different criteria by separate scientists, chiefly due to insufficient communications.between geologists working in different continents.
2. It is suggested that these difficulties may be overcome by:
    a. An extension of refined studies over whole faunas and floras, only parts of which are now adequately known.
    b. A re-examination of the role of facies in faunas and floras.
    c. Further analysis of the true stratigraphic meaning of guide fossils now most widely employed in the Permian, i. e., fusulines, corals, bryozoa, ammonites, and brachiopods.
    d. Special attention to stratigraphic breaks which heretofore may have been overlooked in areas of flatlying rocks.
    e. Frequent summaries on work to date in each country, to be published in major journals.